सीएमपीडीआई

cmpdi

A Mini Ratna Company

PRE-FEASIBILTY REPORT

OF

RAJRAPPA OCP AND WASHERY

Project Area (Ha)	Capacity OCP & Washery (MTPA)
2263.83 Ha	3.0

(Rajrappa Area)

Central Coalfields Limited

(September, 2018)

Prepared at

Regional Institute – III

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

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Chapter 1

Executive Summary

1.1 Summary

1	Rajrappa OCP & Washery is an operating project under Rajrappa Area of Central Coalfields Limited, Jharkhand. The DPR for Rajrappa OCP for a rated capacity of 3.0 MTPA of ROM coal capacity was sanctioned by the Govt. on 17.6.1983, at an estimated capital investment of Rs. 91.46 crores. A revised RCE has been prepared with a capital outlay of Rs. 510.85 Cr and was approved by CIL board in its 364 th meeting dated 23/12/2009. Rajrappa washery is also an existing project located within the acquired area of Rajrappa OCP. Rajrappa washery was designed for a rated capacity of 03 MTY ROM in 1975 with a capital outlay of Rs. 2576.89 Lakhs.
2	Rajrappa OCP and washery are located in the Ramgarh Block-I, Block II & Block-IV of south-eastern part of Ramgarh Coalfield, Ramgarh & Bokaro District, Jharkhand State. The block is bounded by latitudes 23°34´40´´N to 23°38´33´´N and longitudes 85°39´44´´E to 85°42´45´´E. The block is covered in Survey of India toposheet no. 73E/10 (RF: 25000).
3	The proposed project is characterized by generally undulating and the general slopes towards the Damodar river. The maximum and minimum elevation is 340 m & 300 m respectively.
4	Rajrappa OCP & washery is connected by an all-weather road to Ramgarh & Bokaro. The National Highway NH-33 is connected to Ranchi and Hazaribagh from Ramgarh. The nearest railway station Barkipona is about 06 km from the block. The nearest township Ramgarh is about 20 km from Rajrappa OCP.
5	Environmental Clearance of Rajrappa OCP was granted vide letter no J-11015/10/88-IA-II(M) dated 23.11.1992 for coal production capacity of 3.0 MTPA. Rajrappa washery obtained Environmental Clearance vide letter no. J-11015/4/85-IA dated 30.01.1987.
6	Pre-feasibility report of Rajrappa OCP and washery is being prepared for the rated capacity of 03 MTPA within the project area of 2263.83 Ha. for making an application in Form I for EC as per MoEFCC notification no: S.O 1530 (E) dt. 06.04.2018
7	The project area of present proposal is 2263.83 Ha. (Block II: 585.65 Ha. & Block I&IV: 1678.18 Ha). Proposed capacity of OCP and Washery is 03 MTY. The total mineable reserves as on 31.03.2018 have been estimated as 78.46 M.tonne corresponding to a volume of OBR of 241.77 Mm^3 at an average stripping ratio of 3.08 M^3 per tonne. Total estimated life of mine and washery is 29 years.

8	It is proposed to backfill the total OB generated from Block I, II& IV into the mine void created in Block I & IV.
9	6 no of seams from seam V to seam IIIA have been proposed for working. The seams are dipping between 6 deg to 10 deg. The maximum depth of the quarry is 150m and the surface area of excavation of the above quarry is 437.65 Ha in Block I&IV and 389.08 Ha in Block II.
10	The Main source of Power supply of Rajrappa OCP & washery is DVC (Gola sub-station). The power is received at the main sub-station. Transformer Proposed: 2 x 12.5 MVA, 33 / 6.6 kV.
11	The avg. quantity of raw coal fed into washery is 9090 TPD. The ash content of raw coal is 28% and that of washed coal is around 12-15%. 60% of raw coal is converted into product, 22% of middling and 18% as rejects.
12	The total mine water discharge is 8500 Cu.m/day The industrial and domestic demand is 4200 MLD including 1600 MLD of water requirement for washery
13	The existing manpower for Rajrappa OCP & washery for a rated capacity of 03 MTY of coal has been estimated as 1542 Executive : 96 Monthly Rated& Daily Rated : 1446 Total : 1542
14	The project includes land of 14 villages in Ramgarh Dist. and 2 villages in Bokaro Dist. The Buffer zone consists of around 80 villages surrounding the area at 10 Km radius from the Core Zone.

