

Pre-feasibility Report of Jharkhand Expansion OCP

(Proposed Normative Capacity 2.00 MTPA & Peak Capacity 2.70 MTPA)

1 Introduction

Jharkhand Opencast Project is an operating coal mine under Hazaribagh Area of Central Coalfields Limited. The mine was started in 1975-76 with initial coal production of 0.10 MT. A Project Report for Jharkhand OCP for a rated capacity of 1.0 MTPA of Washery Grade-IV coal was prepared in May, 1987 for an initial capital investment of Rs. 110.89 Crores. The mineable reserves were estimated as 21.5 MT with an OBR of 47.00 Mcum at an average stripping ratio of 2.19 cum/t. The P.R. envisages the exploitation of seam-III to VA by opencast method and the life of the mine was estimated as 25 years.

The mine got Environmental Clearance vide letter No.J-11015/12/89-IA.II(M) dated 30.01.1995 for a normative capacity of 1.00 MTPA within lease area of 323.88 Ha. Copy of previous EC letter is enclosed.

At present, Jharkhand OCP has got the capability of producing coal more than the previously sanctioned capacity of 1.00 MTPA with higher utilization of resources within the same mining area. The proposed capacity of project after expansion is 2.00 MTPA normative & 2.70 MTPA peak. This is required to meet the increasing demand of coal for the nation.

Purpose of the report

The Form-I & pre-feasibility report are being submitted for EC of Jharkhand Expansion OCP (2.00 MTPA normative capacity & 2.70 MTPA peak capacity).

As per MOEF office memorandum No. J-11015/200/2008-IA.II(1) Dated 31.03.2011 (regarding projects involving forestland), environmental clearance has been linked with stage-I forestry clearance. The formal environmental clearance will be issued only after the stage-I forestry clearance of the project is granted.

The approved project area is 323.88 Ha which includes part of 78.59 Ha of forest land for which stage-I FC has been obtained for Laiyo UGP. Accordingly, this part along with adjoining non-forest has been deducted and the revised project area becomes 278.88 Ha.

As such, the revised project area for which Form-I is being submitted is 278.88 Ha instead of 323.88 Ha.

Identification of project & project proponent

The project under consideration, i.e. Jharkhand Expansion OCP is administratively under Hazaribagh Area of CCL headed by General Manager, Hazaribagh Area. Geologically, it falls in West Bokaro Coalfield in Ramgarh & Bokaro Districts of Jharkhand.

The mailing address of the Project Officer is given below:

Project Officer,
Jharkhand Project,
Hazaribagh Area, Central Coalfields Limited.
PO- Kedla
Dist- Ramgarh, Pin – 825325

Location & Communication

Jharkhand Expansion opencast project is located in West Bokaro Coalfield of Jharkhand. The Project is bounded by Chutua nala on north side and Bokaro River & Gose Block on south side. The western boundary coincides with Kedla opencast project and eastern boundary is common with Laiyo underground project.

Jharkhand Expansion OCP is well connected by rail and road. The area is approachable through 22 km long Charhi to Laiyo road branching from NH-33 at Charhi. NH-33 connects Ranchi and Hazaribagh cities. Hazaribagh is about 35 Km away and Ranchi is about 90 Km away by road. Another approach is through a 12 km all weather road connecting Gidi Washery and crossing the National Highway No. 33 near Kaju. Nearest Railway Station is Dania at about 6.0 Km on Gomoh-Barkakana Loop-line of EC.Railway. Nearest Airport is Ranchi at a distance of 90 Km.

The Project is bounded between latitude 23° 46' 53" and 23° 48' 29" North and Longitude 85° 36' 23" and 85° 37' 23" East and included in Survey of India Toposheet No. 73E/9 of Scale 1: 50000. Refer location plan at [Plate-I](#).

Description of importance to the country and region

Central Coalfields Limited is facing increasing demand of coal because of increased demand from industry and power sector. Augmentation of coal production from the new / existing / expansion mines of CCL will help to bridge the gap of demand and supply of coal in India. To meet the growing demand of coal, especially in power and steel sectors, CCL has planned to increase its production capacity from the present production level of 50.14 Mt. of coal during 2013-14 to 140.00 MTPA by 2019-20.

2 Project Description

Project Report for Jharkhand OCP for a rated capacity of 1.0 MTPA of Washery Grade-IV coal was prepared in May, 1987 for an initial capital investment of Rs. 110.89 Crores. The mineable reserves were estimated as 21.5 MT with an OBR of 47.00 Mcum at an average stripping ratio of 2.19 cum/t. The P.R. envisages the

exploitation of seam-III to VA by opencast method and the life of the mine was estimated as 25 years.

