ABRIDGED PROJECT REPORT

(MDO MODE)

OF

PIPARWAR UG (PHASE-I)

(Capacity- 0.87Mty)

NORTH KARANPURA COALFIELD

CENTRAL COALFIELDS LIMITED

APRIL -2021

UNDERGROUND MINING DIVISION,
CMPDI HQ, RANCHI
CENTRAL MINE PLANNING & DESIGN INSTITUTE (CMPDI)
(A Subsidiary of Coal India Ltd)
GONDWANA PLACE, KANKE ROAD, RANCHI
JHARKHAND, PIN – 834031

21/4/21

Jitendra Kumar Singh
Project Officer
Piparwar U/G

Mukesh Kumar I.F.S
Divisional Forest Officer
Chatra South Forest Division

2-5-23

ABRIDGED PR OF PIPARWAR UG (PHASE-I) (0.87 MTY)
TARGET CAPACITY ----------0.87 MTY
PEAK CAPACITY (150% of Capacity) -- 1.305 MTY

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Jitendra Kumar Singh
Project Officer
Piparwar U/G

Mukesh Kumar LFS
Divisional Forest Officer
Chatra South Forest Division

Project Officer
Piparwar U/G

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21/11/22
Jitendra Kumar Singh
Project Officer
Piparwar U/G

Mukesh Kumar IFS
Divisional Forest Officer
Chatra South Forest Division

2-5-23
SANJAY KUMAR
Project Officer
Piparwar U/G

SUMMARISED DATA

1.0 GENERAL INFORMATION

S.N	Particulars	Unit	Description
1	Name of Block Considered		Piparwar Coal Block
2	Longitude & Latitude of the Block / Topo Sheet No		Latitudes N 23°42'38" & N 23°44'45" and Longitudes E 85°01'34" & E 85°03'15" Topo sheet No. – 73E/1 and 73E/2
3	Block Area	Sq.km	6.38
4	Name of Coalfields in which block is located		North Karanpura Coalfields , CCL, Jharkhand
5	Name of the project		Piparwar Underground(Phase-I)
6	Location of the project		75 km from Ranchi
7	Nearest Railway station from the Project		Khalari & Ray Railway Station(10 & 5 km)
8	No of borehole within the block	No.	72
9	Overall BH Density within the Block	BH/sq.km	11.28
10	Borehole Intersection up to Bachra seam in the Block	No.	28
11	Borehole density for Lower Bachra seams in the Block	BH/sq.km	Around 4.38
12	Mining area considered from the Piparwar Block in Piparwar UG(Phase-I)	Sq.km	4.04
13	Borehole Intersection up to Bachra seam for the Phase-I	No.	17
14	Borehole density for Lower Bachra seams for Phase-I	BH/sq.km	4.21(approx.)
15	Area proposed for Low Height CM	Sq.km	1.71
16	Borehole intersection up to Lower Bachra seam in Low Ht. CM Area	No.	8

Jitendra Kumar Singh
Project Officer
Piparwar U/G

Mukesh Kumar IFS
Divisional Forest Officer
Chatra South Forest Division

Jitendra Kumar Singh
Project Officer
Piparwar U/G

2-5-23
SANJAY KUMAR
Project Officer
Piparwar U/G

17	Borehole density (Low Height CM District)	BH/sq.km	4.68
18	Area proposed for Normal Height CM	Sq.km	2.32
19	Borehole intersection up to Lower Bachra seam in Normal Ht. CM Area	No.	9
20	Borehole density (Normal Height CM District)	BH/sq.km	3.88

2.0 GEOLOGICAL INFORMATION

S.N	Particulars	Unit	Description
1.0	**Exploration Status**		
i	Total Meterage drilled for 72 boreholes	meter	8000.15
ii	Additional meterage to be drilled to enhance borehole density	meter	2500
2.0	**Details of Geological Formation**		
i	Type of Formation considered for UG		Karharbari Formation
ii	Type of overlying formation		Barakar formation (Suitable for OC)
iii	Igneous Intrusion		Not recorded in the block
3.0	**Strike & Dip**		General dip of the bed varies from 1 in 10 to 1 in 40. However in large part of the area, the gradient varies from 1 in 27 to 1 in 35. The strike of the beds are NNW-SSE which swings to almost N-S in sector-D around boreholes NNKP-42 and NNKP-73.
4.0	**Faults**		The block is traversed by 13 faults.

2.1 SEAM SEQUENCE

S.N.	Coal Seam	Drilled thickness of coal seam	parting with overlying seam / surface (m)	Remarks

Jitendra Kumar Singh
Project Officer
Piparwar U/G

Mukesh Kumar I.F.S.
Divisional Forest Officer
Chatra South Forest Division

2-5-23

SANJAY KUMAR
Project Officer
Piparwar U/G

		Min.	Max.	Min.	Max.	
Barakar Formations						
Strata above Karkata seam – 110m approx. with minor coal bands.						
1.	**Karkata**	4.90 (NNKP-45)	5.42 (NNKP-78)	7.92 (NNKP-45)	14.07 (NNKP-78)	Encountered in only two bhs.
2.	**Bisrampur**	2.40 (NNKP-73)	5.27 (NNKP-45)	7.80 (KP-3)	13.21 (NNKP-42)	Encountered in six bhs
3.	**Bukbuka Top**	2.25 (NNKP-45)	4.32 (NNKP-73)	6.16 (NNKP-71)	23.05 (NNKP-74)	Also encountered in two splits
4.	**Bukbuka**	9.24 (NNKP-74)	14.41 (NNKP-7)	0.75 (NNKP-42)	23.21 (NNKP-108)	
5.	**Upper Dakra**	3.10 (NNKP-47)	8.82 (NNKP-39)	1.11 (NNKP-79)	13.48 (NNKP-38)	Seam splits up in North - eastern part.*
	*split – 3.46 (NNKP-34) Parting-3 3.83 (NNKP-34) Bet. Split – 4.60 (NNKP-89)					
6.	**Lower Dakra**	18.65 (KP-3)	29.16 (NNKP-43)	89.12 (NNKP-67)	106.34 (NNKP-60)	Wherever Up. Bachra seam is not developed parting between Lr. Dakra seam & Lr. Bachra seam ranges between 95.68m (NNKP-41) & 110.73 (NNKP-6).
Karharbari Formation:						
7.	**Upper Bachra**	Nil	2.37 (KP-2)	1.53 (NNKP-10)	12.61 (NNKP-31)	Except in 3 boreholes.*
	* Thickness is invariably less than 0.90m. Usual range is 0.25 – 0.84m. Out of 26 drilled, the seam has been encountered in only 12 boreholes.					
8.	**Lower**	0.74	8.42	90.35		Also considered in splits in