Chapter 2

Project Background

2.1 Introduction

Rajrappa OCP and washery is an operating project under Rajrappa Area of Central Coalfields Limited, Jharkhand. The DPR for Rajrappa OCP for a rated capacity of 3.0 Mt of ROM coal per annum was sanctioned by the Govt. on 17.6.83, at an estimated capital investment of Rs. 91.46 crores. Environmental Clearance was obtained vide letter no J-11015/10/88-IA-II(M) dated 23.11.1992 for coal production capacity of 3.0 MTPA. A revised RCE was prepared by CMPDI in 2009 with following major changes.

1. Transportation of Coal from Block-II by Dumpers to washery
2. OB generated in Block II is to be backfilled in the void generated in Block I & IV.

The revised RCE with above changes and capital cost of Rs. 510.85 Lakhs was approved by CIL board in its 364 th meeting dated 23/12/2009.

Block I&IV is located in Ramgarh Dist. south to river Damodar and Block II is located in Bokaro Dist. north to river Damodar. Block I&IV and Block II are separated by River Damodar.

In the preceding years, the coal production from Rajrappa OCP was as given below:

Year	Coal Prod. (Mt)	OBR (M cum)	S.R. (Cu.m/t)
91-92	2.72	6.99	2.59
92.93	2.84	7.00	2.46
93-94	2.35	6.00	2.55
94-95	1.96	6.03	3.08
95-96	2.35	6.15	2.62
96-97	2.65	6.27	2.37
97-98	2.60	6.05	2.33
98-99	2.30	6.80	2.96
99-2000	2.31	7.31	3.16
2000-01	1.70	7.53	4.43
2001-02	1.47	6.32	4.30
2002-03	1.35	6.01	4.45
2003-04	1.40	5.82	4.16
2004-05	1.51	5.29	3.50
2005-06	0.73	3.22	4.41
2006-07	0.73	2.58	3.53
2007-08	0.85	2.77	3.26
2008-09	1.00	2.79	2.79
2009-10	1.10	3.114	2.83
2010-11	1.10	5.98	5.44
2011-12	1.13	6.06	5.36
2012-13	0.76	4.82	6.34
2013-14	0.80	2.55	3.19
2014-15	1.31	3.52	2.69

Year	Coal Prod. (Mt)	OBR (M cum)	S.R. (Cu.m/t)
2015-16	1.53	6.97	4.56
2016-17	1.95	6.85	3.51
2017-18	1.31	4.23	3.23

The above said production of Rajrappa OCP has been done only in Block I & IV and no mining activity has been taken up till date in Block II.
Rajrappa washery is also an existing project located in Block I&IV within the acquired area of Rajrappa OCP. Rajrappa washery was designed for a rated capacity of 03 MTY ROM in 1975 with a capital outlay of Rs. 2576.89 Lakhs and has obtained Environmental Clearance vide letter no. J-11015/4/85-IA dated 30.01.1987.

In the preceding years, the annual capacity of raw coal input from Rajrappa washery is as given below:

Year	Raw Coal Feed (Mt.)
1990-91	1.72
91-92	1.82
92.93	1.75
93-94	1.66
94-95	1.69
95-96	2.11
96-97	2.42
97-98	2.13
98-99	2.13
99-2000	2.06
2000-01	2.06
2001-02	1.59
2002-03	1.97
2003-04	2.01
2004-05	2.13
2005-06	1.74
2006-07	1.32
2007-08	1.15
2008-09	1.04
2009-10	1.10
2010-11	1.15
2011-12	1.23
2012-13	1.38
2013-14	0.99
2014-15	1.40
2015-16	1.50
2016-17	1.40
2017-18	1.30

2.2 Purpose of the report

Rajrappa OCP and Washery had obtained environmental clearance for 03 MTY prior to EIA Notification, 1994. MoEF&CC has issued a notification vide no: S.O 1530 (E) dt. 06.04.2018 in which it was said that "The mining projects which were granted EC prior EIA notification 2006 and but not obtained EC for expansion/ modernization/ amendment under the EIA

notification 2006 shall make an application in Form I within six months from the date of issue of this notification for grant of EC under the provisions of the EIA notification, 2006".

