



सीएमपीडीआई
cmpdi
A Mini Ratna Company

MINING PLAN
OF
JHARKHAND OCP

Project Area (Ha)	Capacity OCP (MTPA)
261.84 Ha	2.7

(Hazaribagh Area)
Central Coalfields Limited

Prepared at

Regional Institute – III

Central Mine Planning & Design Institute Ltd.
(A Subsidiary of Coal India Ltd.)
Gondwana Place, Kanke Road
Ranchi-834008, Jharkhand

Mining Plan & Mine Closure Plan of Jharkhand Expansion OCP

(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 coal demand.

Purpose of the report

The Mining Plan & Mine Closure Plan is being submitted for approval of CCL Board. This is required 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 is to be issued only after the stage-I forestry clearance of the project is granted.

The approved project area of existing project 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 was deducted and the revised project area was 278.88 Ha. The TOR was issued for the area of 278.88 Ha & the Draft EIA & EMP for Public Hearing was also prepared based on this area.

The project area of 278.88 Ha included 261.84 Ha in Ramgarh District & balance 17.04 Ha in Bokaro District, towards north of Chutuanallah.

The public hearing was held in the office of Project Officer, Jharkhand OCP, Block-Mandu, Dist-Ramgarh on 20.08.16. The public hearing for the area falling in Bokaro


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District could not be held due to administrative reason. In view of this, the part falling in Bokaro District has been deducted & the revised project area is now 261.84 Ha. This reduction in area will not have any adverse impact on mining operation as the area deducted is a part of safety zone of mine.

This mining plan & mine closure plan is being put up for approval of CCL Board. The final EIA & EMP will be revised as per revised mining plan & mine closure plan & EIA & EMP will be submitted to MoEF&CC, Govt of India for Environmental Clearance (EC) of Jharkhand OCP (Normative Capacity 2.00 MTPA & Peak Capacity 2.70 MTPA) within project area of 261.84 Ha.

Identification of project & project proponent

The project under consideration, i.e. JharkhandExpansion 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 Chutuanala on north side and Gose/ Gose East Block on south side. The western boundary coincides with Kedla opencast project and eastern boundary is common with Laiyo underground project.

JharkhandExpansion 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 Kuju. 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 $23^{\circ} 46' 53''$ and $23^{\circ} 48' 29''$ North and Longitude $85^{\circ}36' 23''$ and $85^{\circ}37' 23''$ East and included in Survey of India Toposheet No. 73E/9 of Scale 1:50000.

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. To meet the growing demand of coal, especially in power and steel


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sectors, CCL has produced 61.32 Mt. of coal during 2015-16 and plans to increase it to 133.50 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

As per PR O.B. benches were 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 are used for drilling in OB and 160mm dia Rotary blast bores drills are 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	ChutuaNallah. The Quarry may be extended towards dip side beyond ChutuaNallah, in sector C, D and E, after diversion of ChutuaNallah 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 ChutuaNallah, whereas sector C, D & E cover the area north of ChutuaNallah. 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


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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 quarryable block) can not be mined along with proposed quarry. Gradewise 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. Seam-wise mining & geological characteristics (sector-B) of the Quarry are given below.

Sl. No.	Particulars	Unit	ThicknessRange
1.	Seam Thickness		
A	SeamVA	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 SeamVA	-do-	8.57-14.01
B	Between SeamVA& 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	SeamVA	-	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	SeamVA	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-	7.70
	Total	-do-	21.50
5.	Volume of OB		
A	Above SeamVA	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


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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. envisaged 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, 2016 are 7.83 MT. As per new calendar program, with 2.0 MTPA production capacity, life of the mine will be 6 years.

Solid Waste Management As Per Approved PR

During the initial years, the OB was dumped outside the quarry, located near the south of quarriable block. The capacity of external dump as per PR was 10.0 Mcum. 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 Chutuanallah if required. The top soil is spread over the reclaimed dumps and planted.

Safety provision

- 1) Provision of Indian mines regulations 1957, Indian Electricity rules or any 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 is provided.
- 4) 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 fightingorgansition 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 7.83 MT corresponding to a volume of OBR of 12.02 MM³ at an average


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stripping ratio of **1.54** m³/te. The normative rated output of 2.0 MTPA would be achieved in year 2018-19 after the sanction of EC.

