PRE-FEASIBILITY REPORT

Opencast Mine & Pit Head Coal Washery Project

(Expansion from 10 Mty to 15 Mty)

at

Parsa East and Kanta Basan Coal Block, Tehsil: Udaipur,
District: Surguja, Chhattisgarh

Rajasthan Rajya Vidyut Utpadan Nigam Limited (RVUNL)

JANUARY, 2014

1. EXECUTIVE SUMMARY

Sr.No	Description	10 Mty EC granted by MoEF vide letter No. J-11015/03/2008/IA.II(M) Dated: 21st December 2011	15 Mty
1.	Name of the Project	Parsa East and Kanta Basan Opencast Project	Parsa East and Kanta Basan Opencast Project
2.	Total land requirement for the project	2711.034 ha	2711.034 ha
3.	Mineable reserves	452.46 MT	452.46 MT
4.	Total overburden generation	2334.62 million m3	2368.72 million m3
5.	Quantity of external dump	64.40 million m3	52.07 million m3
6.	Quantity of internal dump	2270.22 million m3	2316.65 million m3
7.	Average stripping ratio (coal:overburden)	1: 5.16	1: 5.24
8.	Method of mining	Overburden by shovel-dumper and Coal by surface miner	Overburden by shovel dumper and Coal by surface miner
9.	Ultimate depth	225 m	225 m
10.	Maximum production capacity	10 million tonnes from 3rd year	15 million tonnes from 5th year
11.	Expected life of mine	50 years including built up period & reducing trend of coal production in start and finishing years of the mine.	34 years including built up period & reducing trend of coal production in start and finishing years of the mine.
12.	Working hours	3 shift per day of 8hrs in 330 days of operation in a year	3 shift per day of 8hrs in 330 days of operation in a year
13.	Quarry floor area	2150.07 –ha	2150.07 -ha
14.	Quarry surface area	2365.95 –ha	2365.95 -ha
15.	Number of seams	3	3

Sr.No	Description	10 Mty EC granted by MoEF vide letter No. J-11015/03/2008/IA.II(M) Dated: 21st December 2011	15 Mty
16.	Average seam gradient	4° (1 in 20)	4° (1 in 20)
17.	Strike length-along floor-(maximum)	6.04 Km	6.04 Km
18.	Strike length-along floor (minimum)	5.12 Km	5.12 Km
19.	Strike length-along surface(maximum)	6.12 Km	6.12 Km
20.	Strike length-along surface(minimum)	5.50 Km	5.50 Km
21.	Maximum bench height	OB removal with 15 cum Hyd. Shovel - 10m Bench Height OB removal with 3 cum backhoe Shovel - 6m Bench Height	OB removal with 15 cum Hyd. Shovel - 10m Bench Height OB removal with 3 cum backhoe Shovel - 6m Bench Height
22.	Bench width	15 m3 Hyd. Shovel - 40m for 3 cum backhoe - 6 m	15 m3 Hyd. Shovel - 40m for 3 cum backhoe - 6 m
23.	Power requirement & source	15-20 MVA at 33 kV, Ambikapur Substation of CSEB	15-20 MVA at 33 kV, Ambikapur Substation of CSEB
24.	Manpower requirement	1707 (Upto target achieving year)	1805 (Upto target achieving year)
25.	Colony area	31.44 Ha	28.44 Ha

2. INTRODUCTION OF THE PROJECT/ BACKGROUND INFORMATION

(i) Identification of project and project proponent.

The Parsa East and Kant Basan Coal block in the state of Chhattisgarh has been allotted to RAJASTHAN RAJYA VIDYUT UTPADAN NIGAM LTD (RVUNL) vide F. No. 13016/74/2006-CA-1 dated 19th June, 2007 (Annexure – I) to meet the coal

requirement of their two thermal power projects.

(ii) **Brief description of nature of the project.**

The Hasdo-Arand coalfield covers a major part of Son-Mahanadi master Gondwana Basin and is located at the upper reaches of Mahanadi valley.

The coal measures of Hasdo-Arand coalfield cover an area of approximately 1200 sq.km. having a length of about 70 km. and a maximum width of about 25 km, stretching in an east-west direction. It is bounded by Latitude 22°37'00" and 22°55'00"N and Longitude 82°20'00" and 83°06'00"E. Southern margin of the basin is demarcated by a basin-border fault. Its extension is also observed in the southwestern part of the basin.

All reserves assessed are in the Proved category. Total gross geological reserves estimated for the block stand at 516.40 million tonnes. The entire reserves are of quarriable nature.

The total mineable reserves are estimated as 452.46 Mt up to the said coal block boundary. The corresponding OBR has been envisaged as 2368.72 Mcum at an average stripping ratio of 5.24 cum/t.

(iii) **Need for the project**

Currently, total power available to the Rajasthan State is 9862 MW as on 01.01.2014. This includes the installed capacity of RAJASTHAN RAJYA VIDYUT UTPADAN NIGAM LTD. (RVUNL) power stations. RVUNL owns and operates the following Thermal/Gas/Hydel Power Stations in the State Sector:

S. No.	Power Stations	Installed capacity
1.	Suratgarh TPS	1500.00 MW
2.	Kota TPS	1240.00 MW
3.	Ramgarh Gas Power Plant	110.50 MW

4.	Chhabra Thermal Power Project U # 1 & 2	500.00 MW
5.	Mahi Hydel	140.00 MW
6.	MMH Schemes (10)	23.85 MW
7.	Giral Lignite TPSU # 1 & 2	250.00 MW
8.	Dholpur CCPP	330.00 MW
	Total:	4094.35 MW

Rajasthan Rajya Vidyut Utpadan Nigam is also managing and operating the Hydel Power stations having installed capacity as under:-

S. No.	Power Stations	Installed capacity
1.	Rana Pratap Sagar Hydel PS (4×43 MW)	172.00 MW
2.	Jawahar Sagar Hydel PS (3×33 MW)	99.00 MW
	Total:	271.00 MW

Ongoing and Proposed Power Projects of Rajasthan Rajya Vidhut Utpadan Nigam Limited in the state by the end of FY: 2013-14 are -

S. No.	Name of Project	Capacity
1.	Kalisindh Power Project U# 1 & 2	2 × 600 MW
2.	Chhabra Thermal Power Project U# 3 & 4	2 × 250 MW
3.	Ramgarh GTPP stage III	160 MW
	Total	1860.00 MW

As per CEA letter dated 23.01.13, anticipated peak demand of Rajasthan State at the end of 12th Plan (2016-17) is 13,886 MW, for which an installed capacity of 18,000 MW is expected to be required by Rajasthan State. The additional capacity required by Rajasthan during 12th Plan is about 10,000 MW.

To bridge gap, the following new thermal power projects have been approved by the State Government to be developed by RVUNL. The activities for establishing these power stations have been initiated by RVUNL.

S. No.	Name of Project	Capacity
1.	Chhabra Unit-5 & 6	2×660 MW
2.	Suratgarh Unit-7 & 8	2×660 MW
3.	Dholpur Gas TPP Stage-II	3×110 MW
4.	Kota Gas TPP	3×110 MW
5.	Chhabra Gas TPP	3×110 MW
6.	Suratgarh TPP Unit – 9 & 10	2×660 MW
7.	Kalisindh TPP Unit- 3 & 4	2×660 MW
8.	Ramgarh Gas TPP Stg-IV	160 MW
9.	Banswara TPP Unit – 1 & 2	2×660 MW
	Total	**7750 MW**

The Ministry of Coal (MoC), Govt of India was requested by RVUNL to allocate Coal blocks for the aforesaid projects for exclusive captive use in these power projects. Accordingly, the Parsa East and Kanta Basan coal block in the State of Chhatisgarh has been allotted to RVUNL vide F. No.- 13016/74/2006-CA-1 dated 19th June, 2007 to meet the coal requirement of their two thermal power projects namely, Chhabra phase II (500 MW) and Jhalawar (Kalisindh 2×660 MW).

Mining plan of Parsa East and Kanta Basan (10 Mtpa) has been approved by MoC vide letter no 13013/74/2006-CA-I dated 16th July, 2009.

The Standing Committee has observed that the block has the potential for producing about 15 Mtpa coal on account of simple geology and large reserves in the block. In the approval letter, MoC has directed RVUNL to come with a revised Mining Plan for a higher capacity as and when the demand for coal increases.

In response to the RVUNL's letter to MoC for assigning Parsa East and Kanta Basan coal block dated 29.12.11 for enhancement in mining capacity from 10 Mtpa to 15 Mtpa for Suratgarh units 7 & 8 and Chhabra unit 5 & 6 super critical power projects, the Ministry of Coal vide letter no. F.No 13016/74/2006-CAI dated 03.02.2012 has given 'In Principle'

approval allowing the use of coal from Parsa East and Kanta Basan coal block in the super critical power projects - Suratgarh units 7 & 8 and Chhabra unit 5 & 6 and also desired to furnish a revised Mining Plan 15 MTPA capacity.

RVUNL assigned job to 'Parsa Kente Collieries Limited (PKCL)' for preparation of the Mining Plan and Mine Closure Plan for Parsa East and Kanta Basan (15 Mtpa) as per the Geological Report. Parsa Kente Collieries Limited (PKCL) assigned this job to M/s. Adani Mining Pvt Limited. Mining Plan for Parsa East and Kanta Basan (15 Mtpa) has been approved by MoC vide letter no 13016/74/2006-CA-I dated 19th Nov, 2013.

Requirement of coal for above mentioned power plants is given in table below:

S No	Name of Project	Utilization of Coal Mtpa
1	Chhabra(Unit 3&4) and Kalisindh(Unit 1&2). Sub Critical Projects	7.0 Mtpa
2	Suratgarh (unit 7 & 8) and Chhabra (unit 5 & 6) super critical	8.0Mtpa
	Total	15 Mtpa

(iv) **Export Possibility.**

No coal will be exported.

(v) **Employment Generation (Direct and Indirect) due to the Project.**

About 1805 persons will get direct employment in various services upto target achieving year and about 3500 persons will get indirect employment.

3. PROJECT DESCRIPTION

(i) Type of project including interlinked and interdependent projects, if any.

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the coal requirement of their two thermal power projects namely, Chhabra phase II (500 MW) and Jhalawar (Kalisindh 2×660 MW).

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The Standing Committee has observed that the block has the potential for producing about 15 Mtpa coal on account of simple geology and large reserves in the block. In the approval letter, MoC has directed RVUNL to come with a revised Mining Plan for a higher capacity as and when the demand for coal increases.

In response to the RVUNL's letter to MoC for assigning Parsa East and Kanta Basan coal block dated 29.12.11 for enhancement in mining capacity from 10 Mtpa to 15 Mtpa for Suratgarh units 7 & 8 and Chhabra unit 5 & 6 super critical power projects, the Ministry of Coal vide letter no. F.No 13016/74/2006-CAI dated 03.02.2012 has given 'In Principle' approval allowing the use of coal from Parsa East and Kanta Basan coal block in the super critical power projects - Suratgarh units 7 & 8 and Chhabra unit 5 & 6 and also desired to furnish a revised Mining Plan 15 MTPA capacity.

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Requirement of coal for above mentioned power plants is given in table below:

S No	Name of Project	Utilization of Coal Mtpa
1	Chhabra(Unit 3&4) and Kalisindh(Unit 1&2). Sub Critical Projects	8.5 Mtpa
2	Suratgarh (unit 7 & 8) and Chhabra (unit 5 & 6) super critical	6.5 Mtpa
	Total	**15 Mtpa**

(ii) Location

The Parsa East & Kanta Basan coal block is located in the north central part of the Hasdo-Arand Coalfield in Surguja District of Chhattisgarh. This coalfield is one of the major coalfields of central India located in the upper reaches of Mahanadi

Valley Master Gondwana Basin and is situated in the northern part of Chhattisgarh. The coal measures of Hasdo-Arand coalfield cover an area of about 1200 sq.km having a length of about 70 km and a maximum width of about 25 km, stretching in an east-west direction. It is bounded by Latitude $22^0 37' 00''$ & $22^0 55' 00''$ N and Longitude $82^0 20' 00''$ & $83^0 06' 00''$ E. The coalfield lies partly in the eastern part of Korba District and extends into western part of Surguja District. Major part of the coalfield is still virgin with huge resources of power grade coal.

The Parsa East & Kanta Basan coal block is spread over an area of 27.67 sq. km. It is bounded by Latitude 22°47' 39" & 22°51' 12" N and Longitude 82° 46' 38" & 82° 50' 51" E. The block is covered under the Survey of India toposheet no. 64J/13 on RF 1: 50000.

The block is rectangular in shape and extends about 6.6 km along strike direction (NW-SE) and about 4.6 km along dip direction (SW). The Tehsil Headquarters at Udaipur is located 26 km northeast of the block on State Highway (SH)-2A connecting Bilaspur and Ambikapur.