Therefore, this pre-feasibility report of Rajrappa OCP and Washery by combining Rajrappa OCP and Rajrappa washery is being prepared for the rated capacity of 03 MTPA and within the revised project area of 2263.83 ha.

2.3 Identification of project & project proponent

The project under consideration, i.e. Rajrappa OCP and Washery is administratively under Rajrappa Area of CCL headed by General Manager, Rajrappa Area. Geologically, it falls in Ramgarh Coalfield in Ramgarh District of Jharkhand.

The mailing address of the Project Officer is given below:

Project Officer,

Rajrappa OCP & Washery,

Rajrappa Area, Central Coalfields Limited.

PO- Ramgarh, Dist-Ramgarh, Pin – 829150

Phone – 8987784299

2.4 Location & Communication

Rajrappa OCP falls in the Ramgarh Block-I, Block II & Block-IV, located in the south-eastern part of Ramgarh Coalfields. Block II falls in Bokaro District and Block I & IV falls in Ramgarh district separated by river Damodar. The block is bounded by latitudes 23°34´40´´N to 23°38´33´´N and longitudes 85°39´44´´E to 85°42´45´´E. The block is covered in Survey of India toposheet no. 73E/10 (RF: 25000) enclosed as Plate I. The block covers an area of 19.97 sq. km out of which 18.51 sq. km is coal bearing area. The maximum length in east-west direction is 4.94 kms and in north-south direction is 6.71 kms. The northern side of the block is encircled by Damodar River. The eastern side of the block is demarcated by Bhera Nadi and the southern side of the block is surrounded by Metamorphic rocks.

Rajrappa OCP is connected by an all-weather road to Ramgarh & Bokaro. The National Highway NH-33 is connected to Ranchi and Hazaribagh from Ramgarh. The nearest railway station Barkipona is about 06 km from the block. The nearest township Rajrappa is about 20 km from Ramgarh OCP.

2.5 Description of importance to the country and region

Benefits at national level-

Central Coalfields Limited is facing increasing demand of coal because of increased demand from industry and steel sector. Continuing of coal production from the 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 63.405 Mt. of coal during 2017-18 to 88.0 MTPA by 2020-21.

Continuation of coal production from Rajrappa OCP will help to a certain degree to meet the growing demand of coking coal in the country.

The Washery will produce clean coal to be used by steel industry and middlings which can be used by power sector.The rejects will be utilized for power generation.

Benefits at regional level-

The project has created employment opportunities both for skilled and semi- skilled persons in the area. Power network has been extended to the project site for the construction & operation of the plant. This network is facilitating distribution of power in the neighbouring area. The project has brought about enhanced socio-economic benefits to local population due to expenditure on CSR activities

2.6 Employment Generation:

Rajrappa OCP and Washery is an existing project operating since 1976-77. Rajrappa OCP and Washery has been a major source of direct and indirect employment for nearby villagers in buffer zone.

Under R&R of Project affected people, around 850 PAPs have already been provided with direct employment against tenancy land falling under Block I&IV. Employment of PAPs against the land falling under Block II is to be done.

Chapter 3

Project Description

3.1 Mining Method

The geological & mining characteristics of the Rajrappa OCP under consideration are favourable for opencast mine field development at optimum conditions of mining operations for the entire life of proposed opencast mine. Opencast Mining method involves drilling and blasting.

Considering the geo-mining characteristics of the mining block i.e.

(a) multiple seams with varying thickness,
(b) Variable gradient of the seams
(c) Short strike length
(d) Quarrying being done followed by backfilling of OB

Shovel-dumper mining system has been envisaged in the OCP.