Mining System (as per PR)

The mining and geological conditions of the mine are as follows: -

- (a) Multiple seams to be worked
- (b) Steep gradient of 1 in 6-10 of the coal seams.
- (c) Variable thickness of OB/Partings.

Considering the above mining and geological conditions, shovel-dumper mining system with horizontal slicing has been envisaged for working this OC mine.

O.B. Removal

The O.B. benches were proposed to be worked by rope shovels of 5 m³ capacity in conjunction with rear dumpers of 50 & 35T capacity. The maximum height of the bench would be 12m & width 25m to 40m.

Drilling and Blasting

200 mm rotary drills were proposed to be used for drilling in OB. 160mm dia Rotary blast boles drills are proposed to be used for drilling in coal benches.

Mine Boundary

Southern boundary	The southern floor boundary has been fixed at incrop of seam-III & fault F-2 and F3.
Western Boundary	Coincides with Kedla OCP & fault F3. However, a barrier of 60m has been left against Kedla OCP for reserve estimation purpose, which may be taken by either of the mines at a later date as per convenience.
Northern Boundary	Chutua Nallah. The Quarry may be extended towards dip side beyond Chutua Nallah, in sector C, D and E, after diversion of Chutua Nallah in future, if need arises.
Eastern Boundary	The eastern floor boundary has been fixed leaving a surface barrier of 80m against existing Laiyo Colony of Laiyo UGP.

Geological & Mining Characteristics

Jharkhand Block comprises of 5 sectors, namely A, B, C, D & E. Sector A & B cover the area south of Chutua Nallah, whereas sector C, D & E cover the area north of Chutua Nallah. Only lower stage of Barakar formation coal seams (I to VA) are of medium thickness and offer potential for quarrying. It is proposed to exploit the reserves in seam III, IV, V and VA available in sector B for quarrying. The possibility of quarrying in seam II gets ruled out due to the following reasons.

1. Seam II is splitted in 4 distinct thin sections in the block of varying thickness of around 1 m.
2. The ash percentage is 35% and above, rendering it unfit for feed to Kedla Washery.
3. In the some way, seam-I (which is available at a greater depth and more parting thickness from seam-II in quarryale block) can not be mined along with proposed quarry. Grade wise also seam-I is poor in quality (ungraded).
4. Both the seams (seam-I & II) can be mined separately by underground in selected portion.

5. Therefore, the area where seam-III has been evacuated may utilized for internal/ external dumps.

The major part of sector-A, where seam-III has been extracted, (south of sector-B) can be utilized for infrastructure of the mine and external dump. The South west side of sector-A where-III/IV outcropped, a semi-mechanised quarry is already in operation with diesel shovel and dumpers. About 1.5 mtes coals are available in seam-III & IV. The existing quarry in sector-A should be continued for early exploitation which will provide a dumping place for quarrying sector-B. Seam-wise mining & geological characteristics (sector-B) of the Quarry are given below.

Sl. No.	Particulars	Unit	Thickness Range
1.	Seam Thickness		
A	Seam VA	M	4.96-7.63
B	Seam V	-do-	6.99-8.82
C	Seam IV	-do-	3.34-5.20
D	Seam III (T)	-do-	3.90-4.89
E	Seam III (B)	-do-	1.48-2.33
F	Seam III (Merged)	-do-	4.79-7.53
2.	Thickness Of Parting	M	
A	Above Seam VA	-do-	8.57-14.01
B	Between Seam VA & V	-do-	24.26-34.51
C	Between Seam V & IV	-do-	8.82-16.61
D	Between Seam IV & III(T)	-do-	7.58-18.29
E	Between Seam III(T) & III(B)	-do-	1.00-2.00
3.	Average Gradient		
A	Seam VA	-	1 in 6-10
B	Seam V	-	1 in 6-10
C	Seam IV	-	1 in 6-10
D	Seam III (Merged)	-	1 in 6.6-10
4.	Mineable Reserve		
A	Seam VA	M te	0.45
B	Seam V	-do-	6.47
C	Seam IV	-do-	5.81
D	Seam III (T)	-do-	1.07
E	Seam III (B)	-do-	7.70
F	Seam III (Merged)	-do-	
	Total	-do-	21.50
5.	Volume of OB		
A	Above Seam VA	M.cum	1.56
B	Between VA & V	-do-	16.65
C	Between V & IV	-do-	13.49
D	Between IV & III	-do-	15.30
	Total	-do-	47.00
6	Avg. Stripping Ratio		2.19
7	Peak Stripping Ratio		2.54
8	Max. strike length of the quarry at the surface	M	1500
9	Max. strike length of the quarry at the bottom	-do-	1350
10	Max. dip length of the quarry floor	-do-	925
11	Grade of Coal		W-IV
12	Area of Excavation	Sq. Km.	1.26