The boundary of Parsa East -Kanta Basan coal block is given below:

North: About 100 to 1000m North of Incrop of Seam IV

South: An imaginary line connecting points at 50m, 140m, 170m & 100m southwest of BH No. PKC-164, 182, 163 & 178 respectively and joining the eastern and western boundaries.

East: An imaginary line connecting points at 60m, 170m, 190m, 380m 300m & 280m southeast of BH No. PKC-70, 74, 98, 81, 148 & 162 respectively and joining the northern and southern boundaries.

West: An imaginary line connecting points at 280m, 100m, 270m, 160m & 40m northwest of BH No. PKC-60, 55, 88, 134 &157 respectively and joining the northern and southern boundaries.

Location Map is shown in Annexure-II.

(iii) Details of alternate sites considered and the basis of selecting the proposed site, particularly the environmental considerations gone into should be highlighted.

No alternative site for this project could be envisaged due to site-specific location of deposition of coal deposit.

(iv) **Size or magnitude of operation.**

Mining Plan for Parsa East and Kanta Basan Coal Block has been prepared for a rated capacity of 15 Mty of power grade ROM Coal. This output is prima facie considered technically feasible because of its favourable geo-mining conditions like:

- Thickness of various seams,
- Their disposition,
- Comparatively long strike length
- Free from major geological disturbances
- Sufficient mineable coal reserves etc.

(v) **Project description with process details**

MINING OF COAL

The Parsa East and Kanta Basan Coal Block covers an area of 27.67 Sq km, which has been allotted to RVUNL for their captive coal mining purpose.

The detailed exploration in Parsa East and Kanta Basan coal block of Hasdo-Arand coalfield has established the existence of 3 persistent and potential coal seams viz Seam-IV, V and VI in ascending order. Besides, at least 1 to 2 thin and impersistent coal seams without any significant economic potential also occur below Seam-IV as revealed from a few boreholes drilled upto the Talcher Formation. All these seams occur within Barakar column.

Among all the seams present in the block, only three Seams viz IV, V and VI have attained workability in the block. Out of these 3 seams, Seam-IV is the most potential and has least number of in-seam dirt bands followed by Seam-VI and V in that order. All these 3 seams incrop within the block and have quarriable potentiality.

The block is characterized by highly undulating topography with several mounds as well as elevated and flat land. The elevation of the area above Mean Sea Level (MSL) ranges from 505m in the northwest and southeast to 569m in the northeast with higher elevation in the central, eastern, southern and southwestern parts. The elevation of the mounds generally ranges from 525m to 554m above MSL. The general slope of the land is towards NNW in the northern, central and western part of the block while the slope is towards south and southeast in the remaining part.

The area is incised by several mostly northerly and easterly flowing streamlets in the northern and western part of the block that join the Atem nala flowing from southeast to northwest almost along the entire length and breadth of the block. The Atem nala and these streams together control the drainage of the area in the northern and central parts of the area. The drainage in the southern and southeastern parts is controlled by several southerly and southeasterly flowing streams. Some of the streams deeply incise the ground where it encounters softer and friable litho units of Barakar Formation. Small ponds and dug wells are common in the area. These are utilized for irrigation and drinking water purpose.

The total area of the block is 27.67 Sq. Km. Detailed exploratory drilling in the entire area was completed by June 2009 and the Geological Report in August 2009.

Quantum of drilling in Parsa East and Kanta Basan block

Agency	Period	No. of Boreholes	Meterage
GSI	1980-85 1996-98	10 3	3229.35 671.85
Sub-Total		**13**	**3901.20**
AMPL	Sept-2008 June-2009	113	17843.50
CDA	Sept-2008 Dec-2008	58	2139.60
SHREERAM GEMICON	Sept-2008 Dec-2008	12	1015.50
Sub-Total		**183**	**20998.60**
TOTAL		**196**	**24899.80**

196 boreholes involving total meterage 24878.80m were drilled in Parsa East and Kanta Basan block with borehole density of 8.1 per sq. km. The depth of the boreholes in the block including those drilled upto Talchir Formation ranges from 15.00 m (PKC-49) to 419.50 m (PKC-89).

The density of boreholes is adequate to ascertain precisely the geometry, quality and quantity of coal resources. The help of geophysical logging was also considered as a tool to enhance the confidence level of interpretation further.

The Mining Plan has envisages to mine the block as one quarry because of favourable existing geo-mining conditions.

Seams IV incrop at a shallow depth and maximum depth of seam IV floor is around 225 m in the block. The entire block is found suitable for exploitation by opencast mining method. The mine boundaries have been considered based on the geological block boundary, lay and disposition of the seams, position of the incrops and strip ratio analysis etc.

The area is incised by several mostly northerly and easterly flowing streamlets in the northern and western part of the block that join the Atem nala flowing from southeast to northwest almost along the entire length and breadth of the block. The Atem nala and these streams together control the drainage of the area in the northern and central parts of the area. The drainage in the southern and southeastern parts is controlled by several southerly and southeasterly flowing streams. Some of the streams deeply incise the ground where it encounters softer and friable litho units of Barakar formation. Small ponds and dug wells are common in the area. These are utilized for irrigation and drinking water purpose.

Surface Boundaries

The mine boundaries of the envisaged option are as follows:-

North	- 1 m thickness line on the base Seam IV as the floor boundary, in the incrop region
East	- The surface limit of the mine is 7.50m away from the block boundary and then the resultant floor boundary has been envisaged

South - The surface limit of the mine is 7.50m away from the block boundary and then the resultant floor boundary has been envisaged.

West - The surface limit of the mine is 7.50m away from the block boundary and then the resultant floor boundary has been envisaged.

Final Stage Quarry Plan is shown in Annexure- III

RESERVES AND OVERBURDEN

The total mineable reserves are estimated as 452.46 Mt up to the requisite block boundary. The corresponding OBR has been envisaged as 2368.72 Mcum at an average stripping ratio of 5.24 cum/t.

The detailed break up of loss of seam wise geological reserves in batter and barrier are given in the table below.

	Loss of coal in Barrier (in Mt)				
SEAM	North	East	South	West	TOTAL
VI	0.00	0.08	0.14	0.12	0.33
V	0.00	0.36	0.41	0.27	1.04
IV	0.00	0.54	0.65	0.60	1.79
TOTAL	0.00	0.98	1.20	0.99	3.16

	Loss of coal in Batter (in Mt)				
SEAM	North	East	South	West	TOTAL
VI	0.00	0.70	2.95	0.97	4.62
VT	0.00	3.42	8.80	2.63	14.85
IV	0.70	6.46	15.89	6.47	29.51
TOTAL	0.70	10.57	27.65	10.07	48.99

	Total loss in Batter and Barrier (in Mt)				
SEAM	North	East	South	West	TOTAL
VI	0.00	0.78	3.09	1.09	4.95
VT	0.00	3.78	9.22	2.90	15.89
IV	0.70	6.99	16.54	7.08	31.30
TOTAL	0.70	11.55	28.85	11.06	52.15

Seamwise and gradewise geological reserves are given in table below.

(Mt.)

	Grade-wise Net Reserves					Gross Reserves
	Gr-D	Gr-E	Gr-F	Gr-G	Gr-UG	
Seam-VI		1.97	38.18	5.08		45.23
Seam-V			1.29	118.62	37.73	157.64
Seam-IV	42.88	245.68	24.97			313.53
Seam-VI TO IV	42.88	247.65	64.44	123.70	37.73	516.40

Due to multiple seams of different thickness, mining Loss has been estimated for each seam separately to arrive at Mineable Coal reserves. Mining Loss depends on:

a) Loss of coal in roof and floor of seam
b) Loss of coal while cleaning roof of bench
c) Loss of coal during selective mining for >1m bands
d) Loss of coal during transportation

Mining loss of 3 % has been taken to arrive at the mineable reserves.

Summary of Coal Reserves

1	Gross Geological Reserves (MT)	516.40
2	Gross Geological Reserves blocked in 7.5m barrier and batter and not considered for mining (MT)	52.15
3	Gross Geological Reserves considered for mining (MT)	464.25
4	Geological Loss @ 3 % (MT)	13.93
5	Net Geological Reserves considered for mining (MT)	450.32
6	Mining loss @ 3 % (MT)	13.51
7	Mineable reserves (MT)	436.81
8	30 % reserves blocked in barrier and batter may be recovered by High wall Mining.	15.65
9	Total Mineable reserves	452.46

TECHNOLOGY

The following options have been considered for selection of equipment for the project

1) Dragline
2) Shovel dumper combination
3) Surface miners

Option 1 – Deployment of Dragline.

(i) Dragline is suitable for flat deposits preferably having a gradient not more than 7^0 to permit back dumping of OB in de-coaled area. The OB is usually dumped on seam floor very near to the coal bench, leaving space sufficient only for water drainage and also to reduce mixing of OB with coal. If the coal seam gradient is not flat, the dumped OB will slide towards the coal area preventing coal extraction besides being dangerous.

(ii) The Strike length of the property should be 1.5 to 2 kms and more so that the dragline is not required to be frequently shifted from one end to the other.

(iii)The property should be free from geological disturbances. A dragline system works with a rigid operational geometry and frequent changes in the geometry may be difficult to implement without heavy loss of efficiency.

(iv)Not suitable for Multi – Seam working.

(v) The property should be large enough to ensure the life of about 25 years or more so that heavy capital investment can be recovered.

Although the block has sufficient strike length, favorable gradient and life to deploy a dragline, occurrence of multi seam do not favor dragline operation. Due to multi-section operations, re-handling would be more with the deployment of few more draglines in the lower benches thus escalating the project cost. The use of a dragline is therefore ruled out.

Option 2 – Shovel dumper combination

This option considers use of shovel dumper combination with inclined slicing pattern for mining mass i.e. Top OB and intervening parting. This will also facilitate water drainage to sump formed along with haul road. The top OB benches above the mining mass would be worked in horizontal slicing method.

The system is flexible and can be used in conditions of varying thickness of seams and partings. The flexibility of the operations enables geological disturbances to be negotiated without much loss of efficiency. Shovel-dumper system is very flexible and also offers convenient mining operations to deal with sudden occurrences of unworkable or poor quality patches. It also offers flexibility for easy transition to any other technology or equipment configuration.

The technology is well known and advantageous to get skilled manpower.
Given the geological conditions of the block, this system suits best and has, therefore, been adopted for OB removal.

In the process of selection of mining equipment following basis has been considered.

i. Equipment should match the techno-economical criteria for the desired production level.
ii. As much as practicable similar fleet of equipment will be deployed for coal and waste benches.

Option 3 – Deployment of Surface Miner for Coal Mining

Surface miner is suitable for flat and thin seams. The limiting gradient is 1 in 10 or flatter. Also, surface miners require large coal exposures which is possible only with flat deposits. For 15 MTPA, 5 numbers of surface miners would be required, for which sufficient working place/coal exposure would be required.

It is strongly recommended to use surface miner for coal winning because of following reasons:

- ECOFRIENDLY
- Mining without blasting
- Simplified mining technology

- Enhanced quality of ROM (Run Off Mine) product by highly selective mining
- Stable, clean surfaces and benches
- Improved overall availability of the system
- Reduced operating cost
- Several working steps are realized by only one machine, leading to easier coordination and process planning during planning, dispatching and maintenance
- As Drilling and blasting is not necessary, there is no chance of vibrations and fly rock.
- Reduced noise and dust development
- One Surface Miner replaces equipment for drilling, blasting, loading and auxiliary works i.e. boulder splitting.
- Low investment costs in comparison to the range of equipment necessary for conventional mining
- Low operating costs due to less equipment and less personnel
- Improved exploitation of the deposit
- Improved safety

The number of equipment has been calculated on the basis of existing availability and utilization norms in India as well as international norms.

O.B. Removal

The following type and size of Shovel-dumper combination has been considered optimum.

3.0 Cum Hydraulic Shovel in combination of 35 T Dump truck will be used for removal of overburden upto initial 40 m depth. Overburden below 40 m will be removed by using 15 cum Hyd. Shovel in combination of 100 T Rear Dumper. But in initial year for better extraction, combination of 3.0 Cum Hydraulic Shovel and 15 cum Hyd. Shovel will be deployed. The coal and intervening parting benches would be formed parallel to the coal seams and would be mined by inclined slicing method. The top OB benches will be formed horizontally above roof of top seam

and will be mined by horizontal slicing method. However the OB benches immediately above the roof of topmost seams would be formed parallel to the coal seams roof to avoid the formation of triangular rib of OB, which is likely to mix-up with coal after blasting. The maximum OB benches height would be maintained at 10m and in case of coal and intervening parting benches the height will be 10m or as the parting thickness permits.

Coal Winning

Coal will be excavated by using Surface miner.