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

1. Mining Benches

a) Maximum Bench Height

- 5.0 cum Rope shovel/Hyd shovel bench - 9-10m
- 10.0 cum rope shovel bench - 10-12m

b) Minimum Bench Width

Working Bench Width for 5.0 cum Hyd Shovel/ 5.0/10.0 cum rope shovel	-	40m
Non-working Bench width for 5.0 cum Hyd Shovel/ 5.0cum rope shovel	-	25m
Non-working Bench width for 10 cum Hyd Shovel	-	30m
2. Width of the permanent haul road	-	30 m.
3. Width of the temporary transport ramp	-	20 m.
4. Usual height of the spoil dump bench	-	30 m.
5. The width of the active dump bench	-	60 m.
6. Bench Slope (working)		
O.B. bench	-	70^0
Coal bench	-	70^0
Dump bench	-	37^0
7. Overall pit slope	-	$37^{0.}$

3.2 Drilling and Blasting

Overburden rocks consist of medium grained sandstone to coarse-grained sandstone. Assumed category of rock is 50% of CAT-III + 50% of CAT-IV.

Type & capacity of drills:

OB	Coal
250mm/ 160mm dia drill	160mm drill

Elements of Drilling and Blasting:

The elements of drilling and blasting are decided during actual operation after trial blasting in the field. Controlled blasting is being practiced near project boundary. However, drilling of coal & OB benches is recommended to be done vertically at $90^{0.}$ It is suggested to use slurry explosive in cartridge / site mixed slurry for better result and enhance safety with proper stemming material. Secondary blasting is not suggested in any circumstances.

3.3 Geological and Mining Characteristics

The geological and mining characteristics of the Rajrappa OCP have been summarized in table below. From this table, it may be seen that 6 nos. of seams from Seam-V to Seam-VIIIA of varying thickness are occurring in this project. The seams are dipping between 6 deg to 10 deg. The maximum depth of the quarry is around 150m in both working blocks and the surface area of excavation of the above quarry is 826.73 Ha.

Geological and Mining Characteristics

Sl. No.	Particulars	Unit	Value
I.	**COAL SEAMS**		
A.	**SEAM THICKNESS**		
1	Seam-VIIIA	M	1.86-4.70
2	Seam-VII Top	M	4.49-15.75
3	Seam-VII Bottom	M	3.40
4	Seam-VIIA	M	3.50
5	Seam-VI	M	2.80
6	Seam-V	M	2.80
B	Dip of the seam	Degree	7-17
C	Av. Sp. Gravity of seam	Te/Cum	1.5-1.70
D	Excavation Category	Assumed	Cat.III
II	**O.B./PARTING THICKNESS**		
1.	Top O.B	M	19-31
2.	Part. Bet. Seam-VIIIA & VII Top	M	5-40
3.	Part. Bet. Seam- VII Top & VII Bot	M	10-24
4.	Part. Bet. Seam- VII Bot & VIIA	M	19.50
5.	Part. Bet. Seam-VIIA & VI	M	13.50
6.	Part. Bet. Seam-VI & V	M	21.10
B.	O.B Volume weight	T/cum	2.40
C	Excavation Category	Assumed	50% Cat.III+ 50% Cat.IV
III	**QUARRY PARAMETERS**		
A	Av. Strike length of the quarry a) At Surface	 Km Km	 Block I&IV 3.80 Block II 2.60
B	Av. width of the quarry b) At Surface At Floor	 Km Km	 Block I&IV 1.95 Block II 1.60
C	Maximum Depth of quarry	M	150

Refer Plate-II for Geological Plan.

3.4 Mining reserves – volume of OB – stripping ratio

The estimated seam wise mineable reserves along with total volume of OBR (as on Apr 2018) and average stripping ratio have been shown in Table below:

Table 3.1 Block wise & section wise balance Mineable Reserve

	Year	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22-29	TOTAL
Block I &IV	**Coal(Mtes)**	**1.00**	**1.00**	**0.70**	**0.78**	**0.65**	**0.02**																	**4.15**
	Section1	0.21	0.09	0.03																				0.34
	Section2	0.39	0.45	0.33	0.39	0.33	0.01																	1.90
	Section3	0.39	0.45	0.33	0.39	0.33	0.01																	1.90
	OB(Mcum)	**2.96**	**3.22**	**2.22**	**2.37**	**2.02**	**0.06**																	**12.85**
	Section1	0.98	0.53	0.20																				1.71
	Section2	0.97	1.32	0.99	1.16	0.98	0.03																	5.44
	Section3	1.01	1.38	1.03	1.21	1.04	0.03																	5.70
Section-II New Patch	**Coal(Mtes)**	**0.75**	**1.00**	**1.00**	**0.80**	**0.75**																		**4.30**
	Seam VIIT	0.10	0.13	0.13	0.11	0.10																		0.57
	Seam VIIB	0.16	0.21	0.21	0.17	0.16																		0.89
	Seam VIIA	0.19	0.25	0.25	0.20	0.19																		1.09
	Seam VI	0.17	0.22	0.22	0.18	0.17																		0.96
	Seam V	0.14	0.18	0.18	0.15	0.14																		0.78
	OB(Mcum)	**3.61**	**4.82**	**4.82**	**3.85**	**3.60**																		**20.70**
	Top OB	0.41	0.54	0.54	0.44	0.41																		2.34
	Part. Bet. VIIT-VIIB	0.57	0.76	0.76	0.61	0.57																		3.29
	Part. Bet. VIIB-VIIA	0.97	1.29	1.29	1.03	0.97																		5.55
	Part. Bet. VIIA-VI	0.66	0.88	0.88	0.70	0.66																		3.78
	Part. Bet. VI-V	1.00	1.34	1.34	1.07	1.00																		5.74
Block II	**Coal(Mtes)**			**0.50**	**1.42**	**1.60**	**1.70**	**2.06**	**2.22**	**3.00**	**3.00**	**3.00**	**3.00**	**3.00**	**3.00**	**3.00**	**3.00**	**3.00**	**3.00**	**3.00**	**3.00**	**3.00**	**21.51**	**70.01**
	Section4									0.34	0.40	0.40	0.40	0.40	0.40	0.40	0.40	0.40	0.40	0.40	1.06	1.06	8.09	14.55
	Section5			0.50	1.42	1.44	1.54	1.90	2.06	2.50	2.52	2.52	2.52	2.52	2.52	2.52	2.52	2.52	2.52	2.52	0.75	0.75	3.86	41.92
	Section6																				1.19	1.19	9.56	11.94
	Section7					0.16	0.16	0.16	0.16	0.16	0.08	0.08	0.08	0.08	0.08	0.08	0.08	0.08	0.08	0.08				1.60
	OB(Mcum)		**0.40**	**2.00**	**5.07**	**5.44**	**6.15**	**7.46**	**7.88**	**10.46**	**8.40**	**8.40**	**8.40**	**8.40**	**8.40**	**8.40**	**8.40**	**8.42**	**8.42**	**8.42**	**7.91**	**7.91**	**63.48**	**208.22**
	Section4									1.65	1.91	1.91	1.91	1.91	1.91	1.91	1.91	1.92	1.92	1.92	3.09	3.09	23.04	50.00
	Section5		0.40	2.00	5.07	5.16	5.87	7.18	7.60	8.53	6.33	6.33	6.33	6.33	6.33	6.33	6.33	6.34	6.34	6.34	0.38	0.38	4.92	110.82
	Section6																				4.44	4.44	35.52	44.40
	Section7					0.28	0.28	0.28	0.28	0.28	0.16	0.16	0.16	0.16	0.16	0.16	0.16	0.16	0.16	0.16				3.00
Total	**Coal(Mtes)**	**1.75**	**2.00**	**2.20**	**3.00**	**3.00**	**1.72**	**2.06**	**2.22**	**3.00**	**3.00**	**3.00**	**3.00**	**3.00**	**3.00**	**3.00**	**3.00**	**3.00**	**3.00**	**3.00**	**3.00**	**3.00**	**21.51**	**78.46**
	OB(Mcum)	**6.57**	**8.44**	**9.04**	**11.29**	**11.06**	**6.21**	**7.46**	**7.88**	**10.46**	**8.40**	**8.40**	**8.40**	**8.40**	**8.40**	**8.40**	**8.40**	**8.42**	**8.42**	**8.42**	**7.91**	**7.91**	**63.48**	**241.77**
	SR(cum/te)	**3.76**	**4.22**	**4.11**	**3.76**	**3.69**	**3.61**	**3.62**	**3.55**	**3.49**	**2.80**	**2.80**	**2.80**	**2.80**	**2.80**	**2.80**	**2.80**	**2.81**	**2.81**	**2.81**	**2.64**	**2.64**	**2.95**	**3.08**

3.5 Coal Reserves and Life of the Mine

The balance extractable coal reserve has been estimated as 78.46 MT (as on Apr '2018)**.** The mine has been proposed to produce 3.00 MTPA of coal and the estimated life of the mine is 29 years.