Jitendra Kumar Singh
Project Officer
Piparwar U/G

Mukesh Kumar Meena
Divisional Forest Officer
Chatra South Forest Division

SANJAY KUMAR
Project Officer
Piparwar U/G

S.N.	Coal Seam	Drilled thickness of coal seam		parting with overlying seam / surface (m)		Remarks
		Min.	Max.	Min.	Max.	
	Bachra	(NNKP-46)	(NNKP-16)	(KP-2)		BH. NNKP-14, 41 & 30.
	Talchir	More than 37.70 base not drilled.				

2.2 GEOLOGICAL RESERVE OF THE PIPRAWR COAL BLOCK

The details of the geological reserve of Piparwar Coal block are as under:

Sl. No	Seam	Grade							Total Gross MT	Net Res. MT
		A	B	MT	D	E	F	G		
A.	SEAMS OF BARAKAR FORMATION									
1	Karkata	-	-	-	0.438	-	-	-	0.430	0.39
2	Bisrampur	-	-	0.217	0.161	2.597	-	-	2.975	2.60
3	Bukbuka Top	-	-	-	0.176	4.116	-	-	4.292	3.86
4	Bukbuka	-	-	-	-	5.559	37.615	-	43.174	38.86
5	Upper Dakra	-	-	-	-	3.549	31.817	0.164	35.530	31.98
6	Lower Dakra	-	-	-	-	23.159	130.44	-	161.60	138.2
Sub-Total (A)		**-**	**-**	**0.217**	**0.775**	**38.980**	**199.87**	**0.164**	**240.01**	**216.0**
B.	SEAMS OF KARHARBARI FORMATION									
1.	Reserve of Upper Bachra seam is not properly developed within the block. So Reserve is not estimated									
2	Lower Bachra	0.313	3.689	11.038	12.646	2.730	-	-	30.416	27.37
Sub-Total(B)		**0.313**	**3.689**	**11.038**	**12.646**	**2.730**	**-**	**-**	**30.416**	**27.37**
Total G. Res.		**0.313**	**3.689**	**11.255**	**13.421**	**41.71**	**199.87**	**0.164**	**270.42**	**243.3**

Jitendra Kumar Singh
Project Officer
Piparwar U/G

Mukesh Kumar I.F.S
Divisional Forest Officer
Chatra South Forest Division

2-5-23

C	LBS (Bottom Section)	0.49	10.91	3.27						14.67

2.2.1 GEOLOGICAL & MINEABLE RESERVE CONSIDERED FOR THE PROJECT

The proposed UG mining area covers mainly the Piparwar coal block area and part of the area outside the block area but within the existing leasehold area of Piparwar opencast project. The details of the geological and mineable reserve considered for the proposed Piparwar UG (Phase-I) are as under:

Area for Project (sqkm)	Area for UG Mining (sqkm)	Area for Mine Pit top Infrastructure (sq.km)	Area Considered for UG Mining(sq.km)		Reserve Considered			Geo Losses	Net Mineable Res.
			Within Block	Outside the Block but within Leasehold	Within Block	Outside the Block	Total		
4.65	4.04	0.61	3.80	0.24	17.04	0.49	17.53	2.617	14.92

2.2.2 ESTIMATED EXTRACTABLE RESERVE

The details of the estimated extractable reserve of selected bottom section for the proposed UG project are as under:

Seam	Mineable Reserve(M.Te)	Mining Losses (M.Te)	Extract. Res (M.Te)	% of Extraction w.r.t Mineable Reserve	% of extract. With respect to geo.res.
Total	14.92	6.09	8.83	59.18	50.37

2.3 GEO-MINING PARAMETERS

The geo-mining parameters of the seams considered for proposed underground mine is as under:

Sl.No.	Particulars	Geo-mining Data	
1	UG project Area	4.65 sq.km	
a	UG mining area	4.04 Sq.km	
b.	Pit top Infrastructure	0.61 sq.km	
2.	**Seam Thickness**		
	Seam Considered for UG Mining	**Thickness Range(m)**	**Average Thickness(m)**
	Lower Bachra seam	0.74 – 8.42	4 m
3.	**Parting**	**Minimum**	**Maximum**

21/4/24

Jitendra Kumar Singh
Project Officer
Piparwar U/G

Mukesh Kumar IFS
Divisional Forest Officer
Chatra South Forest Division

2-5-23

SANJAY KUMAR
Project Officer
Piparwar U/G

	Parting between floor of quarry & Roof of Lower Bachra Seam	98 m	118 m
4.	**Proposed Working / extraction thickness**	1.5m -4.6m (from floor of the seam)	
5.	**Gradient of the seam**	1 in 10 to 1 in 40	
6	**Immediate Roof Characteristics as per GR**		
a.	**Seam**	**Roof Characteristics**	
	Lower Bachra Seam	The distribution of lithology of immediate roof of lower bachra seam shows 56.5% carbonaceous shale, 21.7% of sandstone, 8.7% of alternate band of shale and sandstone and rest is shale and sand stone. The immediate roof characteristics will be different after selection of 4.6m along the floor of the seam in thick seam part. The details are given in chapter-VIII.	
7	**Immediate Floor Characteristics as per GR**		
a.	**Seam**	**Floor Characteristics**	
	Lower Bachra Seam	The distribution of lithology of immediate floor of lower bachra seam shows 25.0% carbonaceous shale, 41.7% of sandstone, 12.5% of alternate band of shale and sandstone and rest is shale and sand stone. The immediate roof for proposed working section will be different than that of immediate roof as that of provided in GR.	
8	**Status of overlying & underlying seam**		
	Overlying Seam	In Overlying Seam opencast is almost completed.	
	Underlying Seam	There is no underlying workable coal horizon.	
9.	**Depth From Surface**	**104m (Min)**	**194m (Max)**
10.	**Quality of Coal as per GR**	**Ash %**	**UHV Range(Kcals/Kg)**
	Lower Bachra Seam	10.0 to 34.9	4070 – 6195 (in-band)
11	**ROM Grade Range**	**G-8 to G-4**	
12	**Wt. Average Quality of Coal as per Selected Bottom Section**	**G-5 (5892 Kcals/kg)**	