GEO-MINING CHARACTERISTICS

Following **Table** shows broad characteristics of the open cast mine:

Sl. no.	Parameters	Unit	Value
1	Maximum depth	m	225
2	Maximum strike length: along the Mine Floor along the Mine Surface	 Km Km	 6.04 6.12
3	Minimum strike length: along the Mine Floor along the Mine Surface	 Km Km	 5.12 5.50
4	Maximum dip rise length: on the Mine Floor on the Mine Surface	 Km Km	 4.46 4.69
5	Minimum dip rise length: on the Mine Floor on the Mine Surface	 Km Km	 3.55 3.78
6	Area: On the Mine Floor On the Mine Surface	 ha ha	 2150.07 2365.95

SELECTION OF HEMM

O.B. Removal

The following type and size of Shovel-dumper combination has been considered optimum.

3.0 Cum Hydraulic Shovel in combination of 35 T Dump truck will be used for removal of overburden upto initial 40 m depth. Overburden below 40 m will be removed by using 15 cum Hyd. Shovel in combination of 100 T Rear Dumper. But in initial year for better extraction, combination of 3.0 Cum Hydraulic Shovel and 15 cum Hyd. Shovel will be deployed. The coal and intervening parting benches would be formed parallel to the coal seams and would be mined by inclined slicing method The top OB benches will be formed horizontally above roof of top seam and will be mined by horizontal slicing method. However the OB benches immediately above the roof of topmost seams would be formed parallel to the coal seams roof to avoid the formation of triangular rib of OB, which is likely to mix-up with coal after blasting. The maximum OB benches height would be maintained at 10m and in case of coal and intervening parting benches the height will be 10m or as the parting thickness permits.

Coal Winning

Coal will be excavated by using Surface miner.

BENCH PARAMETERS

Some major system parameters for both coal winning & OB removal are given below:-

Maximum Bench Height

OB (for 15 cum Hyd. Shovel)	-	10 m
OB (for 3 cum backhoe Shovel)	-	6 m
Coal and Intervening parting	-	10 m or as the parting thickness

Proposed minimum Bench Width

Working Bench Width for 15 m^3 Hyd. Shovel	-	40m
Non-Working Bench Width for 15 m^3 Hyd. Shovel	-	20m
Working Bench Width for 3 cum backhoe	-	6 m
Non-Working Bench Width for 3 cum backhoe	-	6 m

2. Width of the permanent haul road - 40m
3. Width of the temporary transport ramp - 20m
4. Usual height of the spoil dump bench - 30m
5. The width of the active dump bench - 30m
6. Bench Slope
   - OB Bench - 70^0
   - Coal Bench - 70^0
   - Dump bench - 37^0
7. Overall (Ultimate) pit slope (for 255m depth) - 45^0

In this mining plan report, it has been envisaged that the mine will be worked for 330 days per annum i.e. 7 days per week.

MINING SCHEDULE

The summarized calendar programme of excavation is given in Table below which has been developed based on adopted sequence of open cast mine development at optimum condition of mining operation in the block.

years	Coal (Mt)	Cumm coal (Mt)	OB natural (Cum)	Cumm OB (Cum)	Running SR (Cum/t)	Average SR (Cum/t)
1	2.00	2.00	4.38	4.38	2.19	2.19
2	5.00	7.00	9.56	13.94	1.91	1.99
3	10.00	17.00	18.16	32.10	1.82	1.89
4	10.00	27.00	27.06	59.15	2.71	2.19
5	15.00	42.00	44.35	103.50	2.96	2.46
6	15.00	57.00	44.43	147.93	2.96	2.60
7	15.00	72.00	49.24	197.17	3.28	2.74
8	15.00	87.00	57.69	254.86	3.85	2.93
9	15.00	102.00	57.69	312.56	3.85	3.06
10	15.00	117.00	60.31	372.87	4.02	3.19
11	15.00	132.00	68.88	441.74	4.59	3.35
12	15.00	147.00	68.88	510.62	4.59	3.47
13	15.00	162.00	73.30	583.92	4.89	3.60
14	15.00	177.00	80.36	664.27	5.36	3.75
15	15.00	192.00	80.36	744.63	5.36	3.88
16	15.00	207.00	88.46	833.09	5.90	4.02
17	15.00	222.00	89.10	922.19	5.94	4.15
18	15.00	237.00	91.83	1014.03	6.12	4.28
19	15.00	252.00	98.94	1112.96	6.60	4.42
20	15.00	267.00	98.94	1211.90	6.60	4.54
21	15.00	282.00	99.98	1311.88	6.67	4.65
22	15.00	297.00	116.31	1428.19	7.75	4.81
23	15.00	312.00	116.31	1544.51	7.75	4.95

24	15.00	327.00	116.31	1660.82	7.75	5.08
25	15.00	342.00	116.31	1777.13	7.75	5.20
26	15.00	357.00	119.78	1896.91	7.99	5.31
27	15.00	372.00	119.96	2016.88	8.00	5.42
28	15.00	387.00	107.86	2124.74	7.19	5.49
29	15.00	402.00	85.76	2210.50	5.72	5.50
30	15.00	417.00	80.20	2290.70	5.35	5.49
31	15.00	432.00	59.06	2349.76	3.94	5.44
32	0.00	441.00	18.95	2368.72	2.11	5.37
33	7.00	448.00	0.00	2368.72	0.00	5.29
34	4.46	452.46	0.00	2368.72	0.00	5.24

The total mineable coal reserves have been estimated as 452.46 Mt at the corresponding OBR of 2368.72 Mm^3 at an average SR of 5.24 m^3/t. The rated output of 15 Mty would be achieved in 5th year of mine operation.

HEMM DEPLOYMENT

Annual productivity of Shovel & Dumpers

The lead of coal and lead of partings/OB have been considered as 1.00 - 1.50 Km & 1.25 - 2.00 Km respectively.

The annual productivity of shovel with matching dumper combination adopted in this project as per the prevalent norm in Indian coal Industry is given below on 330 working days basis.

Sl.No.	Particulars	Unit	Annual productivity(Mcum)
1	OBR		
	3.0 Cum Hyd. Shovel + RD 35 T	Mcum	0.83
	15.0 Cum Electric hydraulic Back-hoe +RD 100 T	Mcum	3.91
2	Coal		
	SM 3800 surface miner	Mcum	2.35

Productivity of Rear dumpers with matching shovels for OB at different lead in km is given in table below:

Figure in Mm^3

	1.0 Km	1.5km	2.0km	2.5km	3.0km	3.5 Km	4.0km
100T with 15.0 Cum Electric Hyd. Backhoe(Mcum)	0.59	0.49	0.43	0.39	0.35	0.32	0.30
35 T with 3.0 cum Hyd. Shovel(Mcum)	0.19	0.16	0.14	0.13	0.12	0.11	0.10

Productivity of Rear dumpers with matching shovel for coal at different lead in km is given in table below:

	1.0 km	1.5km	2.0km	2.5km	3.0km	3.5km	4.0km
35T with 4.5 Cum Front end loader(Mcum)	0.21	0.18	0.16	0.14	0.13	0.12	0.11

Because of geo mining conditions of the proposed quarry, inclined slicing system of mining is adopted. Requirement of HEMM in the project for achieving the target capacity of coal production is given in table below:

LIST OF HEMM

Sl No	Particulars	Size/Cap	Year wise phasing				
			1	2	3	4	5
A	Overburden						
1	Diesel Hydraulic Shovel	15 Cum	0	1	2	4	5
2	Electrical Hydraulic Shovel	15 Cum					2
3	DH Shovel	3.0 Cum	5	7	13	15	20
4	Rear Dumper	100 T	0	6	11	21	36
5	Dump truck	35 T	25	35	65	75	100
6	Drill	250 mm	0	1	2	3	4
7	Dozer	410 hp	2	3	4	5	7
8	Wheel dozer	320 hp	1	1	1	1	2
9	Drill	160 mm	2	2	4	4	5
B	Coal						
1	FEL	4.5 Cum	1	2	3	3	5
2	Dump truck	35 T	5	10	15	18	30
3	Surface Miner	3800 SM	1	2	3	3	5
C	Common						
1	Grader	280 hp	1	2	3	3	4
2	Crane	50T				1	1
3	Crane	30 T		1	2	2	2
4	Crane	10/8/5 T	1	2	2	2	4
5	Diesel B'hoe	0.9-1.2 Cum	1	1	1	1	3
6	Vibratory compactor	25 T	1	1	2	2	3
7	Fork lift truck			1	2	3	5
8	Tyre handler			1	2	3	5
9	Mobile maintenance Van		1	1	2	4	5

10	Water sprinkler	28kl	1	4	6	8	10
11	Fuel browser	12 KL	1	1	2	3	6
12	Tipping Truck	8 T	1	1	2	3	5
13	Dozer	410 HP	1	2	4	4	5
14	Fire Tender			1	2	2	2

Overburden transportation

Over burdon will be transported by dumpers to respective OB dumps. Haul road has been provided for movement of dumpers.

COAL HANDLING, BENEFICIATION & MODE OF DISPATCH

COAL HANDLING

Introduction

It is proposed to deploy surface miner for extraction of coal. It is proposed to provide sets of conveyor belts for transportation of coal from coal face. Each conveyor will be provided with mobile hoppers to receive coal by pay loaders and feed the coal into conveyors. Another set of conveyors are provided on surface to transport coal to washing plant receiving stock yard. For loading into wagons loading points are envisaged. At loading point coal will be transported by belt conveyors from washery and discharged into SILO. Pre-weigh hoppers and rapid loading system gate will be provided below the SILO to load coal into wagons.

The following advantage will accrue by using surface miner and belt conveyor transportation,

- no drilling and blasting
- less fleet of dumper
- less air pollution
- negligible noise pollution

The handling capacity of the CHP has been decided to match with the production capacity of the mine. In order to meet the fluctuations of coal output from the mine due to irregularities of transport system and seasonal fluctuations, the design capacity of the CHP has been fixed at 2750 TPH.

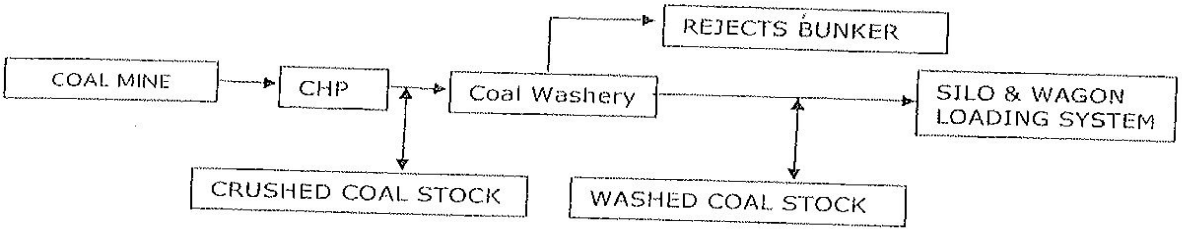
Design Parameters

Basic Data

Production	-	15.00 MTPA
No. of working day/yr.	-	330 days
No. of shift per day	-	3
Selected T.P.H	-	2500 T

SYSTEM DESCRIPTION

The description of process can be understood through simplified block diagram of system as given below :



The description of the process is given in the following sections:

A. RAW COAL

- Coal (-) 100mm will be brought initially by 35 T dumpers and finally by belt conveyors to 3 nos. hoppers of capacity 300 T each.
- The coal will be then conveyed to Screening cum Crusher House through 3 nos of individual conveyors under each hopper.
- Since the Raw Coal contain at least 20% of (-) 50mm size material, the entire coal will be screened using 03 numbers of 1000 TPH capacity screens on to 03 nos. of belt conveyors (separately for (-) 50mm and for (+) 50mm size).
- (+) 50mm size Coal will be fed to 03 crusher of 800 TPH capacity each. The belts will be provided with Tramp iron Magnets before Coal is fed to the crushers.
- The screened (-) 50mm size Coal and the crushed (-) 50mm size Coal is clubbed together from all the 03 streams on a single belt conveyor to a diversion gate –

- For stacking and reclaiming of crushed coal from 55,000T crushed coal stock through a bidirectional conveyor.
- For feeding the crushed coal directly to washery complex.

B. COAL WASHERY COMPLEX

- The crushed raw coal will be fed to Coal Washery Complex for washing of coal.
- In order to ramp-up the mine production schedule, existing 10MTPA coal washery would require expansion to 15MTPA to match with the mine capacity.
- It is envisaged to establish the washery with Jigs as the main washing equipment to meet the above specific commitment of quality.
- The summarized data of Washery is as given below:

o	Plant capacity	:	15 MTPA
o	Daily throughput capacity	:	45000 Tonnes
o	Hourly capacity	:	2500 TPH
o	Quality of Raw Coal	:	39.75% (Approx)
o	Moisture of Raw Coal	:	6.3% (at 60% RH & 40°C) Approx.