3.6 Size or Magnitude of Operation (as on Apr, 2018)

The Summarized 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 balance life of mine (proposed production). Balance mineable reserves have been estimated as 78.46 MT. The normative rated output of 3.00 MTPA would be achieved in the 4th year.

SN	**Year**	**Coal Production (MTPA)**
Future Production (Proposed)		
1	2018-19	1.75
2	2019-20	2.00
3	2020-21	2.20
4	2021-22	3.00
5	2022-23	3.00
6	2023-24	1.72
7	2024-25	2.06
8	2025-26	2.22
9	2026-27	3.00
10	2027-28	3.00
11	2028-29	3.00
12	2029-30	3.00
13	2030-31	3.00
14	2031-32	3.00
15	2032-33	3.00
16	2033-34	3.00
17	2034-35	3.00
18	2035-36	3.00
19	2036-37	3.00
20	2037-38	3.00
21	2038-39	3.00
22-29	2039-47	21.51
	Total	**78.46**

For the rated output of 3.0 MTPA of ROM coal, the balance life of the opencast mine is estimated as 29 years. The mine will achieve the targeted production in the year 2021-22.

3.7 Coal Handling & Dispatch System

The total production of Rajrappa OCP has been the proposed as 3.0 MTY. Presently Coal produced from this project is being fed to adjacent Rajrappa washery. It has been proposed that coal produced from Block –II will be fed to Rajrappa washery by road through tipping truck / dumper for onward washing and dispatch. The ROM coal produced from the mine will be directly fed to the washery for washing and onward dispatch. Two nos. of road weigh bridges have been provided for weighment of coal. The coal produced from the existing

quarries will be dispatched as per the prevailing system. Provision for dust suppression measures has been made.

3.8 Rajrappa Washery

Rajrappa washery has been established over an area of about 27.22 Ha. Coal produced from Rajrappa opencast project is being fed to the Rajrappa washery. The brief summary of Rajrappa washery is as given below:

SUMMARISED DATA as per PR

1. Capacity & Operating conditions
   a) Annual : 3.0 Mty
   b) Daily : 9100 tonnes
2. Raw coal linkage : Rajrappa OCP
   Proposed Life of the washery (As on 01.04.2018) : 29 years
3. a) Ash% : 28
   b) Grade : W II & W III
4. Balance of Products :

Product	Wt%	Ash%	Qty. (Mty)
Washed coal	60	15	1.8
Rejects	18	60	0.54
Middlings	22	32 to 35	0.66
Total	100	28	3.00

5. Broad initial capital investment (Rs. in lakhs) 2576.89
6. Cost of production per tonne (Rs.) 6402.78
7. Capital requirement for plant and machinery (Rs. In lakhs) 1402.69
8. Selling price per tonne of washed coal (Rs.) 8511.34
9. Annual profit (Rs. Crores) 133

3.9 Power Requirement

6.6 kV OHTL feeders originating from the main substation is proposed to be drawn along the quarry periphery for feeding power to various shovels, drills, pumps deployed in this project.

Power Supply to Workshop

Power supply to workshop has been envisaged at 6.6 kV from main S/S. At the workshop, power at 6.6 kV will be stepped down to 0.433 kV for supplying power to various power consumers of the workshop

The Main source of Power supply of Rajrappa OCP is DVC Gola substation. The power is received from the main sub-station to local substation located within the project area by overhead transmission lines. Transformer Proposed: 2 x 12.5 MVA, 33 / 6.6 kV.

Transformer: 2 x 12.5 MVA , 33 / 6.6 kV kV.

Max. Demand (At an Improved P.F Of 0.98): 7808 kVA.

Maximum Annual Power Consumption: 34.58 Mkwh.

Maximum Annual Power Bill: 1175.7 Lakhs.

