SUMMARY ON EIA/EMP OF BALGI UNDERGROUND PROJECT (0.90Mty) FOR PUBLIC HEARING

I. PROJECT DESCRIPTION

A. General:

Balgi underground Projects *is an existing mine and* situated in Korba area, South Eastern Coalfields Limited. Its Tahsil is Katghora and district Korba in Chhattisgarh State.

The project report for Balgi UGP was formulated and approved by the competent authority on 16/09/1983 for an approved capacity of 0.6 Million Tonnes of coal per annum. The project started coal production from sep. 1984, when there was no pre-requisite for environmental clearance. However, the project obtained consent under Air (Prevention and Control of Pollution) Act 1974 and under Water (Prevention and Control of Pollution) Act 1977 for a production capacity of 0.312 Million Tonnes of coal per annum from the MP Pollution Control Board.

The Project exceeded the consented capacity (0.312 MTY) of coal production in the year 1997-98 and was asked to apply for fresh consent to establish. However, in the subsequent years the coal production drastically lowered because of some techno-economical reasons and the project was even considered for premature closure. Presently, the mining is being continued with coal production as 0.412375Mty (2008-09).

Lately, as per the advice of Chhattisgarh Environment Conservation Board and as per EIA Notification 1994, the EIA for a capacity of 0.6 Million tonnes of coal per annum is formulated for environmental clearance. The summery of the EIA in the form of Public Hearing Document was submitted to CECB Raipur to have No Objection Certificate, and that is already sought there from on 13/02/2006.

B. Location:

This project located in Korba Area of SECL in Korba district of Chattisgarh State. The block is bounded by latitudes from22^{o}21’13”N to 22^{o}22’51” N and longitudes from 82^{o}37’00”E to 82^{o}40’06” E as per the Survey of India Toposheet No. 64 J/11. The coal is being exploited by underground mining and the mine boundary has already been demarcated.

C. Communication:

The project is well connected by both road and railway. It is 4.5Km from Bilaspur-Korba Road. However, approach road to the project is from the nearest Gevra Road railway station which is 6Km from the project. Korba town is 16 Km south east of the project.

D. Project Profile:

The total mining area under Balgi UGP is about **1026Ha**. for a production of 0.90Mty(peak capacity). Most of the area in the project is below agricultural land.
Only seam G-III & G-I has been considered for mining from the reorganisation project. The average grade of the coal is B & C.The balance mineable reserves considered in this report is **9.12 Mty** as on 31.03.08. The balance life of the mine is **07** years, considering only 40% of extraction due to using limited span method.Coal would be loaded by SDL and transported by LDCC - Gate Belt – Main Belt to surface bunker.

The project has provisions for pumping & drainage of mine water, coal handling, workshop, power supply, township with water supply & sewerage system and environment protection management including subsidence management.

E. TOPOGRAPHY, DRAINAGE

The project falls under Ghordewa geological block. The project has slightly undulating topography with elevation ranging between 270m to 284m above MSL. Ahiran River which has made a number of "U" turns before joining the Hasdeo River. Kholar Nala also joins Ahiran River in the middle of the project area. The general slope of the area is from NW and SE. The Ahiran River is flowing from NW to SE direction and finally discharges into the Hasdeo River.

F. CLIMATE:

The area has tropical climate with a Maximum temperature of 44.7^0C and minimum temperature of 5^0C. The annual average rainfall is recorded as 1490.4mm.

G. MINE BOUNDARIES

The project is bounded by the following;

Northern Boundary : Incrop of G-I coal seam.
Southern Boundary : Fault F3 – F_3.
Eastern Boundary : Western bank of Hasdeo River.
Western Boundary : Wharf wall siding of the Surakachhar u/g mine.

H. Mine Entries: The details of mine entries are shown below.

Sl. No	Incline/ Shaft	X-Section/ Diameter	Length/ Depth	Gradient	Purpose
1	No. 1	4.8x2.4m^2	80m	1in 4.5	Coal transporting & Intake for Seam GIII (Sector-I),and Seam GI&GII (Sector-II)
2	No. 2	4.8x2.4m^2	80m	1in 4.5	Material transporting,

Sl. No	Incline/ Shaft	X-Section/ Diameter	Length/ Depth	Gradient	Purpose
					Traveling roadway & Intake for Seam GIII (Sector-I),and Seam GI&GII (Sector-II)
3	No. 3	4.8x2.4m^2	80m	1in 4.5	Coal transporting & Intake for Seam GI & GII (Sector-I)
4	No. 4	4.8x2.4m^2	80m	1in 4.5	Material transporting, Traveling roadway & Intake for Seam GI & GII (Sector-I)
5	Air Shafts	5.0m	22m & 59m	Vertical	Main Return airway

I. METHOD OF MINING:

Conventional Bord and pillar system of mining has been done. Pillar size kept 30m x 30m and 25 x 25 and gallery width 4.2 m. Depillaring of G-I seam shall be taken up after the approval from DGMS.