- Quality & quantity of Washery product :

o	Clean Coal	:	30% Ash (11.625 MTPA) Approx.
o	Rejects	:	60% Ash (3.375 MTPA) Approx.
o	Yield of Washery	:	77.5%
o	No. of working Days/Annum	:	330 Days
o	No. of working Shifts / Day	:	3 Shifts
o	No. of effective Hours / Day	:	18 Hours (approx. 6000 hrs / Annum)

- The washery will produce approximate 11.625 MTPA of clean coal with 30% ash content and 3.375 MTPA of rejects with about 60% ash content.
- The clean coal will be fed to CHP conveyors for onward stocking, loading and dispatch through Wagon Loading Silos.

- The washery rejects will be conveyed to Reject Bunkers. Rejects will be used to generate power by setting up a FBC Power Plant.
- The washery is planned with the state-of-the art technology. The process flow-sheet is given in **Fig 7.1**.
- The washery plant will operate with closed loop water circuit with zero discharge outside and also deploys suitable required measures to keep noise and air pollution under control as per statutory norms.

- Afforestation around the plant will act as a barrier for dust and noise.

Washery Process Details:

The technology adapted for achieving the committed quality requirement of customer, for 15 MTPA production stage, 4 Nos. of Jigs circuits have been proposed for washing the (-) 50 mm coal. The raw coal produced from the mine will be conveyed to CHP through feeding conveyor and after crushing and stacking/reclaiming stage of CHP, (-)50 mm raw coal will be conveyed to Washery Building through feeding conveyor. At first instance from the raw coal 0-13mm shall be screened out and coparated and the sizes of (+)13 to (-)50mm coal shall be fed to these washing Jigs which shall deliver two products i.e. washed coal with 30% ash and the rejects. The washed product from the Jigs shall be mixed with already screened out 0-13mm coal and it shall be fed to the despatch system of the coal handling plant. The quality of the despatch coal shall meet the requirement of the RVUNL i.e. 30% ash, 10% moisture and overall GCV shall not be less than 4500 Kcal./kg. (ADB).

C. WASHED COAL STOCKING, LOADING AND DISPATCH

- Washed Coal from the washery is carried to a washed coal stock pile having combined capacity of 1,65,000T through a belt conveyor on to a transfer point, where a provision has been kept for truck loading as well.
- At washed coal stockpile, stacking and reclaiming is envisaged by one set of Stacker and Re-claimer.
- Washed coal will be conveyed to 02 Nos. of 4,000 T each capacity Silos by using a belt conveyor and a feeder conveyor from one Silo to another Silo.

Coal Washery – Flow Sheet

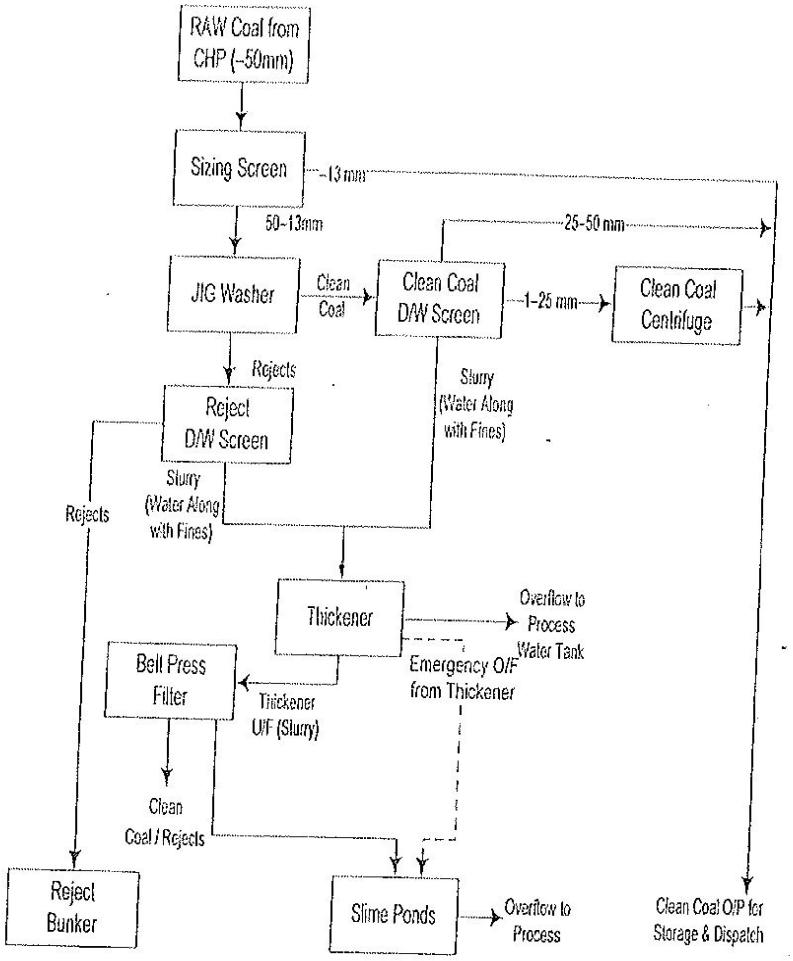


Fig -7.1

Note :- Washery has been carefully designed to operate on **"Close Loop Water Circuit"** and **"Zero Effluent Discharge"** principle.

SYSTEM CAPACITY

The handling capacity of the CHP & washery has been decided to match with the production capacity of the mine. In order to meet the fluctuations of output from the mine due to irregularities of transport system and seasonal fluctuations.

DUST CONTROL SYSTEM

A dust suppression system is envisaged for control of dust during loading and discharging of coal into conveyors/wagons.

The objective of the system is to eliminate the air born coal dust or suppress the dust at its source. The system involves confinement of the dust within the dust producing area by a curtain of moisture and wetting the coal dust by direct contact between the particles and droplets of water. Adequate number of precision anti-clog nozzles are envisaged at suitable locations for suppressing dust by spraying water as suppressant. Suitable control for dust suppression shall be provided and the system shall be so inter-locked so that it functions only when the conveyor system is operating or the loading operation is on.

NOISE CONTROL

It is a well-accepted fact that noise pollution causes fatigue to operating personnel. Provision shall be made to keep down the noise level to the extent it is feasible. All transfer chutes and hoppers shall have wear resistant rubber or ultra-high molecular weight plastic liners of various thicknesses as per design requirement and their suitability.

Provisions have been envisaged to keep down the noise level within permissible limits.

FIRE FIGHTING SYSTEM

Necessary fire-fighting system is also envisaged for the plant, which includes fire hydrant tees at strategic locations at equal spacing of 25 to 35 metres with suitable water supply pipelines. Also portable type fire extinguishers to deal with electrical / oil /ordinary fires are envisaged at all strategic locations in the plant.

PREVENTIVE MAINTENANCE

For effective maintenance of all the equipment, there shall be sufficient working space

around the equipment/machinery. All the equipment and conveyor discharge drums/transfer points etc. shall have covered and well ventilated housing complete with access stair ways, hand rails, platforms, cross-over ladders etc. as required.

Necessary mono-rails electric hoists and chain pulley blocks at suitable points of adequate capacity shall also be provided on respective floors

ELECTRICAL SYSTEM

The maximum demand of power will be met from 33 kv Sub-station located within project area.

The electrical system of CHP will have following facilities:

- Power reception and distribution system
- Centralized sequence control–cum–interlocking, automation, signaling and instrumentation system
- Illumination of plant and adjacent area
- Earthing

USE OF MINERALS

The project has been planned for producing 15 million tonnes of coal per annum. The weighted average ROM coal quality is likely to be of grade F i.e. power grade coal. The block has been allotted to RVUNL for coal requirement of their two thermal power project viz. Chhabra phase II (500 MW) and Jhalawar (Kalisindh 2x600 MW). In response to the RVUNL's letter dated 29.12.11 to Moc for assigning Parsa East and Kanta Basan coal blocks to super critical power projects of Suratgarh units 7 & 8 and Chhabra unit 5 & 6 also by approving enhancement in mining capacity from 10 Mty to 15 Mty, the Ministry of Coal vide letter no F.No 13016/74/2006-CAI dated 03.02.2012 has given in principle approval allowing the use of coal from Parsa East and Kanta Basan coal block in the super critical power projects of Suratgarh units 7 & 8 and Chhabra unit 5 & 6 also.

COAL TRANPORTATION FROM MINE

It has been planned to bring coal from coal face to surface by belt conveyor. Another set of conveyors are provided to transport coal into washing plant receiving stock yard. Belt conveyor has been envisaged for less fleet of dumper, negligible air pollution and negligible noise pollution. Washed coal will be loaded to rail wagon by rapid loading system.

Loaded Coal wagon will move from washery head to Surajpur Railway Station which is situated on Anüppur – Ambikapur branch line on Bilaspur Division of South East Central Railway. From Surajpur Railway Station, coal wagon will move to power plant by rail.

(vi) Availability of water its source, Energy / power requirement and source should be given.

POWER

Heavy Earth Moving Machines consume significant power in opencast project. CHP including crushing & material handling facilities, mine dewatering, workshop, offices, colony, Washery etc. add to the total power demand of the project. On achieving the targeted coal production and commissioning of Shovels, Drills, Coal Handling Plant, Workshop, washery and Main pumps, the power demand of the OCP is expected to touch the maximum demand.

The proposed mining block is virgin. Based on Rated capacity of 15.0 MTY ROM Coal for Parsa East and Kanta Basan coal Block and assuming certain parameters for coal transportation and loading, washery & pumping etc ,the tentative requirement of power shall be in the range of 15-20 MVA at 33 kV.

The source of power for Parsa East and Kanta Basan Opencast project is Ambikapur Substation of CSEB which is located at a distance of about 70 Km from the proposed project. It is suggested to take power from Ambikapur substation at 33 kV and bring it to project's switching substation to meet the power demand of Parsa East and Kanta Basan project.

Restricted earthing has been envisaged for Electrical System. All electrical system will have protection from lightning and high voltage surge.

Switching station and substation shall be equipped with all safety features firefighting system. Earth Moving Machines consume significant power in opencast project. CHP including crushing & material handling facilities, mine dewatering, workshop, offices, colony, etc. add to the total power demand of the project. On achieving the targeted coal production and commissioning of Shovels, Drills, Coal Handling Plant, Workshop and Main pumps, the power demand of the OCP is expected to touch the maximum demand.

Water Supply & Sewerage

Colony water supply

It has been envisaged that the requirement for the potable water demand for the colony shall be met from deep bore well. Water will be stored in a ground reservoir envisaged in the colony area. This water is proposed to be treated and supplied to colony through gravity after being pumped to an overhead tank, located within the colony.

Industrial water supply

To meet the industrial water demand of the Project, deep well boring has been envisaged for water supply system. A provision of an overhead tank has been made to cater the needs of potable water as well as water for industrial purposes. This overhead tank will be fed with treated water from the proposed bore wells. From this tank water will be distributed to the office complex and such other places wherever required through gravity flow. From this tank, water for industrial purposes has also been considered to be delivered to the various industrial buildings, administrative complex & quarry sites and is proposed to be distributed by gravity to the point of consumption through a distribution network. However, provision of ground sumps with necessary pumps, at places, has also been envisaged as per technological needs. Pumped out water from mine will be used for industrial use after its treatment.

For fire fighting purposes in the industrial areas like workshops, stores and quarry area, separate distribution networks have been proposed from the ground reservoir. Provision towards requirement of water for public utilities like garden,

afforestation etc. has been made. It has been envisaged that the distribution network for firefighting purposes shall also be utilised for these purposes.

Colony sewerage

Sewage Treatment Plant of appropriate capacity will be provided.

Industrial sewerage

It has been considered that the industrial wastes from workshop and other industrial establishments would be led through oil & grease traps. The effluent coming out of the industrial premises is proposed to be treated and led to the settling tank and to be recycled for various industrial uses for this project. The domestic sewage generated in industrial premise has been considered to be dealt in septic tanks and soak pits.

(vii) Quantity of wastes to be generated and scheme for their Management/disposal.

The opencast mine is planned upto 225 m depth with overall average stripping ratio of 5.24.

The total volume of OB has been estimated as 2368.72 Mcum. The OB removed during initial years will be placed beyond the incrop of the seam-IV. The total volume of external dump has been estimated as 52.07 Mcum solid. Rest of the OB will be placed in internal dumps. The total volume of internal OB, i.e. the volume which will be accommodated internally by backfilling has been estimated as 2316.65 Mcum.

The internal dumping will start when about 100 m space is available on quarry floor. By adopting the proposed sequence of mining, as the quarry advances, the amount of internal dump will increase as more space for the internal dumping is created. For external dumps no additional land will be required outside the block boundary. External dump will be accommodated inside the block boundary. Two external dump i.e external dump west and external dump east has been proposed on the north western and north eastern side of the

block boundary respectively. Two internal dump i.e internal dump west and external dump east has also been proposed.