Specific Power Consumption: 11.526 kWh / t.

Power Cost: Rs. 39.19 / t.

Capacitor Bank Required 3878 kVAr.

3.10 Water Requirement

Rajarappa OCP and washery is an existing project in Rajrappa area of CCL. The coal production in the year 2017-18 is about 1.30 MTY. The details of mine discharge and water consumption details are as given below.

S.No.	Description	Discharge (m^3/day)
I.	**Mine water discharge**	8500
II.	**Industrial Consumption**	
1.	Washing of HEMM	100
2	Sprinkling	600
3	Washery	3500
	Total Industrial Demand	**4200**
III	**Domestic Demand**	**1600**

The average mine water discharge of Rajrappa OCP is approx. 8500 Cu.m/day. Out of which, around 4200 Cu.m/day is being utilised for industrial purposes and 1600 Cu.m/day is being utilised for domestic purposes. The remaining water is being stored in the mine voids for recharge of ground water.

Bhera River flowing along the eastern boundary of project is used as an alternative source of water for domestic and industrial purposes in case required. Water is being drawn from Bhera river through two dug wells.

The above given details are as per the production. However, a detailed water balance will be prepared in EIA/EMP including mine discharge and consumption from Block II.

3.11 Land Requirement

The total proposed project area of Rajrappa OCP is 2263.83 Ha including 585.65 Ha in Block II and 1678.18 Ha in Block I & IV. The existing Rajrappa washery is located in Block I of project area. The details of land for proposed Rajrappa OCP and Washery is as given below.

land Details within Project Area			
	Area in Ha		
Type	Block I&IV	Block II	Total Area in Ha
Forest	510.82	98.69	**609.51**
GMK JJ	293.61	178.46	**472.07**
Tenancy	750.99	230.26	**981.25**
GMK	122.76	78.24	**201.00**
Total	**1678.18**	**585.65**	**2263.83**

Refer Plate III for Revenue Plan

Status of Land

SN	Type of land	Area wise Status of acquisition	
		Area (Ha)	**Status**
1	Forest land	Block I&IV: 510.82 Block II: 98.69 Ha	Obtained Stage II clearance of 510.82 Ha vide letter no: F.No: 8-105/2003-FC Dt.15.03.2007. Stage I under process.
2	GMK JJ	Block I&IV: 293.61 Block II: 178.46 Ha	Stage I under process.
3	Tenancy land	Block I&IV: 750.99 Block II: 230.26 Ha	Acquired. Acquired.
4	GMK	Block I&IV: 122.76 Block II: 78.24Ha	Acquired. Acquired.
Total		**2263.83 Ha.**	

A part of land within proposed project area has been acquired under CB Act and remaining land under LA Act. The details of land acquisition is as follows.

Details of Acquisition under CB Act:

1. S.O. no: 2777 Dt. 4.8.64
2. S.O. no: 1311 Dt. 24.4.78
3. S.O. no: 3894 Dt. 22.12.62
4. S.O. no: 3998 Dt. 21.12.66
5. S.O. no: 3400 Dt. 27.11.63
6. S.O. no: 499E Dt. 1.3.13

Details of Acquisition under LA Act:

1. Haz-131/63-1119R Dt. 06.02.1963
2. Haz-90/81-2171R Dt. 11.05.1981
3. Haz-119/80, 2411R Dt. 27.06.1980
4. Haz-121/80-2405R Dt. 27.06.1980
5. Haz-120/80-2418R Dt. 27.06.1980
6. Haz-093/81-915R Dt. 24.02.1981
7. Haz-094/81-912R Dt. 28.02.1981
8. Haz-88/81-914 R Dt. 28.02.1981
9. Haz-99/81-1029R Dt. 07.03.1981
10. Haz-35/83-101R Dt. 12.01.1984
11. Haz-49/83-78 Dt. 12.01.1984
12. Haz-48/88-752R Dt. 24.02.1984
13. Haz-109/83-76 Dt. 12.01.1984
14. Haz-7189/1333 Dt. 05.06.1989
15. Haz-148/63/3756R Dt. 11.05.1963

Chapter 4

Site Description

4.1 Identification of Project

The project under consideration, i.e. Rajrappa OCP and Washery is administratively under Rajrappa Area of CCL headed by General Manager, Rajrappa Area. Geologically, it falls in Ramgarh Coalfield in Ramgarh District of Jharkhand.
The mailing address of the Project Officer is given below:

Project Officer,
Rajrappa Opencast Project,
Rajrappa Area, Central Coalfields Limited.
PO- Tapin, Dist-Ramgarh, Pin – 829150
Phone – 8987784669

4.2 Topography

The terrain is generally undulating and the general slopes are towards the Damodar River.