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	0.75	2.42
1998-1999	0.25	0.661	2.65
1999-2000	0.19	0.615	3.24
2000-2001	0.25	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	2.3
2006-2007	0.61	1.584	2.6
2007-2008	0.805	1.947	2.42
2008-2009	0.921	1.797	1.95
2009-2010	0.6	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	0.502	1.267	2.53
2014-2015	0.648	1.537	2.37
2015-2016	1.000	4.457	4.46
Total	13.67	34.98	2.56
Total as per PR	21.50	47.00	2.19
Balance Reserve	7.83	12.02	1.54


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Future Proposed Calendar Program After Expansion

SN	YEAR	COAL (MT)	OB (Mcum)	SR (cum/te)
1	2016-2017	1.00	1.80	1.80
2	2017-2018	1.50	2.40	1.60
3	2018-2019	2.00	3.00	1.50
4	2019-2020	2.00	2.80	1.40
5	2020-2021	1.00	1.40	1.40
6	2021-2022	0.33	0.62	1.89
Total		7.83	12.02	1.54

For the rated output of 2.0 MTPA of ROM coal, the balance life of the opencast mine is estimated as 6 years. The mine is capable of producing more than its existing EC capacity of 1.0 MTPA in 2016-17.

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 Hawas obtained. However, the Environmental Clearance for capacity enhancement (2.0/2.7 MTPA) within existing mining areas proposed from MoEF&CC.EIA & EMP was prepared and and public hearing (PH) was held on 20.08.16.

3. Water Demand

Water demand (m ³ /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. One feeder breaker proposed for crushing coal to – 100 mm size. Coal is dispatched by trucks to NR Siding about 18 km away from mine.


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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.

The earlier 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 and part area falling in Bokaro District has been deducted and the revised project area is 261.84 Ha as per details given below.

Land Use	Land Area (Ha)		
	Forest	Non-Forest	Total
Quarry	89.47	33.10	122.57
External OB Dump	31.37	2.63	34.00
Haul Road	1.82	1.32	3.14
Safety Zone	38.15	63.98	102.13
Total	160.81	101.03	261.84

Refer 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

Waste Management & Land Reclamation

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
9	2014	Nil	Nil
10	2015	Nil	Nil
	Total	80.31	199275


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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	2089.15*	2196.15
2	Biological Reclamation of OB dump	11.60	9.43	21.03
	Total	118.60	2098.58	2217.18

Note- * Both for progressive & final reclamation

Post Mining Land use

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	102.13	Unworked Area & Safety Zone - Plantation	Plantation
	261.84	-	-

7. Provision for Mine Closure at Jharkhand OCP

ESCROW ACCOUNT	
Project Area (Ha)	261.84
Escrow amount per Ha for OC project as on Aug, 2009 (in Rs Lakhs)	6
Corpus Value based on Aug, 2009 rate (in Rs. Lakhs)	1571.04
WPI as on Aug, 2009	129.6
WPI as on April, 2016	177.8
Current value of Corpus (in Rs. Lakh)	2155.33
Amount provided (excluding interest) till 01.04.16 (in Rs. Lakh)	651.52
Balance Corpus for which provision is to be made as on 01.04.16 (in Rs. Lakh)	1503.81
Balance Life of mine as on 01.04.16 (in years)	6


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Annual corpus (Balance corpus / Balance life, in Rs. Lakh)	250.64
Year	Amount in Lakh (Rs.)
1	250.64
2	263.17
3	276.33
4	290.15
5	304.66
6	319.89
Total	1704.84
Total Mine closure cost (in Rs Lakhs)	2356.36
Data given by CCL	
Amount deposited (excluding interest) till 31.03.16 (in Rs. Lakh)	651.52
Interest accumulated on MCP Corpus till 31.03.16 (in Rs. Lakh)	102.16