There will not be any internal dump till 3rd year of mine operation. It is proposed to start internal dumping from 4th year of mine operation. As the gradient of the seam is flat, during working of the quarry substantial amount of OB will be accommodated in internal dump. During 4th year of mine operation, 7.09 Mcum of OB will be accommodated in internal dump and remaining 19.97 Mcum of OB will be accommodated in external dump. From 5th year of mine operation, no external dumping will be required. Hence, OB will be accommodated in internal dump for rest of the mine life.

Overburden will be dumped in external as well as internal dump. Dumping has been planned assuming 15 % swelling factor.

During 1st year, height of external dump will be kept at only 15 m. During 3rd year, height of western external dump and eastern external dump will be 30m. At the end of 5th year height of west external dump and east external dump will be 30 m and 45 m respectively. At the end of mine life, western internal dump will be at the ground level except in the area of 425.89 Ha where dump height is 60 m above ground level. Similarly, At the end of mine life, eastern internal dump will be at the ground level except in the area of 544.00 Ha where dump height is 30 m above ground level. During closure of mine, overburden dumped above ground level will be used to fill void upto 30 m below ground level. It is proposed to maintained water body in the final void that is 30 m below ground level.

The land reclamation will be taken progressively after exhaustion of coal and completion of internal back dumping and flushing with external dumps.

The top soil is to be used with minimum time lag for spreading over the external & internal dumps.

It is proposed to reclaim dump with plantation etc after dumping / spreading top soil over the external and internal dumps.

Out of 2368.72 Mcum of OBR, 52.07 Mcum have been accommodated in external dumps, which constitutes about 2.2% of total dumping.

Phased dump planning along with dump capacity has been given in table below:

Year	External Dump	Cumulative External Dump	Internal Dump	Cumulative Internal Dump	Total OB	Total OB Cumulative
	(Mcum)	(Mcum)	(Mcum)	(Mcum)	(Mcum)	(Mcum)
1	4.38	4.38	0	0	4.38	4.38
2	9.56	13.94	0	0.00	9.56	13.94
3	18.16	32.10	0	0.00	18.16	32.10
4	19.97	52.07	7.09	7.09	27.06	59.15
5	0	52.07	44.35	51.44	44.35	103.50
6	0	52.07	44.43	95.86	44.43	147.93
7	0	52.07	49.24	145.11	49.24	197.17
8	0	52.07	57.69	202.80	57.69	254.86
9	0	52.07	57.69	260.49	57.69	312.56
10	0	52.07	60.31	320.80	60.31	372.87
11	0	52.07	68.88	389.68	68.88	441.74
12	0	52.07	68.88	458.55	68.88	510.62
13	0	52.07	73.30	531.85	73.30	583.92
14	0	52.07	80.36	612.21	80.36	664.27
15	0	52.07	80.36	692.56	80.36	744.63
16	0	52.07	88.46	781.02	88.46	833.09
17	0	52.07	89.10	870.13	89.10	922.19
18	0	52.07	91.83	961.96	91.83	1014.03
19	0	52.07	98.94	1060.90	98.94	1112.96
20	0	52.07	98.94	1159.83	98.94	1211.90
21	0	52.07	99.98	1259.81	99.98	1311.88
22	0	52.07	116.31	1376.13	116.31	1428.19
23	0	52.07	116.31	1492.44	116.31	1544.51
24	0	52.07	116.31	1608.75	116.31	1660.82
25	0	52.07	116.31	1725.06	116.31	1777.13
26	0	52.07	119.78	1844.85	119.78	1896.91
27	0	52.07	119.96	1964.81	119.96	2016.88
28	0	52.07	107.86	2072.67	107.86	2124.74
29	0	52.07	85.76	2158.43	85.76	2210.50
30	0	52.07	80.20	2238.63	80.20	2290.70
31	0	52.07	59.06	2297.69	59.06	2349.76
32	0	52.07	18.95	2316.65	18.95	2368.72
33	0	52.07	0.00	2316.65	0.00	2368.72
34	0	52.07	0.00	2316.65	0.00	2368.72

4. SITE ANALYSIS

(i) Connectivity.

The Tehsil headquarters at Udaipur and the District headquarters at Ambikapur are located at a distance of 26 km and 70 km northeast of the block on State Highway (SH)-2A. Lakhanpur, another small township is also located about 43 km northeast of the block on this State Highway. The block is connected to the State Highway -2A aligned in a NE–SW direction and passing at a distance of about 5 km from its northwestern corner through a metalled road approaching Parsa village. The junction where these roads meet is located about 160 km from Bilaspur on SH-2A and 8 km from Tara village on this highway. The block can also be approached from Tara village, located on SH -2A at a distance of about 152 km from Bilaspur, through a fair weather forest road that leads to Ghatbarra village. The accessibility within the block is through kutcha/unmetalled roads and is difficult during monsoon. The villages within the block are connected by morrum and mud roads.

The nearest railhead Bisrampur on the Bijuri-Ambikapur section of the South East Central Railway (SECR) is located about 62 km from the northwestern corner of the block.

The nearest airstrip is located at Ambikapur at a distance of about 70 km from the block while the nearest major airport is at Raipur, the state capital, situated at about 290 km southwest. The nearest major ports are at Paradip and Calcutta in the east coast.

(ii) Land details

Total 2711.034 Ha of land is proposed to be acquired for the Parsa East and Kanta Basan Opencast project, which would be utilized for different purposes to carry out the operations as stated in Table below.

(Figure in Ha)

Sl. No.	PARTICULAR	AREA (Ha)
A	MINING LEASE	
	QUARRY AREA AND BARRIER	2388.525
	SUB TOTAL	2388.525

B	ADDITIONAL LAND TO BE ACQURED	
	EXTERNAL DUMP	164.259
	WASHERY	47.340
	COLONY AND PLANTATION AREA	49.054
	INFRASTRUCTURE	22.438
	RATIONALISATION	39.418
	SUB TOTAL	**322.509**
	TOTAL	**2711.034**

The total area of 2711.034 Ha includes 1898.328 hectares of forest land, 110.543 hectares of Government land and 702.163 hectares of Tenancy land. There are 7 villages falling in Parsa East and Kanta Basan coal block. It has been envisaged not to acquire total village area. A detail of land (village wise) to be acquired for Parsa East and Kente Basen opencast project and total land of each village is given in table below:

Name of the Village	Total Area (Ha.)	Land use pattern of land proposed to be acquired						Total Land (in Ha)
		Forest Land(Ha)			Govt Land (Ha)	Tenancy Land(Ha)		
		Revenue Forest		Protected forests		Adiwasi	Non Adiwasi	
		Chhote Jhhar ka Jungle	Bade Jhhar ka Jungle					
Salhi	1171.00	16.817	-	59.378	14.879	23.973	1.469	116.516
Hariharpur	441.00	2.768	19.321	110.156	10.187	34.815	0.735	177.942
Parsa	1266.00	50.378	8.542	138.036	18.320	100.398	12.533	328.207
Kente	1284.00	83.380	0.782	505.928	14.890	194.387	0.089	799.456
Ghatbarra	2447.00	61.660	0.611	706.783	52.256	212.217	121.547	1155.085
Porigiya	3956.00	-	-	128.130	-	-	-	128.130
Basen	1519.00	-	-	5.698	-	-	-	5.698
Total		**214.963**	**29.256**	**1654.109**	**110.543**	**565.790**	**136.373**	**2711.034**

(iii) Topography and drainage

The block is characterised by highly undulating topography with several mounds as well as elevated and flat land. The elevation of the area above mean sea level (msl) ranges from 505 m in the northwest and southeast to 569m in the northeast with higher values in the central, eastern, southern and southwestern parts. The elevation of the mounds generally ranges from 525m to 554m above msl. The

general slope of the land is towards NNW in the northern, central and western part of the block while the slope is towards south and southeast in the remaining part.

The area is incised by several mostly northerly and easterly flowing streamlets in the northern and western part of the block that join the Atem nala flowing from southeast to northwest almost along the entire length and breadth of the block. The Atem nala and these streams together control the drainage of the area in the northern and central parts of the area. The drainage in the southern and southeastern parts is controlled by several southerly and southeasterly flowing streams. Some of the streams deeply incise the ground where it encounters softer and friable litho units of Barakar Formation. Small ponds and dug wells are common in the area. These are utilized for irrigation and drinking water purpose.

Surface topography of the area is shown in Annexure-V.

(iv) Existing land use pattern, shortest distances from the periphery of the project to periphery of the forests, water bodies.

Existing land use study was carried out for the existing 10MTPA mining project including the pit head washery. The findings / Summary of the study is reproduced below:

The study area falls in Ambikapur, Surajpur tehsils of Surguja District and Katghora tehsils of Korba Districts covers about 62 villages within 10 km zone around mine lease area.

LANDUSE PATTERN IN THE STUDY AREA

Sr. No.	Particulars	Study Area (ha)	Area (%)
1	Forest Land	30091	57.99
2	**Land under Cultivation**		
	a) Irrigated Land	242	0.46
	b) Un irrigated Land	10739	20.70
3	Culturable Waste Land	8451	16.28
4	Area not available for cultivation	2373	4.57
	Total Area	**51896**	**100.00**

Source: District Primary Census Hand Books –Surguja and Korba Districts

Block is connected to the State Highway -2A and passing at a distance of about 5 km from its northwestern corner. Nearest railhead is Bisrampur on the Bijuri-Ambikapur section of the South East Central Railway (SECR)

(v) Infrastructure facility

For maintenance and repair of equipment deployed in Parsa East and Kanta Basan Opencast project, the following maintenance and repair concept is envisaged:

a) Daily maintenance, scheduled maintenance, minor repair and medium repair proposed to be carried out in the project maintenance and repair unit.
b) Capital repair and major overhauling of equipment at manufacturers' repair unit or, by outside agency at site.

Planning has been done for providing maintenance and repair facilities to all the major equipment deployed in Parsa East and Kanta Basan Opencast project. The proposed maintenance and repair unit and project store will facilitate the maintenance and repair requirement of mining, mechanical, electrical, and other auxiliary equipment and storage of spare-parts, sub-assemblies and consumables.

Excavation maintenance and repair unit

Scope of work for excavation maintenance and repair unit will be

- Preventive maintenance.

a) Daily maintenance, routine lubrication and weekly washing of equipment.
b) Technical inspection and running repair of equipment and checking of tyre pressure.
c) Daily and fast filling of diesel at fuel delivery station for transport equipment and at site for field equipment.
d) Dismantling, opening and refitting of tyres.
e) Incidental minor repairs of assemblies and sub-assemblies of mining and mechanical equipment i.e. dumper, dozer, shovel, drill etc.

- Scheduled maintenance.
- Medium repair and replacement of assemblies and sub-assemblies.

- Mobile repair and maintenance facilities with maintenance crew for field equipment at site.

The following facilities are envisaged for excavation maintenance and repair unit:

- Mechanised washing on specially constructed platform for dumpers and dozers.
- Daily maintenance bays for dumpers and dozers.
- Schedule inspection and lubrication bays for dumpers and dozers.
- Scheduled maintenance, medium repair and minor repair facilities for dumpers and dozers.
- Minor repair and replacement of sub-assemblies and assemblies of shovels, drills and other field equipment at site by mobile repair team.
- Medium repair and overhauling of sub-assemblies and assemblies of field equipment.
- Machine shop.
- Electric and auto repair shop.
- Engine and radiator repair shop.
- Welding and structural shop.
- Pavements for dumper and dozer parking.
- Underground water reservoirs.
- Supporting facilities like offices, computer room, electronics room, charge stores, tool room, pump room, cycle stand, canteen, security post, fire fighting facilities, ventilation system etc.
- Material handling facilities.
- Machine tools, general and special purpose tools, diagnostic tools, master tool kits etc.
- Refueling station with high capacity pump.

E&M maintenance and repair unit

Scope of work for E&M maintenance and repair unit will be

- Minor repair, medium repair and replacement of components, assemblies and sub-assemblies of CHP, pumps and electrical equipment.
- Minor and medium repair of switch gears, motors, self-starters and other electrical equipment.

The following facilities is envisaged in E&M maintenance and repair unit

- E&M maintenance and repair unit for maintenance and minor repair of CHP equipment, pumps, electrical equipment and other installations.
- Machine shop, electrical repair shop, mechanical repair shop etc.
- Machine tools, general and special purpose tools, diagnostic tools, master tool kits etc for electrical and mechanical equipment.
- Supporting facilities like charge store, tool store, toilet, offices etc.

PROJECT STORE

The report has envisaged a project store for reception, storage and issue of all kinds of materials, spares, equipment and consumables required for mine operation and maintenance of mining, mechanical and electrical equipment. The storage capacity has been planned for 30 to 45 days consumption of materials. Due consideration has also been given for proper working environment, cleanness and safety measures. Proper equipment and material handling facilities have also been provided.