Jitendra Kumar Singh
Project Officer
Piparwar U/G

Mukesh Kumar I.F.S
Divisional Forest Officer
Chatra South Forest Division

SANJAY KUMAR
Project Officer
Piparwar U/G

a	Low Height CM Panel Area	G-4 (6153.74 Kcals/kg)
b	Normal Height CM Panel Area	G-6 (5757.33 Kcals/kg)
13.	**Degree of Gassiness of the seam**	Not Known. For planning purpose assumed as Degree-I. It is proposed to determine after opening of the coal seam.
14	**Wateriness of the Seam**	As per the working of same seam in the adjoining mines, the seam is not watery.
15	**Incubation Period**	Not Known. For planning purpose it is considered 9 months.

3.0 MINE PARAMETERS FOR UNDERGROUND

Sl. No.	Particulars	Unit	Value
1	Pillar Size	m x m	35 x 35
2	Gallery Width	m	5.5
3	Working Height	m	1.5m to 4.6m
4	Panel Length	m	Up to1600 m
5	Panel width	m	Up to140m
6	No of headings in the panel	5 (max)	
7	Panel Barrier Width	One Pillar width	
8	Coal Evacuation	Through Belt	
9	Man Transport	Free Steered Vehicle	
10	Material Transport	Multi-Utility Vehicle	
11	Roof Support	With Resin Bolts, Mobile Breaker Line support	
12	Pumping	Stage Pumping through incline.	
13	Fan Parameters	80-120m^3/sec,250Kw	
14	Coal Linkage	Rajdhar Siding	
15	Mode of Transport from Mine to Rajdhar Siding	By truck transport	
16	Coal Washing	Not Proposed	
17	Mode of Entry	Set of three Incline	
18	Panel Equipment	Continuous Miner Package (2 Sets)	

Jitendra Kumar Singh
Project Officer
Piparwar U/G

Mukesh Kumar IFS
Divisional Forest Officer
Chatra South Forest Division

SANJAY KUMAR
Project Officer
Piparwar U/G

4.0 GENERAL TECHNICAL INFORMATION FOR THE PROJECT

S.N	Particulars	Unit	Description
1	**General Information**		
i	Project Area	Ha	464.69
ii	UG Mining Area	Ha	403.56
iii	Area for Surface Infrastructure	Ha	61.13
2.	**Method of Mining**		Bord & pillar with CM
3.	**Geological Reserve Considered**	MT	**17.53**
i	Within the Piparwar Block	MT	17.04
ii	Outside the Piparwar Block(within existing leasehold boundary of Piparwar opencast)	MT	0.49
4.	**Extractable Reserve**	MT	8.83
5	**Percentage extraction(w.r.t Geological Reserve considered)**	%	50.37
6.	**Grade Wise Extractable Reserve**		
i	G-8	MT	0.80
ii	G-6	MT	1.58
iii	G-5	MT	2.82
iv	G-4.	MT	3.64
	Total Extractable Reserve	**MT**	**8.83**
7.	**Wt. Average Coal Quality of total extractable Reserve**	Kcal/Kg	G5 (5892)
8.	**Production Capacity**		
i	**Nominal Production Capacity**	Mty	0.87
ii	**Peak Capacity (150% as per new guideline of Mining Plan)**	Mty	1.305
9.	**Year of Starting Coal Production**		3rd Year
10.	**Year of achieving target production**		5th year (Including Construction period)
11	**Proposed Life (Including Construction Period)**	Years	14
12	**Proposed End User**		As per Company FSA
13.	**Land Requirement for the Project**	**Ha.**	**464.69**
14.	**Land proposed to be acquired**	**Ha.**	**0.000**

Jitendra Kumar Singh
Project Officer
Piparwar U/G

Mukesh Kumar I.F.S.
Divisional Forest Officer
Chatra South Forest Division

2-5-23
SANJAY KUMAR
Project Officer
Piparwar U/G

15	Land proposed to be possessed	Ha.	0.000
16.	Housing Facilities		
	Housing facilities for essential & statutory manpower shall be met by existing residential facilities of Piparwar OC whereas for the Mine Operator's manpower separate residential complex needs to be constructed by the Mine Operator.		
17	Estimated Connected Load		
i	UG Power Transmission Voltage	kV	6.6
ii	Surface & Underground Supply	kW	9237
iii	For proposed Executive Hostel(80 Room)	kW	400
18	Estimated Maximum Demand, Active Demand & Connected Load		
i	Maximum Demand for Surface , UG & other supply	kVA	4850
ii	Assessed Active Demand	kW	4740
iii	Proposed Connected Load	kW	9637

5.0 YEAR WISE GRADE WISE PRODUCTION PROGRAMME FOR THE PROJECT

Year	Production (MTy)			
	Normal Ht.CM	Low Ht.CM	Total	Wt av.grade
1				
2				
3	0.36	0.00	0.36	G-5
4	0.51	0.24	0.75	G-4
5	0.51	0.36	0.87	G-5
6	0.51	0.36	0.87	G-4
7	0.51	0.36	0.87	G-5
8	0.51	0.36	0.87	G-5
9	0.51	0.36	0.87	G-5
10	0.51	0.36	0.87	G-5
11	0.51	0.36	0.87	G-5
12	0.51	0.24	0.75	G-6
13	0.51	0.00	0.51	G-8
14	0.37	0.00	0.37	G-5
Total	5.83	3.00	8.83	

31/1/24
Jitendra Kumar Singh
Project Officer
Piparwar U/G

Mukesh Kumar I.F.S
Divisional Forest Officer
Chatra South Forest Division

2-5-23
SANJAY KUMAR
Project Officer
Piparwar U/G

CHAPTER –I

INTRODUCTION

1.1 BACKGROUND

Piparwar UG(Phase-I) (0.87 Mty) has been prepared for extraction of lower bachra seam in Piparwar coal block (including part of extended lease boundary of Piparwar opencast) and is approved by CCL Board in 463rd meeting of CCL Board held on 18.09.2018 and 73rd meeting of the ESC of CCL held on 18.09.2020.