Minable Reserve & Life of Mine

The mineable reserves were estimated as 21.5 MT with an OBR of 47.00 Mcum at an average stripping ratio of 2.19 cum/t. The P.R. envisages the exploitation of seam-III to VA by opencast method and the life of the mine was estimated as 25 years.

Balance Mineable reserves upto 31st March, 2014 are 9.22 MT. As per new calendar program, with 2.0 MTPA production capacity, life of the mine will be 7 years.

Solid Waste Management As Per Approved PR

During the initial years, the OB is proposed to be dumped outside the quarry, located near the south of quarriable block. The capacity of external dump would be 10.0 Mcum. In case, the area marked for external OB dump could not be evacuated by the existing operation, the same may be dump along with external OB dump of kedla OCP in exchange of this. Internal dumping of OB can be started from VIIIth yr of quarry operation. It is estimated that a total of 37 Mcum of OB can be accommodated in the internal dump with the provision of continuing further dip side progress of the quarry beyond Chutua nallah. The top soil is proposed to be removed separately and dumped outside the quarry in manner so as not to loose its fertility. The top soil can be spread over the reclaimed land after words.

The external OB dump is proposed to be reclaimed with plantation as is being done in the project.

Safety provision

- 1) Provision of Indian mines regulations 1957, Indian Electricity rules or an other bay laws in respect of safety of working in the opencast mine.
- 2) Stability of slope in quarry & dump should be as per the design lay-out.
- 3) Sufficient barrier against river, colony, roads and blasting/vibration should be provided.
- 4) Embankment against HFL must be provided, for which provision has been made in PR. A flood protection embankment of 1120 metre length is proposed for safety of the quarry operation.
- 5) Measures against spontaneous combustion will be taken from initial stage of mining operation. A fire fighting organsition has been provided in the PR for this purpose

Village Rehabilitation

16 families have already been rehabilitated and they have been paid total compensation of Rs. 25.10 Lakhs. No more R&R is needed for this project.

Size or Magnitude of Operation

The Summarised Calendar Programme of Excavation is given below which has been formulated based on adopted sequence of opencast mine field development at optimum conditions of mining operations for the entire life of mine (actual previous

production & proposed production). The balance mineable reserves have been estimated as **9.22** MT corresponding to a volume of OBR of **21.66** MM³ at an average stripping ratio of **2.35** m³/te. The normative rated output of 2.0 MTPA would be achieved in year 2016-17 after the sanctioning of one time enhancement.

YEAR	PREVIOUS ACTUAL PRODUCTION		
	COAL	OB	SR
1986-1987	0.205	0.379	1.85
1987-1988	0.215	0.383	1.78
1988-1989	0.223	0.488	2.19
1989-1990	0.348	0.482	1.39
1990-1991	0.361	0.606	1.68
1991-1992	0.345	0.663	1.92
1992-1993	0.271	0.655	2.42
1993-1994	0.272	0.658	2.42
1994-1995	0.265	0.672	2.53
1995-1996	0.226	0.618	2.74
1996-1997	0.253	0.651	2.57
1997-1998	0.311	0.750	2.42
1998-1999	0.250	0.661	2.65
1999-2000	0.190	0.615	3.24
2000-2001	0.250	0.711	2.84
2001-2002	0.371	1.303	3.51
2002-2003	0.601	1.647	2.74
2003-2004	0.801	1.806	2.25
2004-2005	0.685	1.839	2.68
2005-2006	0.632	1.451	2.30
2006-2007	0.610	1.584	2.60
2007-2008	0.805	1.947	2.42
2008-2009	0.921	1.797	1.95
2009-2010	0.600	1.687	2.81
2010-2011	0.606	1.313	2.17
2011-2012	0.412	1.174	2.85
2012-2013	0.491	1.175	2.39
2013-2014	0.605	1.379	2.28
Total	11.92	28.87	2.41

Future Proposed Calendar Program After Expansion

YEAR	COAL (MT)	OB (Mcum)	SR (cum/te)
1	1.00	2.45	2.45

2	1.50	3.68	2.45
3	2.00	4.90	2.45
4	2.00	4.90	2.45
5	1.50	3.30	2.2
6	1.00	2.00	2.0
7	0.22	0.44	2.01
Total	9.22	21.66	2.35

For the rated output of 2.0 MTPA of ROM coal, the balance life of the opencast mine is estimated as 7 years. The mine will achieve the targeted production in the third year.