Separate space has been envisaged for the storage of following items:

- Spares and assemblies of HEMM
- Electrical equipments like, motor, generator, switch gear, etc.
- Spares and assemblies of electrical equipment
- Spares and assemblies of CHP and pumps.
- P.O.L
- Cables and beltings
- Stationery and office materials

Colony Roads

The width of colony roads has been envisaged as 5m. Provision for culverts, tree guards and drains would be provided.

Haul Road

Haul roads suitable for plying 100T & 35T class rear dumpers with side drains and dozer path would be provided within the mining area.

Heavy duty Road

The dumpers deployed in the benches will also go to the workshop for maintenance as well as dump for dumping. Hence a provision for heavy duty road has been made. The type of road suitable for 100T & 35T class rear dumpers would be provided connecting, workshop, dumps etc.

Approach roads

Existing approach roads are adequate to meet the requirement of the proposed expansion.

SERVICE BUILDINGS

The residential colony consists of type quarters, community and welfare buildings, parks and play ground etc. for the proposed Project. The colony has been envisaged as shown in surface plan.

The SERVICE BUILDINGS include community buildings like dispensary, primary school, officers' and staff rest houses, clubs, post office, bank, shopping centre, community centre etc. apart from offices, workshop & stores, sub-stations, shovel erection yard, magazine & other statutory buildings like canteen, first aid centre, rest shelter, training centres, pit head bath etc.

Following are the broad details of these buildings.

COMMUNITY BUILDINGS

Community facilities, essential for a sound living of the project personnel and their families like Parks and Playground, Primary School, Workers' Institute, Staff club, Community Centre, shopping complex etc. have been envisaged in the present report.

OFFICES

Provision has been made for Project office and mine site office. These buildings have been envisaged as RCC-cum-brick masonry structures.

WORKSHOPS AND STORES

Provisions have been made for maintenance and repair of HEMM, LMV and other Plant & Machineries. Accordingly, workshop and stores to cater for the needs of their repairs and maintenance have been considered. The area of various shops

and facilities are envisaged on the basis of technological & operational requirements.

The buildings are envisaged to be of structural steel construction with RCC foundation, cubicles for shop in-charge, small toilet facility, cage ladder for access to roof etc.

SUB-STATION

Sub-station has been considered to cater for the requirements of the Project & township. This will be brick masonry, RCC beam and slab construction with RCC louvers for ventilation and ducts with proper size for electric cables.

MAGAZINE

Required provision for magazine has been made in the report.

STATUTORY BUILDINGS

There are provisions for canteen, first aid centre, rest shelter, training centre, pit head bath etc. The areas for various statutory buildings have been considered on the basis of BPE guidelines.

RESIDENTIAL BUILDINGS

The manpower requirements for this Opencast Mine have been estimated as 1805 upto target achieving year. The proposed project has been envisaged as mechanised mine needing skilled manpower. This manpower is required to be housed near the project site for smooth and continuous operation of the mine. With this background, 70% housing satisfaction has been considered for the project.

CLIMATOLOGICAL DATA

The secondary meteorological data was collected from the IMD-Ambikapur which is the nearest IMD station to the proposed project. The data collected from IMD includes wind speed, wind direction (recorded in sixteen directions), temperature, relative humidity, atmospheric pressure, rainfall and cloud cover over a period of 10 years. The monthly maximum, minimum and average values are collected for

all the parameters except wind speed and direction. The collected data is tabulated in Table-below

CLIMATOLOGICAL DATA-STATION: IMD, AMBIKAPUR

Month	Atmospheric Pressure (mb)		Temperature (°C)		Relative Humidity (%)		Rainfall (mm)
	0830	1730	Mean Max	Mean Min	0830	1730	
January	947.8	944.8	27.8	3.4	75	44	16.7
February	946.1	942.8	31.7	5.6	65	35	24.3
March	944.5	940.7	36.7	10.3	47	25	16.3
April	941.7	937.6	40.4	15.8	36	21	11.8
May	937.7	933.8	42.4	20.9	37	22	13.5
June	934.2	931.1	40.8	21.3	64	54	176.9
July	933.7	931.1	33.7	21.2	86	80	456.5
August	934.7	932.2	32.4	21.2	88	83	417.2
September	938.4	935.4	32.2	19.6	84	77	230.4
October	943.7	940.6	31.9	13.0	76	62	87.4
November	947.2	944.2	29.3	7.7	69	50	3.4
December	948.3	944.6	27.0	4.5	76	47	5.1

Source : India Meteorological Department

5. PLANNING BRIEF

Rehabilitation Action Plan

Rehabilitation and Resettlement Plan (RAP) has been drawn on the basis of base line socio-economic survey carried out through reputed voluntary organization through participatory process. RAP has following important components

1. Rehabilitation and Resettlement of families affected due to acquisition of land for the project from seven villages within project boundary.
2. Corporate Social Responsibility Plan for the communities around the project comprising of 14 villages including seven villages in core zone.
3. Tribal Development Plan for the core zone and other seven villages around .

The RAP is based on the best of the two policies in vogue i.e National R&R Policy 2007, Chhattisghar Adarsha Punarwasa Niti 2007 (Chhattisghar Ideal Rehabilitation Policy 2007). RAP was deliberated upon during Environment Appraisal Committees (EAC) Meeting of MOEF on and 23/09/09 and also deliberated in District Rehabilitation Committee (DIC) Meeting held at Surguja on 1/11/09.

The present RAP has been modified and updated on the basis of the recommendations of EAC and DIC. The salient features of the RAP is as under.

1. Land compensation on the basis of negotiations with the farmers in presence of DRC within provisions under Land Acquisition Act 1894.
2. Employment as per provisions of NPRR 2007.
3. Provision for skill training to enhance the employability as suggested by DRC.
4. R&R benefits as per NPRR 2007.
5. Resettlement benefits (Developed Plots) as per Chhattisghar State Adarsha Punarwas Niti 2007).
6. All the financial benefits as per NPRR 2007 updated and will be payable on the basis of price index at the time of disbursement as per provicion of NPRR 2007.
7. Provision of self employment training to those who nor benefited with company employment.
8. Preferential access to petty contracts for the PAF in individual or group capacity.
9. Integrated pilot project on Corporate Social Responsibility covering 14 villages has been incorporated as a part of this RAP.

CSR activities proposed includes special interventions for improvement and community access to better education, health facilities. Capacity building of the community in health, hygine education, environment, employment, self employment and natural resource management is integral part of this CSR. CSR is 5 years intervention along with the implementation of RAP so as to have synergy. Convergence of the government scheme has been incorporated in the CSR to ensure sustainability of the CSR intervention even after the initial pilot

project period of 5 years. Company will continue to extend assistance under its CSR Policy to the community around.

Special Tribal Development Plan for 5 years duration has also been prepared considering the felt needs of the tribal in the influence zone of the project. The major objective of this TDP is to ensure that the livelihoods and food security of poor tribal households especially who are directly affected due to project are sustainably improved through promoting a more efficient, equitable, self-managed and sustainable exploitation of the balance natural resources like forests, water and agriculture/ waste land at their disposal and through off-farm/non-farm enterprise development.

Total budget of RAP including CSR and TDP to gather comes to Rs. 99.63 Crore at an estimated rate summary of which has been presented below:

Budget Head	Amount (Rupees Lakhs)
Resettlement and Rehabilitation benefits to project affected families.	7862
Tribal Development Plan	0318
Corporate Social Responsibility Plan	0809
Corpus Funds for Maintenance of Resettlement Sites	0500
Administrative / Implementation Cost	0474
Total	**9963**

Land use planning

Total 2711.034 Ha of land is proposed to be acquired for the Parsa East and Kanta Basan Opencast project, which would be utilized for different purposes to carry out the operations as stated in Table below.

(Figure in Ha)

Sl. No.	PARTICULAR	AREA (Ha)
A	**MINING LEASE**	
	QUARRY AREA AND BARRIER	2388.525
	SUB TOTAL	**2388.525**
B	**ADDITIONAL LAND TO BE ACQURED**	
	EXTERNAL DUMP	164.259

	WASHERY	47.340
	COLONY AND PLANTATION AREA	49.054
	INFRASTRUCTURE	22.438
	RATIONALISATION	39.418
	SUB TOTAL	322.509
	TOTAL	2711.034

The total area of 2711.034 Ha includes 1898.328 hectares of forest land, 110.543 hectares of Government land and 702.163 hectares of Tenancy land. There are 7 villages falling in Parsa East and Kanta Basan coal block. It has been envisaged not to acquire total village area. Details of land (village wise) to be acquired for Parsa East and Kente Basen opencast project and total land of each village is given in table below:

Name of the Village	Total Area (Ha.)	Land use pattern of land proposed to be acquired						
		Forest Land(Ha)			Govt Land (Ha)	Tenancy Land(Ha)		Total Land (in Ha)
		Revenue Forest		Protected forests		Adiwasi	Non Adiwasi	
		Chhote Jhhar ka Jungle	Bade Jhhar ka Jungle					
Salhi	1171.00	16.817	-	59.378	14.879	23.973	1.469	116.516
Hariharpur	441.00	2.768	19.321	110.156	10.187	34.815	0.735	177.942
Parsa	1266.00	50.378	8.542	138.036	18.320	100.398	12.533	328.207
Kente	1284.00	83.380	0.782	505.928	14.890	194.387	0.089	799.456
Ghatbarra	2447.00	61.660	0.611	706.783	52.256	212.217	121.547	1155.085
Porigiya	3956.00	-	-	128.130	-	-	-	128.130
Basen	1519.00	-	-	5.698	-	-	-	5.698
Total		214.963	29.256	1654.109	110.543	565.790	136.373	2711.034

6. PROPOSED INFRASTRUCTURE

(i) Industrial Area

Workshop

For maintenance and repair of equipment deployed in Parsa East and Kanka Basen opencast project, the following maintenance and repair concept has been envisaged:

a) Daily maintenance, scheduled maintenance, minor repair and medium repair proposed to be carried out in the project maintenance and repair unit.
b) Capital repair and major overhauling of equipment at manufacturers' repair unit or, by outside agency at site.

Planning has been done for providing maintenance and repair facilities to all the major equipment deployed in Parsa East and Kanta Basan opencast project. The proposed maintenance and repair unit and project store will facilitate the maintenance and repair requirement of mining, mechanical, electrical, and other auxiliary equipment and storage of spare-parts, sub-assemblies and consumables.

Excavation maintenance and repair unit

Scope of work for Excavation maintenance and repair unit will be

- Preventive maintenance.

c) Daily maintenance, routine lubrication and weekly washing of equipment.
d) Technical inspection and running repair of equipment and checking of tyre pressure.
e) Daily and fast filling of diesel at fuel delivery station for transport equipment and at site for field equipment.
f) Dismantling, opening and refitting of tyres.
g) Incidental minor repairs of assemblies and sub-assemblies of mining and mechanical equipment i.e. dumper, dozer, shovel, drill etc.

- Scheduled maintenance.
- Medium repair and replacement of assemblies and sub-assemblies.
- Mobile repair and maintenance facilities with maintenance crew for field equipment at site.

The following facilities are envisaged in Excavation maintenance and repair unit

- Mechanised washing on specially constructed platform for dumpers and dozers.
- Daily maintenance bays for dumpers and dozers.
- Schedule inspection and lubrication bays for dumpers and dozers.
- Scheduled maintenance, medium repair and minor repair facilities for dumpers and dozers.

- Minor repair and replacement of sub-assemblies and assemblies of shovels, drills and other field equipment at site by mobile repair team.
- Medium repair and overhauling of sub-assemblies and assemblies of field equipment.
- Machine shop.
- Electric and auto repair shop.
- Engine and radiator repair shop.
- Welding and structural shop.
- Pavements for dumper and dozer parking.
- Underground water reservoirs.
- Supporting facilities like offices, computer room, electronics room, charge stores, tool room, pump room, cycle stand, canteen, security post, fire fighting facilities, ventilation system etc.
- Material handling facilities.
- Machine tools, general and special purpose tools, diagnostic tools, master tool kits etc.
- Refueling station with high capacity pump.

E&M maintenance and repair unit

Scope of work for E&M maintenance and repair unit will be

- Minor repair, medium repair and replacement of components, assemblies and sub-assemblies of CHP, pumps and electrical equipment.
- Minor and medium repair of switch gears, motors, self-starters and other electrical equipment.

The following facilities are envisaged in E&M maintenance and repair unit:

- E&M maintenance and repair unit for maintenance and minor repair of CHP equipment, pumps, electrical equipment and other installations.
- Machine shop, electrical repair shop, mechanical repair shop etc.
- Machine tools, general and special purpose tools, diagnostic tools, master tool kits etc for electrical and mechanical equipment.
- Supporting facilities like charge store, tool store, toilet, offices etc.