1.1.1 BRIEF ABOUT EARLIER REPORT

The details of earlier report are as under:

Year of Preparation	Year of Approval (In Principle)	Technology adopted	Production Capacity(Mty)
2009	2011	CM + LHD	1.38

Earlier report was in the combined area of Piparwar and Mangardaha coal block.

1.2 EXPLORATION STATUS

The area considered for the proposed Piparwar Underground(Phase-I) project falls in Piparwar Block and is geologically explored but the borehole intersection up to the considered Lower Bachra seam is very low. The exploration work was mainly to prove the quarriable seams i.e. up to lower Dakra seam. Number of boreholes and meterage drilled by the various agencies and period of drilling thereof, in the Piparwar blocks is as under:

Table no.-1.1: Details of Drilling

Period of drilling	Agency	Area (Sq. Km)	No. of BH	Borehole Intersected LBS	Meterage (m)
1963-65	GSI	6.38	2	1	535.95
1979-82	CMPDI	6.38	70		7664.20
Total			**72**	**28**	**8000.15**

Borehole Density within Piparwar Block & within proposed UG mining area of Piparwar UG (Phase-I) for Lower Bachra seam are around 4.38 & 4.21 respectively. Total 17 number of borehole intersection within the proposed UG mining area (4.03 sq.km within Piparwar block) of Piparwar UG (Phase-I).

1.3 MINING ACTIVITY, IF ANY

Piparwar opencast for extraction of overlying seam (i.e up to Lower Dakra Seam) was in operation within the geological block considered for planning. Presently opencast mining in lower Dakra seam is already complemented in the extended lease area of Piparwar opencast

Jitendra Kumar Singh
Project Officer
Piparwar U/G

Mukesh Kumar I.F.S
Divisional Forest Officer
Chatra South Forest Division

2-5-23
SANJAY KUMAR
Project Officer
Piparwar U/G

(i.e in Bijan Basti). The proposed UG mining area / project area of Piparwar UG (Phase-I) will be either within the de-coaled area or below internal dump of piparwar opencast.

1.4 JUSTIFICATION OF PROJECT REPORT

- Seams from Karkatta to lower Dakra is extracted by Piparwar opencast.The underlying seams of Lower Dakra seam within the geological block are upper Bachra and lower Bachra seam. Upper bachra seam is not workable due to its low thickness (generally less than 0.90m). Lower Bachra seam lies around 100m below the floor of Piparwar opencast (i.e floor of lower Dakra seam) having thickness ranges from 0.74m (NNKP-46) to 8.42m (NNKP-16) (in major part 2 to 3m) is workable. The extraction of lower Bachra seam by opencast will not be economically viable. Hence, extraction of lower Bachra seam is possible only by underground mining method.
- Underground coal production of CCL is declining gradually. Hence, to enhance the underground coal production of CCL by introducing mass production technology. The geo-mining parameters of the area selected for the project is very much suitable for introduction of mass production technology as continuous miner. Introduction of CM will help in meeting the demand of good quality non-coking coal and will reduce the gap between demand and supply of coal in CCL.
- Area selected for the project is already acquired and are in possession of Piparwar opencast and have sufficient extractable reserve (at least one life cycle) for deployment of continuous miner technology as mass production. No rehabilitation & resettlement will be required for the proposed Piparwar UG (Phase-I).

1.5 SALIENT FEATURES OF PROPOSED PROJECT REPORT

The salient features of the proposed project report is as under:

S.N	Parameters	Values
1	Production Capacity (Nominal Capacity)	0.87 MTY
2	Recommended Capacity for EMP (150%)	1.305 MTY
3	Life of the Project	14 Years
4	Seam Proposed to work	Lower Bachra (Bottom Section)
5	Range / Av. grade of Coal	G-4 to G-8 ***(Generally G-4 to G-6)*** (Weighted average. G-5)
6	Total Extractable Reserve (M.Te)	8.83 M.Te
7	Method of Mining Proposed	Bord & Pillar with CM (Low Height CM & Standard Height CM)

Jitendra Kumar Singh
Project Officer
Piparwar U/G

Mukesh Kumar IFS
Divisional Forest Officer
Chatra South Forest Division

SANJAY KUMAR
Project Officer
Piparwar U/G

9	Underground Coal Evacuation System	Through Belt Conveyors
10	Man & Material Supply System	Free Steered Vehicles & multi utility Vehicles
11	Total Land required for the Project	464.69 Ha
12	Acquisition & Possession Status of Land	Acquired & Possessed by Piparwar OC