Particulars	Formula Used
Corpus Value based on Aug, 2009 rate (in Rs. Lakhs)	Project Area (Ha) x Escrow amount per Ha for OC project as on Aug, 2009 (in Rs Lakhs)
Current value of Corpus as on 01.04.16 (in Rs. Lakh)	Corpus Value based on Aug, 2009 rate (in Rs. Lakhs) x WPI as on March, 2016 / WPI as on Aug, 2009
Balance Corpus for which provision is to be made as on 01.04.16 (in Rs. Lakh)	Current value of Corpus (in Rs. Lakh) - Amount deposited (excluding interest) till 01.04.16 (in Rs. Lakh)
Annual corpus (Balance corpus / Balance life, in Rs. Lakh)	Balance Corpus for which provision is to be made as on 01.04.16 (in Rs. Lakh) / Balance Life of mine as on 01.04.16 (in years)

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:

PROGRESSIVE AND FINAL MINE CLOSURE COST DISTRIBUTION				
SL. NO.	ACTIVITY	% OF TOTAL MINE CLOSURE COST	AMOUNT IN LAKH (RS.)	Remarks
A	PROGRESSIVE CLOSURE ACTIVITIES			
1	OB Dump Reclamation			
	Handling/ Dozing of OB Dump and back filling	71	1673.02	Throughout the life of the mine
	Bio-reclamation including soil spreading, plantation and post care	0.4	9.43	Throughout the life of the mine
2	Landscaping		0.00	
	Landscaping of the open space in lease hold area for improving its esthetic	0.3	7.07	Throughout the life of the mine


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3	Plantation		0.00	
	Plantation around the quarry area and in safety zone	0.2	4.71	Throughout the life of the mine
	Plantation over the external OB Dump	0.02	0.47	Throughout the life of the mine
	Entrepreneurship Development (Vocational/ skill development training for sustainable income of affected people)	0.26	6.13	Throughout the life of the mine
	Miscellaneous and other mitigative measures	2	47.13	Throughout the life of the mine
	TOTAL (A)	74.18	1747.95	
B FINAL CLOSURE ACTIVITIES				
1	Dismantling of Structures			To be included in final mine closure plan
	Service Buildings	0.2	4.71	
	Residential Buildings	2.67	62.91	
	Industrial structures like CHP, Workshop, field sub-station etc	0.3	7.07	
2	Permanent Fencing of mine void and other dangerous area		0.00	To be included in final mine closure plan
	Random rubble masonry of height 1.2 metre including levelling up in cement concrete 1:6:12 in mud mortar	1.5	35.35	
3	Grading of highwall slopes		0.00	To be included in final mine closure plan
	Levelling and grading of highwall slopes	1.77	41.71	
4	OB Dump Reclamation		0.00	
	Handling/ Dozing of OB Dump and back filling	17.66	416.13	17.66% for final mine closure
5	Plantation		0.00	
	Plantation over cleared area obtained after dismantling	0.5	11.78	To be included in final mine closure plan
6	Post Closure Env Monitoring/ testing of parameters for three years			For three years after mine closure
	Air Quality	0.22	5.18	
	Water Quality	0.2	4.71	
7	Post Closure Manpower cost for supervision	0.8	18.85	To be included in final mine closure plan
	TOTAL (B)	25.82	608.41	
	GRAND TOTAL (A+B)	100	2356.36	


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8. Project Benefits

Development of Jharkhand OCPs resulted in following benefits:

- Improvements in 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
Check Dam/ Sedimentation Lagoon/ Embankment/ Drains	12.73
Others	2.74
Sub-total (1)	192.47
(2) Environmental Control Measures at Colony	
Sewage Treatment	9.10
Storm water drain	3.82
Others	14.41
Sub-total (2)	27.33
Other Costs (3)	
Mine Closure	2356.36
CSR Cost (@Rs 2/tonne for balance coal of 7.83 MT)	156.60
Total (1+2+3)	2732.76

NOTE: The above figures have been taken from Earlier EMP Report of Jharkhand OCP except mine closure corpus, which was approved separately during 390th meeting of Board Of Directors held on 1st October, 2012 for Rs 2777.85 Lakh. This amount will reduce to Rs 2356.36 Lakh on account of reduction in project area & life of project.


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