PROJECT STORE

The report has envisaged a project store for reception, storage and issue of all kinds of materials, spares, equipment and consumables required for mine operation and maintenance of mining, mechanical and electrical equipment. The storage capacity has been planned for 30 to 45 days consumption of materials. Due consideration has also been given for proper working environment, cleanness and safety measures. Proper equipment and material handling facilities have also been provided.

Separate areas are envisaged for the storage of following items:

- Spares and assemblies of HEMM
- Electrical equipments like, motor, generator, switch gear, etc.
- Spares and assemblies of electrical equipment
- Spares and assemblies of CHP and pumps.
- P.O.L
- Cables and beltings
- Stationery and office materials

Road

Colony Roads

The width of colony roads is envisaged as 5m. Provision for culverts, tree guards and drains would be provided.

Haul Road

Haul roads suitable for plying 100T & 35T class rear dumpers with side drains and dozer path would be provided within the mining area.

Heavy duty Road

The dumpers deployed in the benches will also go to the workshop for maintenance as well as dump for dumping. Hence a provision for heavy duty road has been made. The type of road suitable for 100T & 35T class rear dumpers would be provided connecting, workshop, dumps etc.

Approach roads

Existing approach roads are adequate to meet the requirement of the proposed expansion.

(ii) Residential Area

The residential buildings and allied facilities of the project shall be located at a suitable place.

(iii) Connectivity

The Tehsil Headquarters at Udaipur and the District Headquarters at Ambikapur are located at a distance of 25 km and 70 km northeast of the block on State Highway (SH)-2A. Lakhanpur, another small township is also located about 43 km northeast of the block on this State Highway. The State Highway -2A aligned in a NE–SW direction passes very close to the north western corner of the block. The block can be approached from Tara village, located on SH -2A at a distance of about 152 km from Bilaspur, through a fair weather forest road that leads to Ghatbarra village through Phatepur village located in the southern part of the block. The accessibility within the block is through kutcha/unmetalled roads and is difficult during monsoon. The villages within the block are connected by morrum and mud roads.

The nearest railhead Bisrampur on the Bijuri-Ambikapur section of the South East Central Railway (SECR) is located about 62 km from the northwestern corner of the block.

The nearest airstrip is located at Ambikapur at a distance of about 70 km from the block while the nearest major airport is at Raipur, the state capital, situated at about 290 km southwest. The nearest major ports are at Paradip and Calcutta in the east coast.

It has been planned to bring coal from coal face to surface by belt conveyor. Conveyors are provided to transport coal into Coal Handling plant. Belt conveyor has been will reduce fleet of dumper, air pollution and noise pollution. Coal will be loaded to rail wagon by rapid loading system.

Loaded Coal wagon will move to Surajpur Railway Station which is situated on Anuppur – Ambikapur branch line on Bilaspur Division of South East Central Railway. From Surajpur Railway Station, coal wagon will move to power plant by rail.

(iv) Drinking Water Management (Source & Supply of water)

It is proposed that requirement of potable water requirement is met from ground water resources.

(v) Sewerage System.

Domestic and industrial effluent will be disposed off after suitable treatment in the effluent treatment plants (STP/ ITP) located in colony and industrial area.

(vi) Industrial Waste Management.

a) **Mine discharge:** Mine effluent contains silt and coal particles, which will be treated in two stages at primary sedimentation sump in mine floor and secondary sedimentation sump at mine surface.

The mine discharge will be used to meet the requirement of the, afforestation / plantation, dust suppression, fire fighting, other industrial, domestic applications. Surplus water meeting the prescribed standards, if any, will be discharged into nearby surface body.

b) **Workshop effluent:** The workshop effluent will be treated in a proper effluent treatment plant. Oil and grease will be removed using oil trap and stored in leak proof containers and will be sold to authorized vendors.

c) **Domestic effluent:** STP will be provided. Sludge after digestion will be used as manure / compost.

(vii) Solid Waste Management.

The opencast mine is planned upto 225 m depth with overall average stripping ratio of 5.24.

The total volume of OB has been estimated as 2368.72 million cum. The OB removed during initial years will be placed beyond the incrop of the seam-IV. The total volume of external dump has been estimated as 52.07 million cum solid. Rest of the OB will be placed in internal dumps. The total volume of internal OB, i.e. the volume

which will be accommodated internally by backfilling has been estimated as 2316.65 million cum.

The internal dumping will start when about 100 m space is available on quarry floor. By adopting the proposed sequence of mining, as the quarry advances, the amount of internal dump will increase as more space for the internal dumping is created. For external dumps no additional land will be required outside the block boundary. External dump will be accommodated inside the block boundary. Two external dump i.e external dump west and external dump east has been proposed on the north western and north eastern side of the block boundary respectively. Two internal dump i.e internal dump west and external dump east has also been proposed.

There will not be any internal dump till 3rd year of mine operation. It is proposed to start internal dumping from 4th year of mine operation. As the gradient of the seam is flat, during working of the quarry substantial amount of OB will be accommodated in internal dump. During 4th year of mine operation, 7.09 Mcum of OB will be accommodated in internal dump and remaining 19.97 Mcum of OB will be accommodated in external dump. From 5th year of mine operation, no external dumping will be required. Hence, OB will be accommodated in internal dump for rest of the mine life.

Overburden will be dumped in external as well as internal dump. Dumping has been planned assuming 15 % swelling factor.

During 1st year, height of external dump will be kept at only 15 m. During 3rd year, height of western external dump and eastern external dump will be 30m. At the end of 5th year height of west external dump and east external dump will be 30 m and 45 m respectively. At the end of mine life, western internal dump will be at the ground level except in the area of 425.89 Ha where dump height is 60 m above ground level. Similarly, At the end of mine life, eastern internal dump will be at the ground level except in the area of 544.00 Ha where dump height is 30 m above ground level. During

closure of mine, overburden dumped above ground level will be used to fill void upto 30 m below ground level. It is proposed to maintained water body in the final void that is 30 m below ground level.

The land reclamation will be taken progressively after exhaustion of coal and completion of internal back dumping and flushing with external dumps.

The top soil is to be used with minimum time lag for spreading over the external & internal dumps.

It is proposed to reclaim dump with plantation etc after dumping / spreading top soil over the external and internal dumps.

Out of 2368.72 Mcum of OBR, 52.07 Mcum have been accommodated in external dumps, which constitutes about 2.2% of total dumping.

Phased dump planning along with dump capacity is given in table below:

Year	External Dump	Cumulative External Dump	Internal Dump	Cumulative Internal Dump	Total OB	Total OB Cumulative
	(Mcum)	(Mcum)	(Mcum)	(Mcum)	(Mcum)	(Mcum)
1	4.38	4.38	0	0	4.38	4.38
2	9.56	13.94	0	0.00	9.56	13.94
3	18.16	32.10	0	0.00	18.16	32.10
4	19.97	52.07	7.09	7.09	27.06	59.15
5	0	52.07	44.35	51.44	44.35	103.50
6	0	52.07	44.43	95.86	44.43	147.93
7	0	52.07	49.24	145.11	49.24	197.17
8	0	52.07	57.69	202.80	57.69	254.86
9	0	52.07	57.69	260.49	57.69	312.56
10	0	52.07	60.31	320.80	60.31	372.87
11	0	52.07	68.88	389.68	68.88	441.74
12	0	52.07	68.88	458.55	68.88	510.62
13	0	52.07	73.30	531.85	73.30	583.92
14	0	52.07	80.36	612.21	80.36	664.27
15	0	52.07	80.36	692.56	80.36	744.63
16	0	52.07	88.46	781.02	88.46	833.09
17	0	52.07	89.10	870.13	89.10	922.19
18	0	52.07	91.83	961.96	91.83	1014.03
19	0	52.07	98.94	1060.90	98.94	1112.96
20	0	52.07	98.94	1159.83	98.94	1211.90

21	0	52.07	99.98	1259.81	99.98	1311.88
22	0	52.07	116.31	1376.13	116.31	1428.19
23	0	52.07	116.31	1492.44	116.31	1544.51
24	0	52.07	116.31	1608.75	116.31	1660.82
25	0	52.07	116.31	1725.06	116.31	1777.13
26	0	52.07	119.78	1844.85	119.78	1896.91
27	0	52.07	119.96	1964.81	119.96	2016.88
28	0	52.07	107.86	2072.67	107.86	2124.74
29	0	52.07	85.76	2158.43	85.76	2210.50
30	0	52.07	80.20	2238.63	80.20	2290.70
31	0	52.07	59.06	2297.69	59.06	2349.76
32	0	52.07	18.95	2316.65	18.95	2368.72
33	0	52.07	0.00	2316.65	0.00	2368.72
34	0	52.07	0.00	2316.65	0.00	2368.72

Power Requirement & Supply / source.

Power

Heavy Earth Moving Machines consume significant power in opencast project. CHP including crushing & material handling facilities, mine dewatering, workshop, offices, colony, Washery etc add to the total power demand of the project. On achieving the targeted coal production and commissioning of Shovels, Drills, Coal Handling Plant, Workshop, washery and Main pumps, the power demand of the OCP is expected to touch the maximum demand.

The proposed mining block is virgin. Based on Rated capacity of 15.0 MTY ROM Coal for Parsa East and Kanta Basan coal Block and assuming certain parameters for coal transportation and loading, washery & pumping etc the tentative requirement of power shall be in the range of 15-20 MVA at 33 kV.

The source of power for Parsa East and Kanta Basan Opencast project is Ambikapur Substation of CSEB which is located at a distance of about 70 Km from the proposed project. It is suggested to take power from Ambikapur substation at 33 kV and bring it to project's switching substation to meet the power demand of Parsa East and Kanta Basan project.

Restricted earthing has been envisaged for Electrical System. All electrical system

will have protection from lightning and high voltage surge.

Switching station and substation shall be equipped with all safety features firefighting system.

7. REHABILITATION AND RESETTLEMENT (R & R) PLAN

Rehabilitation and Resettlement Plan (RAP) was drawn for 10 MTPA mining project including the pit head washery on the basis of baseline socio-economic survey carried out through reputed voluntary organization through participatory process. RAP has following important components:

1. Rehabilitation and Resettlement of families affected due to acquisition of land for the project from seven villages within project boundary.
2. Corporate Social Responsibility Plan for the communities around the project comprising of 14 villages including seven villages in core zone.
3. Tribal Development Plan for the core zone and other seven villages around

The RAP is based on the best of the two policies in vogue i.e National R&R Policy 2007, Chhattisghar Adarsha Punarwasa Niti 2007 (Chhattisghar Ideal Rehabilitation Policy 2007). Total budget of RAP including CSR and TDP to gather comes to Rs. 99.63 Crore at an estimated rate.

8. PROJECT SCHEDULE & COST ESTIMATES

(i) Likely date of start of construction and likely date of Completion

Coal production was started from Parsa East and Kanta Basan during year 2012-13. Yearly production planned as per approved Mining Plan until achievement of full capacity has been given in table below:

2013-14	–	5.0 MTPA
2014-15	—	10.0 MTPA
2015-16	—	10.0 MTPA
2016 -17	—	15.0 MTPA

(ii) Estimated project cost along with analysis in terms of economic viability of the project.

Project cost has been estimated as 236900 Lakhs.

Details of Investment has been presented below (Rs.in Lakhs)

i) Land	:	Rs.40100.00
ii) Building	:	Rs.7800.00
iii) Plant and Machinery	:	Rs.150000.00
Sub Total	:	**Rs 206900.00**
iv) Other fixed assets	:	**Rs 30000.00**
Total	:	**Rs.236900.00**

On the basis of capital investment envisaged for the project, this project is economically viable

9. ANALYSIS OF PROPOSAL (FINAL RECOMMENDATIONS)

Financial and social benefits.

It is obvious to assume that the activities of the mining operations will improve the socio-economic levels in the study area. The anticipated impact of this project on various aspects is given below:

- **Impact on Human Settlement**

  Human settlement is expected to increase after this project gets operational.

- **Impact on Population Growth**

  This project will have an impact on the population growth, as it will provide good value of employment to the families in the nearby villages. Preference will be given to local unemployed youth for employment during development of mine and in operation of mines which will substantially increase the income status of population of the area and due to migration of people from outside area will be haying impact on the area

- **Impact on Literacy and Educational Facilities**

  The literacy level of the project area is likely to increase as there will be influx of many educated people taking up jobs in the mine, which is likely to result in establishment of better educational facilities.

- **Impact on Civic Amenities**

  The impact of mining on the civic amenities will be substantial after the

commencement of mining activities. The construction of new roads in the project area will enhance the transportation facilities.