1.6 DIFFICULTIES AND CONSTRAINTS IN MINING WITH ASSOCIATED RISK

- Seam considered for underground mining (i.e Lower Bachra seam) falls in Karharbari group of seam which shows very erratic behavior in roof, floor and quality of seam in the coalfield. Borehole density for lower Bachra seam is low. Therefore, there may be chances of getting erratic roof & floor behaviour (i.e weak roof & floor) and variation in seam thickness & coal quality while actual mining.
- Drilling from surface for increasing borehole density is practically difficult due to internal dumping over the proposed UG mining area.
- The general thickness of lower Bachra seam in the proposed mining area varies from 1.5m to 7.0m (as per isochore plan).The concentration of bands generally exists in upper part of the seam. Working entire seam thickness in higher seam thickness range may reduce the quality of coal. The proposed PR envisages extraction of generally clean bottom section along the floor of seam to maintain the quality of coal. Hence selection of proper working horizon i.e. generally clean bottom section of Lower Bachra Seam will be essential. Improper selection of bottom section may lead to quality reduction.
- The propose UG working will be below internal dump of Piparwar opencast. The dead weight of internal dump may cause problem in maintaining the roof strata in underground. Further increase in dump height within the proposed UG mining area may also endanger the pillar stability of the proposed underground.
- The mine entries for the proposed underground are proposed from the floor of the quarry which will be around 70m below original surface level. Diverted Benti Nala and Mangardaha nala are flowing in the south and north of proposed UG project area & Damodar River makes the eastern boundary of proposed Piparwar UG(Phase-I). These rivers / nala may be potential source of surface inundation. However, the proposed PR envisages required safety precaution for the same.
- The present status of proposed incline site (i.e at the floor of Quarry-1 of Piparwar OC) is waterlogged (around 242 million gallon water) which needs to be de-watered. Surface sump area is filled in patches which need to be cleaned.

Jitendra Kumar Singh
Project Officer
Piparwar U/G

Mukesh Kumar Singh
Divisional Forest Officer
Chatra South Forest Division

SANJAY KUMAR
Project Officer
Piparwar U/G

- Around 37.81 Ha of JJ land (Jungle Jhari Land) falls over the proposed the project area where opencast mining is already completed but forest department has raised some charges for that JJ land. Application for the diversion of earlier used JJ land is submitted to forest department. The admissible charges shall be provided by Piparwar opencast. This will not be the liability for the proposed UG. But before finalization of dispute it will be a constraint for the proposed UG project.

1.7 PROJECT OBJECTIVE AND TARGET BENEFICIARIES

- To enhance the underground coal production of CCL
- To introduce the mass production technology in the company.
- To reduce the demand supply gap of coal of the company.
- To help in meeting the 1.0 B.T target of C.I.L.

21/4/24
Jitendra Kumar Singh
Project Officer
Piparwar U/G

Mukesh Kumar I.F.S
Divisional Forest Officer
Chatra South Forest Division

2-5-23
SANJAY KUMAR
Project Officer
Piparwar U/G

CHAPTER-II

PROJECT SITE INFORMATION

2.1 LOCATION

The Piparwar Underground (Phase-I) project is located in Piparwar block of North Karanpura Coalfield. The limiting latitudes and longitudes of the project are as under:

Latitudes : 23⁰ 42' 38" N and 23⁰ 44' 45" N and

Longitudes : 85⁰ 01' 34" E and 85⁰ 03' 15" E

The block is covered by the Survey of India Topo sheet No.73 E/1 and 73E/2 (1" = 1 mile) and special Topo-sheet No.18. Aerial photographs on 1: 10,000 RF is done by the survey of India on behalf of CMPDIL.

2.2 AREA OF THE PROJECT

Total Block Area considered for the Project	:	6.38 sq. km
Total proposed area for the Project	:	4.65.sq. km
Area falling below Piparwar OCP	:	4.65 sq. km
Area falling outside Piparwar OCP	:	0.00 sq. km
Total Area for Project	**:**	**4.65 sq.km**

This proposed project area includes underground mining area as well as mine pit top infrastructure area. Out of 4.65 sq.km of area, 4.04 sq.km of area is underground mining area and remaining 0.61 sq.km area is for mine pit top infrastructure and surface sump. Out of 0.61 sq.km area, 0.33 sq.km area is for pit top infrastructure and 0.28 sq.km area is for surface sump. The seam is south-westerly dipping in the area selected for underground mining. ***Length alone true-dip rise is around 3.65 km whereas along strike is 1.10km.***

2.3 BOUNDARIES OF THE PROJECTISED AREA

The proposed mine boundary of Piparwar Underground (Phase-I) project is as under:

North : F28, F36 and limit of quarry-1 of Piparwar OC

South : Fault F13-F13 & Damodar River

East : Arbitrary 2.5m line of Lower Bachra seam in Quarry-1

West : Arbitrary 1.5 m isochore line of Lower Bachra seam (BH-NNKP-76) & Fault F25, F28 & Block Boundary

2.4 CLIMATE AND RAINFALL DATA

The climate of the proposed area is tropical. The days are usually hot with dusty winds during summer seasons but nights are generally pleasant. The maximum temperature during winter is

Jitendra Kumar Singh
Project Officer
Piparwar U/G

Mukesh Kumar IFS
Divisional Forest Officer
Chatra South Forest Division

SANJAY KUMAR
Project Officer
Piparwar U/G

around 1°C. However this temperature range is as per geological report data of 1984. After passing such a long time and due to active mining in the area, change in climate cannot be ruled out. The rainfall data collected for the period from 1966 to 1982 from the Bachra colliery, just across the Damodar River in south-east, indicates that the average monthly rainfall during the monsoon period (June to October) is 198.87 mm. During non-monsoon (November to May) the average monthly rainfall has been calculated to be 17.83 mm. The rainy season is generally from June to October with about 73 rainy days and average annual rainfall of 1200mm. The variation in the annual rainfall from year to year is not large.

2.5 TOPOGRAPHY AND DRAINAGE PATTERN

UG mining area is lying below the quarry-2 of Piparwar OC. The de-coaled area is mostly filled by internal dumping. Part of the dump area is planted. Dumped top surface RL (as told by the colliery surveyor) is mostly as that of original RL.

The drainage of the area is mainly controlled by the Damodar River and its tributaries.

2.6 ACCESSIBILITY AND COMMUNICATION

The proposed underground project is located at a distance of 75 km from Ranchi and 60 km from Hazaribagh. It is well connected from Khalari railway station and Ray railway station, which is at a distance of 10 km and 5 km, respectively. The Khalari railway station is linked to Ranchi by a black topped road road (S.H-47) via Bijupara (about 26 km from Khalari) on Ranchi-Daltonganj highway (S.H-48). The proposed underground project will be well connected from Hazaribagh and Ranchi district of Jharkhand.