Proposed schedule for approval and implementation

This is an approved project of CCL for a capacity of 1.00 MTPA. Environmental Clearance vide letter no J-11015/12/89-IA.II(M) dated 30.01.1995 for a coal production capacity of 1.00 MTPA within lease area of 323.88 Ha was obtained. However, the Environmental Clearance for capacity enhancement (2.0/2.7 MTPA) within existing mining area is proposed from MOEF. For this purpose, this pre-feasibility report & Form-I have been prepared. The pre-feasibility report is being submitted to CCL Board for approval. In the meantime, the Form-I & enclosures are being submitted to MOEF for grant of TOR for preparation of Draft EIA & EMP and subsequent public hearing (PH).

3. Water Demand

Water demand (m³/day)	
Industrial	220
Potable	570
Total	790

Source of water: Mine Water

4. Source of Electrical Power Supply as per PR:

A central sub-station with an installed capacity of 4X10 MVA, 33/33KV is being erected near Kedla washery. This central sub-station shall receive power a 33 KV from M/S Damodar Valley Corporation/ State Electricity Board. For the Jharkhand OCP it is proposed to tap the 11KV incoming line of Kedla OCP at a suitable point.

Load in operation	5508 KW
Maximum demand	3121 KW
	3406 KVA

5. Coal Handling & Dispatch System

There is no existing CHP in this project and no proposal for CHP yet. Coal is dispatched by trucks to NR Siding about 18 km away from mine.

6. Land Requirement

As per earlier approved EIA & EMP of Jharkhand OCP (1.00 MTPA normative capacity), the project area was 323.88 Ha, no increase in land requirement is proposed for increase in coal production by 50%.

The approved project area includes part of 78.59 Ha of forest land for which stage-I FC has been obtained for Laiyo UGP. Accordingly, this part along with adjoining non-forest has been deducted and the revised project area has become 278.88 Ha as per details given below.

Land Use	Land Area (Ha)		
	Forest	Non-Forest	Total
Quarry	89.47	33.1	122.57
External OB Dump	31.37	2.63	34
Haul Road	1.82	1.32	3.14
Safety Zone	38.15	81.02	119.17
Total	160.81	118.07	278.88

Refer **Plate-II** for Land Use Plan.

SN	Forest Land (Ha)	Stage of FC	Details
1	57.94	Stage-II	Vide letter no. 8-52/93-FC dated: 27-03-1997
2	96.28	Stage-II	Vide letter no. 8-52/2003-FC dated: 28-05-2004
3	6.59	Stage-II	Vide letter no. 8-52/2003FC -(vol I), dated: 22-03-2010

Solid Waste Management & Land Reclamation

Total OB generation since 1986-87 (PR data till 1985-86) is 28.87 Mcum till March 2014. This 28.87 Mcum OB has been dumped internally.

It is estimated that a total of 37 Mcum of OB can be accommodated in the internal dump with the provision of continuing further deep side progress of the quarry beyond Chutua nallah. The top soil is proposed to be removed separately and stored outside the quarry in manner so as not to lose its fertility. The top soil can be spread over the reclaimed land after works.

Year-wise Biological Reclamation of OB Dumps			
SN	Year	Area (Ha)	No. of Trees
1	1992	7.0	16450
2	1996	3.0	7050
3	2007	2.31	5775
4	2009	22.0	55000

5	2010	26.0	65000
6	2011	20.0	50000
7	2012	Nil	Nil
8	2013	Nil	Nil
	Total	80.31	199275

The above plantation includes 34.0 Ha of external OB dump and 46.31 Ha of internal OB dumps.

Fund Provision For Rehandling of OB Dump & Land Reclamation

SN	Reclamation activity	Fund Provision (Rs Lakhs)		
		In EMP	In MCP	Total
1	Physical Reclamation of OB dump	107.00	2462.84	2569.84
2	Biological Reclamation of OB dump	11.60	11.11	22.71
	Total	118.60	2473.95	2592.55

Time Frame For Land Reclamation

Rehandling of OB will be done continuously with mining activities, whenever required. Biological reclamation will be started when dump will not be active. Green belt development in undisturbed area/safety zone will be going on all along mine life.