G-I seam is being worked by conventional bord and pillar method using SDL for loading on LDCC. Pillar development completed in G-III seam and to be completed in G-I shortly. Depillaring by caving (limited span method) in G-I seam shall be done after permission from DGMS.

J. Reserve & Quality of Coal

Grade of coal	: Grade B-C
Reserve	: 17.56 Mtes
Reserve exhausted till 31.03.2008	: 8.44 Mtes
Balance reserves (as on 01.04.2008)	: 9.12 Mtes
Target production (Normative)	: 0.60 Mtes
Target production (peak)	: 0.90 Mtes
Net Extractable (Due to limited span method 40% can be expected)	: 3.648 Mtes
Balance life of the mine	: 7 yrs.

II. DESCRIPTION OF THE ENVIRONMENT

SOCIO-ECONOMIC ASPECTS

The socio-economic profile within the study area of the project is based on 2001-census data. The land use pattern, basic and civic amenities details are also based on available 2001- census data collected.

A study of socio-economic profile in buffer zone including core zone (based on available census data) reveals that the total population of the area consists of about 214135 persons, of which 110373 (51.54%)are male and 103762 (48.46%)are female. Scheduled castes account for 27587 (12.88%) of total population and Scheduled tribes 57599 (26.90%), whereas 127071 (59.35%)

population is literate. The data reveals that 53698 (25.07%) of the population are main workers and 18042 (8.43%) are marginal workers, the rest 142395 (66.50%)are non-workers.

Land requirement

The present land use pattern of the project (Core Zone) involves a total mining leasehold area of 1026 Ha. The breakup of land involved is given below.

Sl. No.	Type of Land	Area in Ha.
1	Forest	Nil
2	Govt.	171.801
3	Tenancy	854.199
Total		**1026.000**

The buffer zone includes the aforesaid core zone and area situated within 10 kms. radius from the periphery of the core zone. The land use pattern of the study area (Buffer Zone) is given below.

Sl.No.	Land use	Area (In ha.)	% of total area
1	Forest land	12345	34.95
2	Irrigated agricultural land	720	2.04
3	Unirrigated agricultural land	12148	34.40
4	Cultivable Waste land	4136	11.70
5	Area not available for cultivation	5975	16.91
TOTAL		35324	100

The data reveals that, out of total study area of 35324Ha, there is around 34.95% forest land, 36.44% is agricultural land, 11.70% is cultivable waste land and 16.91% is not available for cultivation.

HYDROGEOLOGY

The historical groundwater levels monitored, at Banki and Korba reveals that the pre-monsoon water levels vary from 6.55m (1999) to 14.06m (2006) with an average of 10.30 m. The post monsoon water levels in the area vary from 2.87m (2003) to 11.98m (2006) with an average of 7.42m. Thus, the average water level fluctuation in the area is 2.88 m. Deep water levels and high fluctuations as noticed at Korba is due to large withdrawal and location in a recharge area.

Water level trends:The pre-monsoon water level trends, at Korba maintain a normal trend. Whereas, at Banki with a slight declining trend. The post-monsoon water levels, both at Korba and Banki show a decreasing trend. The decrease in post-monsoon levels may be attributed to the increase in local population and declining groundwater recharge rate due to continuous decline of rainfall.

Groundwater Stage of Development: Except for coal mining, no major industrial development activity is located in the area. As per CGWB, NCC Region Raipur, the total annual replenishable groundwater resource in the Khatgora Development Block, Bilaspur district (Where Balgi UG Project is located) was assessed as 89.0 M.Cum. It was also reported that the ground water development in the block is as 24.95 % and falls within category "**Safe**". As such the entire Korba is covered under the category "Safe".

ENVIRONMENTAL QUALITY

A. AMBIENT AIR QUALITY

SPM values are ranging from a minimum of 167 $\mu g/m^3$ at BA_4 and a maximum of 525 $\mu g/m^3$ at BA_2.RPM values are ranging from 67 $\mu g/m^3$ to 274 $\mu g/m^3$. SO_2 and NO_x values are ranging from 14 to 27$\mu g/m^3$. While comparing with CPCB norms for Residential and rural area environment, all SPM, RPM, SO_2 and NO_x values are well within the limits.