2.7 PRESENT LAND USE PATTERN

The proposed underground project covers around 464.69 Ha of land. Out of this total area around 403.56 Ha has been considered for underground mining and rest of land is for underground mine infrastructure. Out of 464.69 Ha of land 403.56 Ha of land is internally dumped and partly planted over dump and rest 61.18 Ha is de-coaled and kept vacant for proposed underground mine infrastructure.

21/11/24
Jitendra Kumar Singh
Project Officer
Piparwar U/G

Mukesh Kumar I.F.S
Divisional Forest Officer
Chatra South Forest Division

2-5-23
SANJAY KUMAR
Project Officer
Piparwar U/G

CHAPTER- III

GEOLOGY AND DEPOSIT APPRAISAL

3.1 INTRODUCTION

Exploration by drilling in the Piparwar Block was first undertaken by G.S.I. in 1963-65 by drilling 3 boreholes. First geological report of the block was submitted in 1981 by GSI. CMPDI started semi-detailed drilling over 14 sq.km of area notified under CB Act. On the basis of data obtained from semi detailed drilling, 6.38 sq.km area was under taken for detailed drilling and referred as **"Piparwar Block"**. The geological report of Piparwar Block was submitted in 1984.

3.1.1 BLOCK BOUNDARIES

The block boundary of Piparwar block is as under:-

South: Damodar River.

North : Fault F28-F28 (up to the point where it merges with Fault F36 and fault F36.

West : Benti Nala up to point defined by Lat + 5860 N & Dep. + 3525 E and Fault F13.

East : Mangardaha Block boundary.

N.B: Latitude & departure in local grid should be converted in national grid and should be read accordingly.

3.1.2 SECTORS OF PIPARWAR BLOCK

The sectorial division of the block has been done only for quarriable seams on the basis of physico-graphic features and structural elements mainly faults.

Sector-A : In the east, between Magardaha nala and Floor incrop of lower Dakra seam.

Sector-B : South of Benti nala, area surrounded by Benti Nala, Damodar River and fault F13.

Sector-C : Area bounded by Benti Nala, F13, F25, F39 And floor in crop of lower Dakra seam.

Sector-D : Area west of Mangardaha nala and between Fault F25 & F36.

Sector-E : Area defined as 'Piparwar North Extension (Between faults F36 & F40).

21/7/24

Jitendra Kumar Singh
Project Officer
Piparwar U/G

2-5-23

Mukesh Kumar
Divisional Forest Officer
Chatra South Forest Division

3.1.3 PRESENT MINING STATUS OF THE BLOCK.

The Piparwar opencast is in operation for exploitation of coal up to Lower Dakra seam in the block and it is already exhausted.

3.2 EXPLORATION STATUS

The block is geologically explored. But majority of boreholes have been drilled up to Lower Dakra seam only to prove the quarriable potential of the seam.

3.2.1 BOREHOLE DRILLED BY VARIOUS AGENCIES

Number of boreholes and meterage drilled by the various agencies and period of drilling thereof, in the block areas are as under:

Table no.-3.1: Details of Drilling

Period of drilling	Agency	Block	Area (Sq. Km)	No. of BH	Meterage (m)
1963-65	GSI	Piparwar	6.38	2	535.95
1979-82	CMPDI	Piparwar	6.38	70	7664.20
Total				**72**	**8000.15**

3.2.2 BOREHOLE DENSITY

The borehole density of the Piparwar Block is shown below:

Table no.-3.2: Details of Drilling by various agency

Sl. No.	Agency	Intersection Seam	No. of BH	Area of Block	BH Density
1	CMPDI	Lower Dakara	42	6.38	6.89
2	CMPDI	Lower Bachra	28	6.38	4.38
3	GSI	Regional	2	6.38	
Total			**72**	**6.38**	**11.28**

But the borehole density in the underground mining area for lower Bachra seam is less than 4.38 and it comes around 4.21 borehole /sq.km.

ADDITIONAL DRILLING FOR THE PROJECT

The borehole density for Bachra Seam in Piparwar block is low. To increase the borehole density, some additional boreholes up to Lower Bachra seam may be required to ascertaining the trend of banding in the seam and selection of proper horizon of working. Around 2500m length drilling has been proposed, considering 16 numbers of boreholes having average depth

Jitendra Kumar Singh
Project Officer
Piparwar U/G

Mukesh Kumar I.F.S
Divisional Forest Officer
Chatra South Forest Division

2-5-23
SANJAY KUMAR
Project Officer
Piparwar U/G

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Expansion Project Report

For

PIPARWAR OCP (10 MTY)

North Karanpura Coalfield
(Central Coalfields Limited)

(330 days working)

TEXT & APPENDICES

July '06

Regional Institute-III

AUTHORIZED & CONTROLLED	
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ARUN KUMAR TYAGI
Project Officer
Piparwar OpenCast Project

EPR OF PIPARWAR OCP (10MTY)