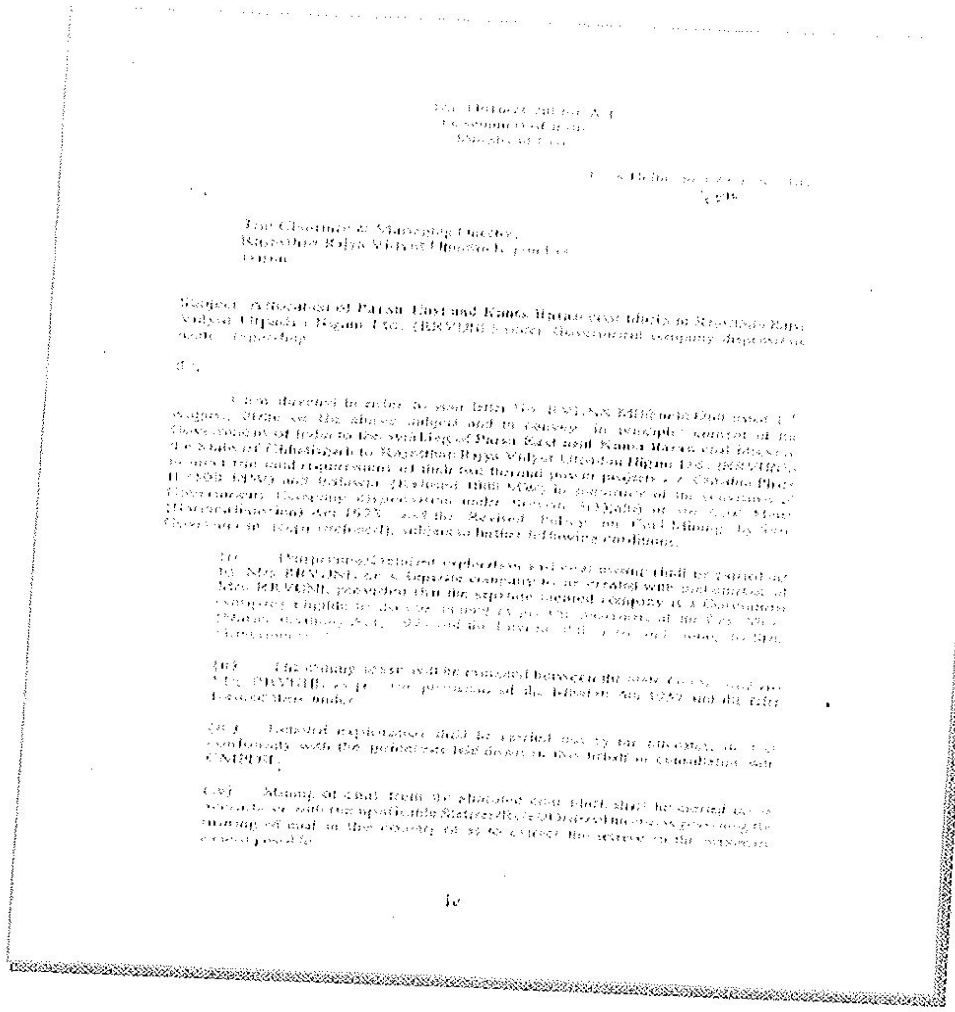
- **Impact on Health Care Facilities**

  It is imperative to have proper health care facilities near the mining area. Health care center will be developed at proposed residential colonies, which will also extending the medical facilities in the surrounding villages through its rural welfare schemes.

- **Impact on Economic Aspects**

  The proposed mining activities will provide employment to persons of different skills and trades. The local population will have preference to get an employment. The employment potential will ameliorate economic conditions of these families directly and provide employment to many other families indirectly who are involved in business and service oriented activities. This in-turn will improve the socio-economic conditions of the area.

Annexure - I



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(vi) The allocattee shall ensure that the land acquisition process is completed at all levels till the mine reaches its rated capacity or at the latest by [illegible]. Any lapses on this count shall lead to the allocation[illegible] of mining lease.

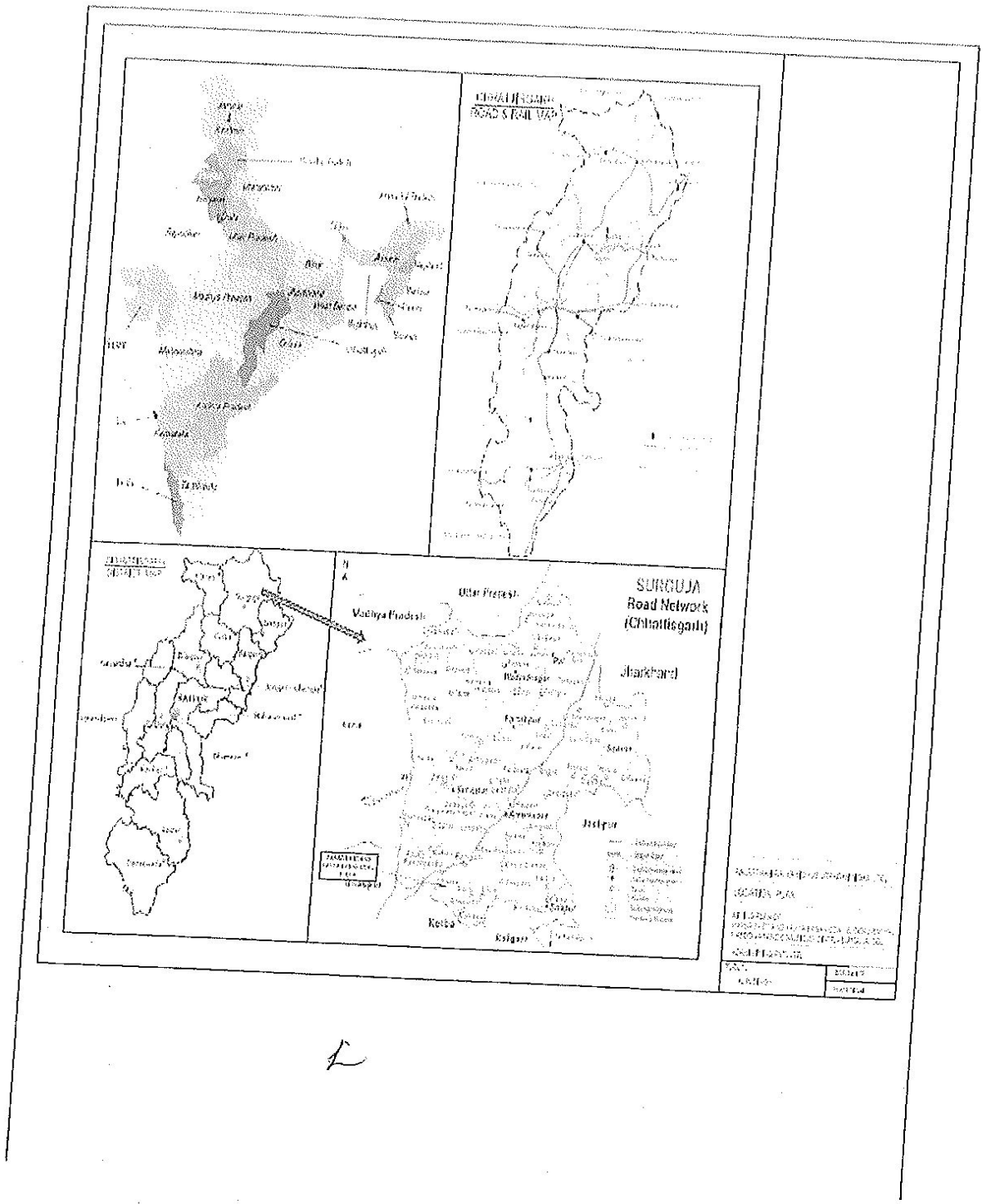
(vii) Any violation of the conditions imposed above in respect of coal from the Parsa East and Kanta Basan coal block will render the mining lease liable for cancellation and withdrawal of allocation.

(V. S. Kaul)
Under Secretary to the Government of India.

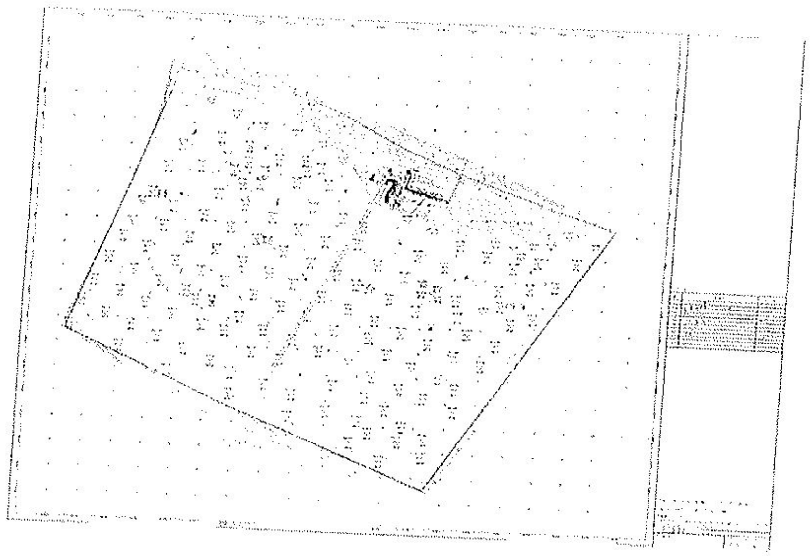
Copy to

1. The Chief Secretary, Government of Rajasthan, Government Secretariat, Jaipur 302 005
2. Prime Minister's Office with reference to PMO's ID No. 2007/PMO/086/ISI dated 13.06.2007
3. Chairman, CIL, Kolkata
4. CMD, CMPDIL, Ranchi (HEADQTR.)
5. CMD, SCCL, Hyderabad
6. Ministry of Power with reference to D.O. letter No. 12/30/03-
7. Coal Controller, Kolkata
8. Office Folder.

Annexure –II : Location of Parsa East and Kanta Basan coal block



Annexure III: Final stage quarry plan



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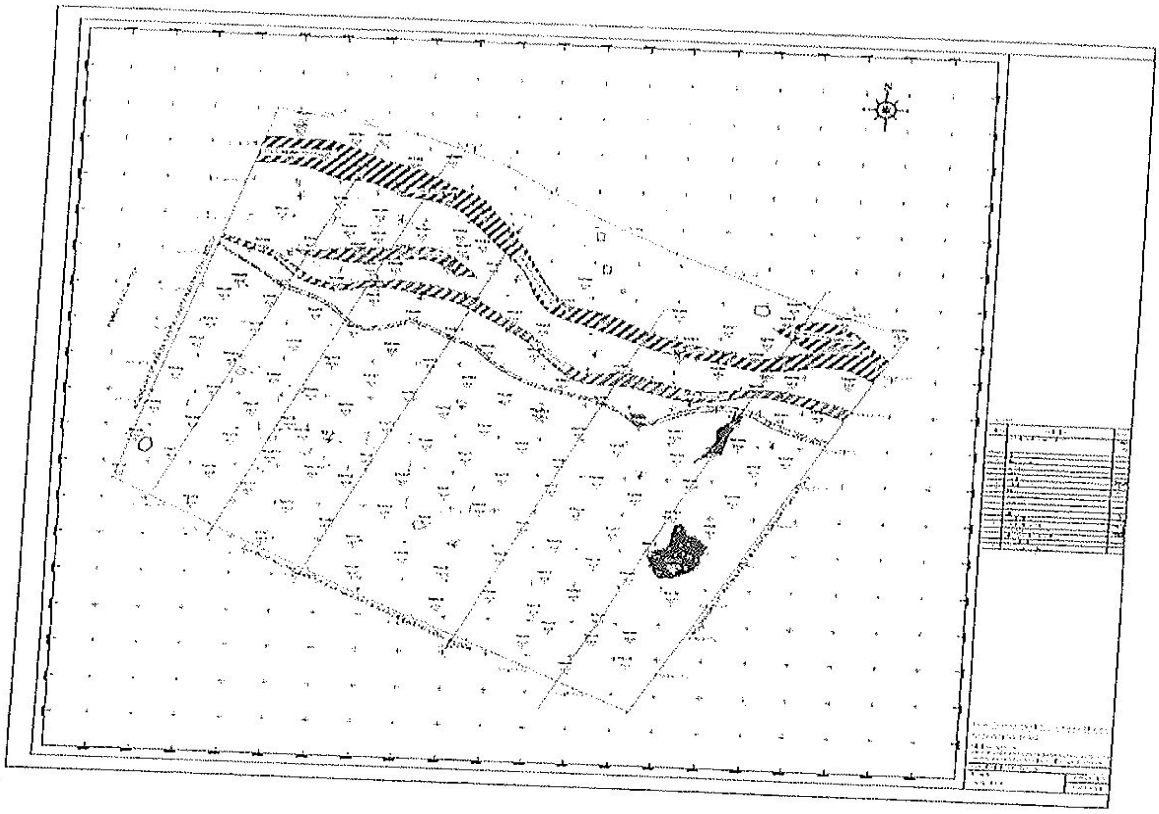
Annexure-IV : Geological plan



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Annexure V: Topographical plan