B. WATER QUALITY

Water samples were collected and analysed from different locations representing surface sources and adjoining mine discharge. The analytical result shows that the physical and chemical parameters are within prescribed limits of IS: 10500 for drinking water. The effluent quality of the UG mines is regularly monitored and their quality are well within the limit prescribed by MOEF/CPCB standard.

C. NOISE LEVEL

$L_{eq.}$ Noise levels at Day-time and Night-time are ranging from 48.0 - 74.6 db(A) and 38.2 – 64.3 db(A) respectively in the study area. While comparing with IS: 4954-1868 norms for acceptable outdoor noise levels in residential area, these values are found to be within the limits.

D. Soil Quality

The summarized result of soil testing for post monsoon season is given in the following Table**.**

Highlights of Analytical Results of Soil Testing

Sl. No.	Parameters	Unit	Forest land	Barren Land	Agricultural Land, Saraipali Village
1.00	Grain size distribution				
1.01	Gravel	%	20-24	29-31	16-19
1.02	Sand	%	19-26	21-24	20-22
1.03	Silt & Clay	%	49-61	46-49	60-64
2.00	pH		7.26-7.36	7.51-7.59	7.38-7.42
3.00	Bulk density	g/cc	1.09-1.19	0.81-0.88	1.14-1.18
4.00	Electrical conductivity	m-mhos/ cm at 20^0 C	0.22-0.28	0.42-0.51	0.28-0.31

Sl. No.	Parameters	Unit	Forest land	Barren Land	Agricultural Land, Saraipali Village
5.00	Nitrogen (Kg/ha)	*Kg/ha*	213-231	152-173	216-244
6.00	Phosphorus (kg/ha)	*Kg/ha*	18.3-22.4	9.0-9.80	31.2-34.1
7.00	Potassium (kg/ha)	*Kg/ha*	82-95	68 -78	128-142
8.00	Organic Carbon	%	.90-1.30	0.50-0.61	1.12-1.18
9.00	Textural class		Clay loam	Clay loam	Clay loam

The soil quality of the project area would support vegetation after suitable reclamation / modification.

E. COMPOSITION OF FLORA AND FAUNA.

No forest land involved in the mine take area. But in the study area there exists 34.95% of forest land. For assessment of Flora & fauna in core zone & buffer zone of Balgi UGP, the data of the nearby existing mine has been taken for reference.

Conservation Plan for Flora

From the present study, it appears that there is no Endemic or Endangered plant species in the core zone and the buffer zone were present. Hence it is considered that there is no specific conservation plan for the particular species community is required. However, the floral conservation plan is mainly focused on the regeneration of a good forest cover to the scattered small patches of baren lands present at the project sites. However the project zone was already covered by a good diversity of plant species that compraised of herbs, shrubs and tree species. The small plants such as herbs, medicinal herbs and commonly available weeds were found to be good in number and these plants were having the potential of rapid regeneration and spread. Due to self regenerative capacity of these plants, the probagation strategy is not required. Except for a few plant species, all the plant species found in this region were found to be commonly available flora of all the regions. To improve the vegetation cover, it is suggested that the saplings of diverse tree species such as *Acacia catechu*, *Anogeissus latifolia*, *Butea monosperma*, *Diospyros melanoxylon*, *Bassia latifolia*, *Lagerstroemia parviflora*, *Lannea coromandelica*, *Shorea robusta*, *Terminalia bellirica*, *Boswellia serrata*, *Dendrocalamus strictus*, *Cassia siamea, Eucalyptus globules, Acacia auriculiformis, Albicia lebok, Azadirachta indica, Delbergia sisoo, Gmellina arborea, Phyllanthus emblica, Pongamea glabora* and *Tectona grandis* could be planted to fill the gaps at aregular intervels. The natural forests should be strictly prevented from human interferences.

Conservation Plan for Fauna

In the core zone, no wild animals reported in the Shedule I of the Wild life protection Act 1972 were present where as in the buffer zone, Tortoises, namely *Geoclemys hamiltoni* and *Kachuga dhongoka* mentioned in the above schedule were noticed. The buffer zone is not directly disturbed by the mining activities but

affected by anthropogenic activities of the local people. These animals are being hunted for the purpose of food by some community of local people and its medicinal importance. In order to conserve those animals, this should be strictly prohibited.