SUMMARISED DATA

S.No.	Description	Unit	SANCTIONED	With CPP - Washed Coal			Without CPP -Raw Coal		
				OPTION-I	OPTION-II	OPTION-III	OPTION-I	OPTION-II	OPTION-III
1	Mineable Reserve	Mte	197.58	105.96	105.96	105.96	105.96	105.96	105.96
2	Volume of OBR	Mcum		79.85	79.85	79.85	79.85	79.85	79.85
3	Target Output								
	Coal	Mte	6.50	10.00	10.00	10.00	10.00	10.00	10.00
	OBR (Peak)	Mcum		9.03	9.03	9.03	9.03	9.03	9.03
4	Average Stripping Ratio	Cum/T	0.65	0.75	0.75	0.75	0.75	0.75	0.75
5	Life of the Mine	Years	35	16	16	13	16	16	13
6	Grade of Coal		G	E,F	E,F	E,F	E,F	E,F	E,F
7	Initial Capital	Rs. Crore	838.27	1136.86	1093.65	1093.29	819.47	776.27	775.91
8	Specific Investment (Raw Coal)	Rs/te	1289.65	1136.86	1093.65	1093.29	819.47	776.27	775.91
9	P & M Capital	Rs. Crore	519.55	408.34	365.48	365.13	408.34	365.48	365.13
10	Specific Investment on P&M (Raw Coal)	Rs/te	799.31	408.34	365.48	367.05	408.34	365.48	367.05
11	HEMM Capital	Rs. Crore	264.99	230.74	230.74	230.74	230.74	230.74	230.74
12	Specific Investment on HEMM (Raw Coal)	Rs/te	407.68	230.74	230.74	230.74	230.74	230.74	230.74
13	Total Average cost of Production Rs./te								
	At 100%		212.82	606.70	598.41	513.04	393.42	385.87	305.66
	At 85%						436.89	427.84	337.64
14	Wt. Average Selling Price of Coal Rs./t		268.07	919.96	901.21	901.21	602.91	593.03	593.05
15	Profit Rs./t								
	At 100%		55.25	313.26	302.80	388.17	209.49	207.16	287.39
	At 85%						166.02	165.19	255.41
16	Financial IRR								
	At 100%		10.40	28.39	29.02	31.21	34.83	36.01	38.62
	At 85%						25.56	26.67	29.90
17	Economic IRR (Domestic Price)								
	At 100%		18.00				38.48	39.42	41.58
	At 85%						29.28	30.16	32.81
18	Completion Capital Rs. Crores	Rs. Crore		1141.52	1095.67	1095.29	824.13	778.29	777.91
19	Internal Rate of return								
	a) at 100% Capacity						34.71	35.96	38.62
	b) at 85% Capacity						25.44	26.62	29.90
20	Economic Internal Rate of return								
	a) at 100% Capacity						38.37	39.37	41.58
	b) at 85% Capacity						29.17	30.28	32.81
21	EMS (Target)	Rs.					841.04	837.34	842.96
22	OMS (Target)	Te	31				45.53	46.31	50.98
23	No. of Personnel (Target)	No.	775				832	818	743

OPTION-I Quarry-II as per sanctioned PR; Quarry-I concurrently started @3.5 mty; With shifting of conveyor-1002 & 1003; With addl 3.5Mty CHP; in Quarry-I Coal & OB outsourced for initial 9 years thereafter by departmental means.

OPTION-II Quarry-II as per sanctioned PR; Quarry-I concurrently started @3.5 mty; Without shifting of conveyor-1002 & 1003; Without addl 3.5Mty CHP; in quarry-I Coal & OB outsourced for 9 years thereafter by departmental means.

OPTION-III Quarry-II as per sanctioned PR; Quarry-I concurrently started @3.5 mty; Without shifting of conveyor-1002 & 1003; Without addl 3.5Mty CHP; Coal & OB outsourced for whole life of quarry-I. Partial outsourcing of Coal & OB also done in Quarry-II for 9 years

18/7/2019

ARUN KUMAR TYAGI
Project Officer
Piparwar OpenCast Project

CHAPTER-1

1.0 INTRODUCTION

1.1 Piparwar Opencast Block is located in the North Karanpura Area of Central Coalfields Limited in the State of Jharkhand. Piparwar coal was to meet the requirement of 4x210 MW Dadri Thermal Power Station of Capital Region. The Central Electricity Authority had recommended that the 2 x 210 MW Bhatinda Power Station will receive coal from the Piparwar Project. A part of the requirement of Yamuna Nagar 3 x 210 MW Power Station was also to be met from this Project. The combined requirement of these three powerhouses was estimate as 5.5MTY from 1994-95 onwards. The Project Report for Piparwar Opencast Project was prepared by CMPDI in April:86 for a rated capacity of 5.0 Mte of ROM Coal per annum at an average stripping ratio of 0.73 Cum/Te. The CCL and CIL Board approved this report on 30.7.86 and 17.9.86 respectively. The IMG had considered the report on 17.11.86

Collaboration with Australia was considered for the purpose of constructing a highly productive coalmine and also to obtain the technology of crusher-conveyor system for coal, which is expected to be used in other mines also.

Discussion were held with the Australians to develop the Piparwar OC Project Including the following assistance from them:

a) Financing of the Piparwar Project (Mine Development, Coal preparation and Coal Handling System)

b) Turn key project development:
   - i) Feasibility Report,
   - ii) Mine Plan, Design and Development.
   - iii) Equipment Design, Selection, procurement and installation.
   - iv) Infrastructure design, manufacture and installation,
   - v) Technology transfer and training.

c) Achieve designed output; and

d) Achieve high output per man shift (of the order of 29 tonne).

18-7-2014
ARUN KUMAR TYAGI
Project Officer
Piparwar OpenCast Project

The Govt. of Australia had entrusted white Industries Limited (WIL) to undertake the above job. The Technical F.R. by WIL was based upon the (a) Project Report for Piparwar Opencast Project and (b) Project Report for the Piparwar Coal Preparation by CMPDI in 1986.

The Technical Feasibility Report was submitted in Sept.:'87 by white Industries Limited. The WIL team visited CMPDI/ CCL in Dec.'87 and Jan.'88 for detailed discussion and preparation of 'Financial Report. Thereafter, a final ' Technical Feasibility Report' has been submitted by WIL in 4 volumes including Financial Report in Jan. 88

Subsequently, a Revised ' Project Report (Vol IV Financial part and Addendum to Tecnhical Part) was sumitted by white Industries Limited in April '88.

The Approved UCE for Piparwar OCP was prepared by CMPDI in May 1993, which envisaged total capital investment as Rs. 838.27 Crores to produce 6.5 MTY 'G' grade ROM coal. The total reserve was estimated as 197.58 Mte corresponding to total OBR of 128.93 M.Cum. With a stripping ratio of 0.65M.Cum / Te. Since its working Quarry N o. II has produced 91.62 Mte of coal after removing 49.08 Mcum of OB. The balance coal reserve in Piparwr OCP is now 105.96 Mte & balance OB is 79.85 MCum

The life of the OCP was estimated as 35 years & total manpower was estimated as 775. The Piparwar OCP is now linked to Dadri, Bhatinda, Badarpur and Unchahar Thermal Power Stations.