Environmental Impacts

Land: Stage-wise land-use and reclamation area (Ha)

SN	Area (Ha)	Post Mining Land use	
		Before Reclamation (7th Year)	After Reclamation (10 th Year)
1	64.17	Quarry void	To be used for internal OB dumping in extension plan
2	58.40	Internal OB Dump- Partly planted	Plantation
3	34.00	External OB Dump- Plantation	Plantation
4	3.14	Haul Road	To be used in extension plan
5	119.17	Unworked Area & Safety Zone - Plantation	Plantation
	278.88	-	-

7. Mine Closure At Jharkhand OCP

The financial assurance for mine closure at Jharkhand OCP has been approved at Rs 2777.86 during 385th meeting of Board Of Directors held on 24.02.2012 (No. 2 of 2012).

The break-up of Mine Closure Cost As Per CMPDI Norms

The cost of different activities of Mine Closure cost is given in the table below:

SL. NO.	ACTIVITY	% OF TOTAL MINE CLOSURE COST	AMOUNT IN LAKH (RS.)
A	Dismantling of Structures		
	Service Buildings	0.20	5.56
	Residential Buildings	2.67	74.17
	Industrial structures like CHP, Workshop, field sub-station etc.	0.30	8.33
B	Permanent Fencing of mine void and other dangerous area		
	Random rubble masonry of height 1.2 metre including levelling up in cement concrete 1:6:12 in mud mortar	1.50	41.67
C	Grading of highwall slopes		
	Levelling and grading of highwall slopes	1.77	49.17
D	OB Dump Reclamation		
	Handling/ Dozing of external OB Dump in to mine void	88.66	2462.84
	Bio-reclamation including soil spreading, plantation and maintenance	0.40	11.11
E	Landscaping		
	Landscaping of the clear land for improving its esthetic	0.30	8.33
F	Plantation		
	Plantation over area obtained after dismantling	0.50	13.89
	Plantation around the fencing	0.20	5.56
	Plantation over the cleared off external OB Dump	0.02	0.56
G	Monitoring/ Testing of paramaters for three years		
	Air Quality	0.22	6.11
	Water Quality	0.20	5.56
H	Enterpreneurship Development (Vocational/ skill development training for sustainable income of affected people	0.26	7.22
I	Miscellaneous and other mitigative measures	2.00	55.56
J	Manpower cost for supervision	0.80	22.22
	TOTAL	100.00	2777.86

Details of Last Public Hearing

EC for Jharkhand OCP was granted in 1997, before introduction of the concept of PH.

8. Analysis of Alternatives

Not applicable, as this is an expansion of existing project within existing mining area.

9. Project Benefits

Development of Jharkhand OCP has considerably improved the socio-economic status of the adjoining areas. This has resulted in following benefits:

- Improvements in Physical Infrastructure
- Improvements in Social Infrastructure
- Increase in Employment Potential
- Contribution to the Exchequer
- Meet energy requirement
- Post-mining Enhancement of Green Cover

10. Environmental Management Plan

Central Coalfields Limited, the owner of this project has already set-up an Environmental Cell headed by Deputy General Manager at its HQs. The cell provides necessary support that is required for Environmental Management of various projects and mines under the jurisdiction of the company.

11. Capital Expenditure on Environmental Control Measures As Per Earlier EMP Report

Particulars	Amount (Rs. Lakh)
(1) Environmental Control Measures at mine	
Land restoration	107.00
Biological Reclamation of OB dump	11.60
Water Sprinklers	32.00
At CHP	1.50
Industrial sewerage treatment Plant in workshop	24.22
Domestic sewerage treatment Plant	0.68
Water supply distribution system	16.12
Check Dam/ Sedimentation Lagoon/ Embankment/ Drains	12.73
Others	2.74
Sub-total (1)	208.59
(2) Environmental Control Measures at Colony	
Sewage Treatment	9.10
Water treatment plant & distribution	87.41
Storm water drain	3.82
Others	14.41
Sub-total (2)	114.74
(3) Cost of compensatory afforestation	304.59
(4) Others	64.49
(5) Mine Closure Corpus	2777.86

Grand Total (1+2+3+4)

3470.27

NOTE: The above figures have been taken from Earlier EMP Report of Jharkhand OCP except mine closure corpus which was approved separately during 385th meeting of Board Of Directors held on 24.02.2012 (No. 2 of 2012), as already mentioned earlier.