Indian mongoose and Grey langur are the two wild animals that were mentioned in the Shedule II of the Wild life protection Act (1972), which are also needed to pay special attention for the protection. Gray langurs feed mainly on leaves, fruit, buds and flowers moct of the plant species. These animals also supplement their diet with insects (up to 25%), tree bark and gum. Developing a forest with diverse population of fruit bearing trees such as *Artocarpus hirsute, Bassia latifolia*, *Diospyros melanoxylon*, *Ficus bengalensis, Ficus religiosa, Manigifera indica, Phyllanthus emblica, Psidium guajava, Phoenix sylvestris, Syzigium jombolanum* and *Terminalia bellarica* in the corezone, where there are no mining activities, could be a concervation measure for these animals. Indian mongoose were found in buffer zone, the population of which is stabilized by the local fauna.

Jackel and fox are some of the common inhabitants of the area which live in burrows of this area. Only thing required for the protection is to provide places to escape from predators. It is suggested that the aforestation area provides sufficient hideoutes to those animals which helps to escape from the predators since these two species are generally not hunted by the local people.

Since Indian pythons are under threatened/endangered condition, a conservation measure should essentially be taken. These animals live in a wide range of habitats including river valleys, woodlands, forests, grasslands, swamps, marshes and rocky foothills. Except swamps and marshes, all the above said habitats can be seen in and around the core zone, which could be protected to ensure the protection of these animals. Arrival of diverse fauna by means of aforestation in the barren lands could act as a direct conservation measure. These snakes have often been killed for their fine skin and the meat is eaten by locals as the fat is purported to have medicinal value. Very strict prohibition of these activities will enrich Pythons in these regions.

III. ANTICIPATED ENVIRONMENTAL IMPACT & MITIGATION MEASURES

SOCIO ECONOMIC IMPACT

The project will have on the whole a positive impact on socio-economic profile of the area due to increase in employment opportunities, trade and business, community development, improved communication link etc.

IMPACT ON LAND USE

Important surface features within core zone will not be affected since, no depillaring operation will be undertaken, and developed pillars will be left standing after isolating them. Subsided land and cracks would be filled with soil to maintain the original topography of the area.

IMPACT ON ENVIRONMENT

Air environment: - Air quality in respect of SPM, RPM, SO2 & NOx within and around the project area are found to be within the prescribed limits of MOEF. These parameters may increase their values if proper mitigative measures are not taken care of may cause pulmonary infections like neumoconiosis , silicosis etc, irritation of eyes , poor visibility etc.

Water environment : - Untreated mine water , Workshop & Domestic effluent water could cause pollution to surface & ground water courses with excess of Suspended solids , Oil & Grease , COD and BOD, Dissolved solids , Sulphates , Chlorides , Bacterial contamination leading to serious problems to aquatic life & human health hazard.

Lowering of ground water table are the likely impacts on surface & ground water courses leading to water scarcity in the area.

Noise environment: - The impact of continued exposure of higher noise levels on humans and fauna are as follows:

* 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.
* Hypertension and higher blood cholesterol.

FLORA & FAUNA: - There will not be any adverse effect on the existing habitat due to underground mining operations at greater depth. However, some indirect impact due to developmental activity and population growth is expected which will be controlled by adopting strict protective measures by area authorities.

HYDROGEOLOGICAL ASPECT: - As mentioned earlier, because of the low permeability of aquifers, the impact of mining on local water regime will be marginal and the radius of influence will be limited to a small distance. So also, due to stratification, the individual permeable beds develop individual drawdown cones and the impact is usually limited to few hundred meters.

IV ENVIRONMENTAL MONITORING PROGRAM

The implementation and monitoring of pollution control measures and for overall environmental management, environmental cell at the area and Corporate level will take all necessary care. It will look after the following aspects of environmental management.

* Generation of environmental data bank.
* Evolving micro environmental management plan for the project in collaboration with other agencies and consultants.
* Monitoring project implementation along with environmental control measures.
* Co-ordinate with other project activities to ensure timely

implementation of the project.

* Co-ordination with Ministry of Environment & Forest, Central/State Pollution Control Board for prevention and control of water and air pollution.

V ADDITIONAL STUDIES

PUBLIC CONSULTATION

To ascertain the concern of local affected and others who have a plausible stake in environmental impacts of the project / activity public consultation will be done at project site or close proximity for local affected persons.

RISK ASSESSMENT

Keeping in view the three basic principles i.e. prevention, preparedness (both pro-active and reactive) and mitigation of effect through rescue, recovery, relief and rehabilitation; a comprehensive blue print of risk assessment and management plan has already been prepared for Churcha UGP incorporating the following:

* Identification and assessment of risks
* Recommendation of measures to prevent damage to life and property against such risks.