18-7-2015

ARUN KUMAR TYAGI
Project Officer
Piparwar OpenCast Project

1.1.1 The list of equipment for the sanctioned project report is given in Table No. 1.1 below.

Table no.1.1

Sl. No.	Equipment	Size/Capacity	Total Quantity
A.	**H.E.M.M.**		
	Overburden		
1.	Electric Shovel	10 Cu.M	1
2.	Track Dozer	600 HP	1
3.	Diesel Drill	250-160 mm	1
	Coal :		
1	Conveyor (Coal)	2800 tph	1
2	Conveyor (Coal)	2800 tph	1
3	Conveyor (Coal)	2800 tph	1
4	Conveyor (Coal)	2800 tph	1
5	Electric Shovel	23/25 Cu.M	1
6	Electric Drill	250 mm	1
7	Mobile Crusher	2800 tph	1
8	Belt Wagon	2800 tph	1
9	Track Dozer	600 HP	2
10	Drive Head Transporter		1
	Common :		
1	Electric Shovel	10 Cu.M	1
2	Electric Drill	250 mm	1
3	Electric Drill	250 mm	2
4	Track Dozer	400 HP	5
5	Rear Dump Truck	120/85T	13/19
6	FE Loader	500 KW	2
7	FE Loader	120 KW	1
8	Hydraulic Excavator	12/10 Cu.M	1
9	Hydraulic Backhoe	1.5 Cu.M	1
10	Hydraulic Face Shovel	5.5 Cu.M	1
11	Dozer (Rubber Type)	230 KW	1
12	Rear Dump Truck	50/85T	6/4
13	Grader	200 KW	2
14	Compactor	230 KW	1
15	Mobile Hydraulic Crane	80 T	1
16	Rough Terrain Crain	35/40T	1
17	Rough Terrain Crane	10 T	1
18	Cable Reeler	280 KW	1
19	Fork Lift	4 T	1
20	Fork Lift	1.5 T	1
21	Form Lift (Tyre Handler)	15 T	1

NOTE : 2 Nos. 10 Cu.M Shovel and 14 Nos. 85T Dumpers which would be deployed in 14/15th year are not included in the above estimate and are assumed to be financed through retained earnings.

18-7-2015
ARUN KUMAR TYAGI
Project Officer
Piparwar OpenCast Project

1.2 Need for EPR for Piparwar Opencast Project (10 MTY)

As the demand of coal has increased the EPR for Piparwar OCP is required to be prepared under Emergency Coal Production programme enhancing the capacity of Piparwar OCP from existing 6.5MTY to 10.0 MTYof Coal Production as per letter No. CGM/PP/o6/758-59 dated 20.3.2006 issued by the Chief General Manager (P&P). CCL, Darbhanga House Ranchi.

1.3 PRESENT STATUS OF THE MINE –

The mine has produced 91.62 Mte of Coal and has removed 49.08M Cum of OB till2004-2005. At present Piparwar OCP is working in Quarry No. II only. To enhance the production from 2007-2008 onward to the tune of 10MTY of Coal, it is proposed to open quarry no.I also simultaneously. The Piparwar OCP will produce 6.5 MTY of coal from Quarry No.II as per sanctioned PR.

Quarry No-II will work departmentally as usual and Quarry No-I is proposed to be outsourced both (coal &OB) for initial 8(eight) years. After Quarry no-II is exhausted completely the desired manpower and machine will be put in Quarry no-I, for its remaining life.

The coal production & OB removal with stripping ratio from Piparwar OCP for last five years have been given below in Table No.1.2

Table No.1.2

Year	Coal production in MTe	OBR in MCum	SR in Cu.m/Te.
2000-2001	8.001	4.536	0.567
2001-2002	7.601	4.276	0.563
2002-2003	8.432	3.543	0.420
2003-2004	8.384	2.850	0.340
2004-2005	6.778	4.125	0.609

Three options have been worked in this EPR. The total capital requirement for option I, II & III have been given in respective appendices.

ARUN KUMAR TYAGI
Project Officer
Piparwar OpenCast Project

CHAPTER - XIV

Land

Total land requirement for piparwar open cast project was estimated to be 1120.25 Ha. Comprising of 186.5 Ha of forestland 933.75 Ha of non-forestland. Non –forestland further classified into G.M.K. land and tenancy land. Out of 933.75 ha of non forest land, 279.35 Ha. is G.M.K. land and 654.4 Ha. is tenancy land.

Classification of land

<table>
<tr><td rowspan="4">Total Land
1120.25 Ha</td><td colspan="3">Forest land -- 186.5Ha.</td></tr>
<tr><td rowspan="3">Nonforest land
933.75 Ha.</td><td colspan="2">G.M.K. land - 279.35 Ha.</td></tr>
<tr><td rowspan="2">Tenancy land - 654.40 Ha.</td><td>Paddy land-163.6 Ha</td></tr>
<tr><td>Tanr land- 490.80 Ha</td></tr>
</table>

Break-up of land

The total lease area of land is 1120.25 hectares, out of which 186.50 ha. is forest land and 933.75 Ha. is non- forest land. 540 hectares of land would be utilized for quarry. Details of land use is given in following table

Table –

Details of land

Sl.no.	Particular	Land requirment		
		Forest	Non forest	Total
1	Quarry	130.5	409.5	540
2	External dump	--	25	25
3	Coal preparation plant	56	316.90	372.9
4	Workshop			
5	Industrial site, road, etc			
6	Safety zone	-	182.35	182.35
7	**Total**	**186.5**	**933.75**	**1120.25**

All land (1120.25 Ha) has been acquired by CCL for the project.

18-7-2019
ARUN KUMAR TYAGI
Project Officer
Piparwar OpenCast Project