VI PROJECT BENEFITS

IMPROVEMENT IN THE SOCIAL INTRASTRUCTURES:

a) Literacy Drive:

An action plan for achieving 100% literacy among workers in the SECL, was launched in the year 1992. Under the same scheme, workers of Churcha RO UG project will be covered to achieve 100% literacy level.

b) Socio-Economic Development: Infrastructure Development in nearby villages.

c) Community Development works in nearby villages.

d) Vocational Training Programme for the village provided by Balgi UG project.

EMPLOYMENT POTENTIAL:-

a) In the project

There is already 1017 manpower directly employed in different categories.

b) Secondary Employment opportunities

There will be spontaneous economic stimulus in the area with the commencement of the 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.

VII ENVIRONMENTAL MANAGEMENT PLAN

The surface feature such as villages, river, canal, seasonal nallas PWD roads. Kutcha village/forest road, HT line and telephone line and Villages existing over the mining area are unlikely to be affected by subsidence because panels proposed to be extracted below them are at higher depth.

RECLAMATION

Subsided land and cracks would be filled with soil to maintain the original topography of the area.

AIR QUALITY CONTROL MEASURES

Considering anticipated effect on air quality due to mining operations, following control measures have been envisaged for the project.

- Mist sprinkling arrangements would be installed in surface coal bunkers for dust suppression.
- Project envisages road sale of coal and all coal transport is through tarpoulin covered trucks.
- Black topping of approach roads already completed.
- Green belt around colony, industrial complex and other service centre.
- Sapling of fruit bearing trees, medicinal trees, timber value trees and ornamental trees have been planted.

WATER QUALITY CONTROL MEASURES

The analytical result shows that the physical and chemical parameters are within prescribed limits of IS: 10500 for drinking water. The effluent quality of the UG mines is regularly monitored and their quality is well within the limit prescribed by MOEF/CPCB standard.

For mine water treatment a sedimentation tank of 480 KL capacity is already exists. For domestic water supply in colony and nearby villages water filter plant of 4.5M.Cum capacity have already been installed. Almost 86% of mine discharge is being utilized for domestic consumption.

Septic tanks and soak pits are provided in each residential accommodation

Monitoring of surface water quality & ground water levels will be done throughout life of the project.

CONTROL MEASURE FOR NOISE LEVEL

Green belt development and other control measures are recommended to keep the noise levels within permissible limits.
To minimise anticipated noise pollution, following control measures are envisaged.

- Provision of earplugs, earmuffs as and when required.
- Routine maintenance of equipment.

- Location of colony at sufficient distance from mine.
- Green belt around colony and industrial complex.

FLORA & FAUNA

It is presumed that there will not be any adverse effect on the existing habitat due to underground mining operations at greater depth. However, some indirect impact due to developmental activity and population growth is expected which will be controlled by adopting strict protective measures by area authorities.

ENVIRONMENTAL ECONOMICS

Statement showing the Cost on EMP (In Rs. Lakh)

Sl. No.	Particulars	Existing		Additional	
		Capital	Revenue	Capital	Revenue
A	**ENV. cost**				
1	**Pollution control**			-	-
(i)	Mine & industrial area	13.19	1.00	-	1.00
(ii)	Township	171.69	5.50	-	5.50
2	**Pollution monitoring**				
(i)	EMP preparation	5.00	2.75	10.00	-
(ii)	Peizometer construction	-	-	5.00	-
(iii)	Flora & fauna study	-	-	-	0.40
(iv)	Monitoring	-	10.00	-	10.00
(v)	Environment Audit	-	0.60	-	0.60
3	**Green belt**	60.53	8.75	-	2.00
4	**Subsidence management**	2.00		-	2.50
5	**Final mine closure**	-	-	19.11	1.00
Sub total of (A)		**252.41**	**28.50**	**34.11**	**23.00**
B	**Social cost**			-	-
1	**Occupational health**	-	-	-	-
2	**Community development work in villages / CSR Cost**	17.63	7.50	-	45.00*
Sub Total (B)		**17.63**	**7.50**	**-**	**45.00**
Total cost(A+B)		**270.04**	**36.00**	**34.11**	**68.00**

*** CSR Cost @ Rs. 5/= per tonne of peak production/annum (0.9Mty)**

MINE CLOSURE PLANNING

Although, the mining activities may last a few decades, but they are liable to leave a long lasting impacts on the landscape, ecology and on local inhabitants. If not properly managed, effects can be detrimental for general welfare of most of the stake holders. Thus, any mining venture must have adequate closure plan, aimed at rehabilitation of disturbed area, which should be acceptable to local community as well as regulatory authority. Mine closure cost will be around **Rs. 19.1095 Lakhs**

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