The topsoil is thicker in the valleys and scanty on the ridges. The steeper slopes are denuded and devoid of soil cover. The Damodar River flows through high banks for most of the way and runs along a rocky bed. There are pockets of sand brought down from the upper catchment. The recorded high flood level in the river is 297 M above MSL. The low water level at the river pump house on the right bank is 273.6 M above MSL. The Bhera River flows on the eastern boundary of Block I and is meandering in nature.

4.3 Land Use Pattern

The total proposed project area of Rajrappa OCP is 2263.83 Ha including 585.65 Ha in Block II and 1678.18 Ha in Block I & IV. The existing Rajrappa washery is located in Block I of project area. The details of land for proposed Rajrappa OCP and Washery is as given below.

land Details within Project Area			
	Area in Ha		
Type	Block I&IV	Block II	Total Area in Ha
Forest	510.82	98.69	**609.51**
GMK JJ	293.61	178.46	**472.07**
Tenancy	750.99	230.26	**981.25**
GMK	122.76	78.24	**201.00**
Total	**1678.18**	**585.65**	**2263.83**

4.3 Climate

The broad climatic characteristics are as follows:

i. The predominant summer wind direction is from south and winter wind is from north-northwest.

ii. The maximum temperature (day) is expected during the months of April-May and is around 38^0 C. The minimum temperature (night) will be in the months of December-January and may fall to about 10^0 C.

iii. The rainy season in this area starts from June and continues till September. However, pre-monsoon showers are experienced in May. Showers have been witnessed in the area throughout the year though rains during December had been nominal (about 4 mm). The months April, November and December are the driest. Annual rainfall expected is about 1200mm with highest monthly rains of 350 mm in the months of July-August.

iv. Consistent with temperature and rainfall, the relative humidity is lowest during March-April and highest during July to September. The maximum and minimum relative humidity expected are 86% and 27% respectively.

Chapter 5

Project Planning

5.1 Mine Planning

Considering the geo-mining characteristics of the mining block i.e.

(a)multiple seams with varying thickness,
(b)Variable gradient of the seams
(c)Short strike length
(d)Quarrying being done followed by backfilling of OB

Shovel-dumper mining system has been envisaged in the OCP.

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

1. Mining Benches

a) Maximum Bench Height

- 5.0 cum Rope shovel/Hyd shovel bench - 9-10m
- 10.0 cum rope shovel bench - 10-12m

b) Minimum Bench Width

Working Bench Width for 5.0 cum Hyd Shovel/ 5.0/10.0 cum rope shovel	-	40m
Non-working Bench width for 5.0 cum Hyd Shovel/ 5.0cum rope shovel	-	25m
Non-working Bench width for 10 cum Hyd Shovel	-	30m
2. Width of the permanent haul road	-	30 m.
3. Width of the temporary transport ramp	-	20 m.
4. Usual height of the spoil dump bench	-	30 m.
5. The width of the active dump bench	-	60 m.
6. Bench Slope (working)		
O.B. bench	-	70^0
Coal bench	-	70^0
Dump bench	-	37^0
7. Overall pit slope	-	$37^{0.}$

5.2 Life of Mine and Magnitude of Operation

The balance extractable coal reserve of Block I, II and IV has been estimated as 78.46 MT (as on Apr '2018)**.** The mine has been proposed to produce 3.00 MTPA of coal and the estimated life of the mine is 29 years.

The Summarized 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 balance life of mine (proposed production). Balance mineable reserves have been estimated as **78.46** MT. The normative rated output of 3.00 MTPA would be achieved in the 4th year.

SN	Year	Coal Production (MTPA)
Future Production (Proposed)		

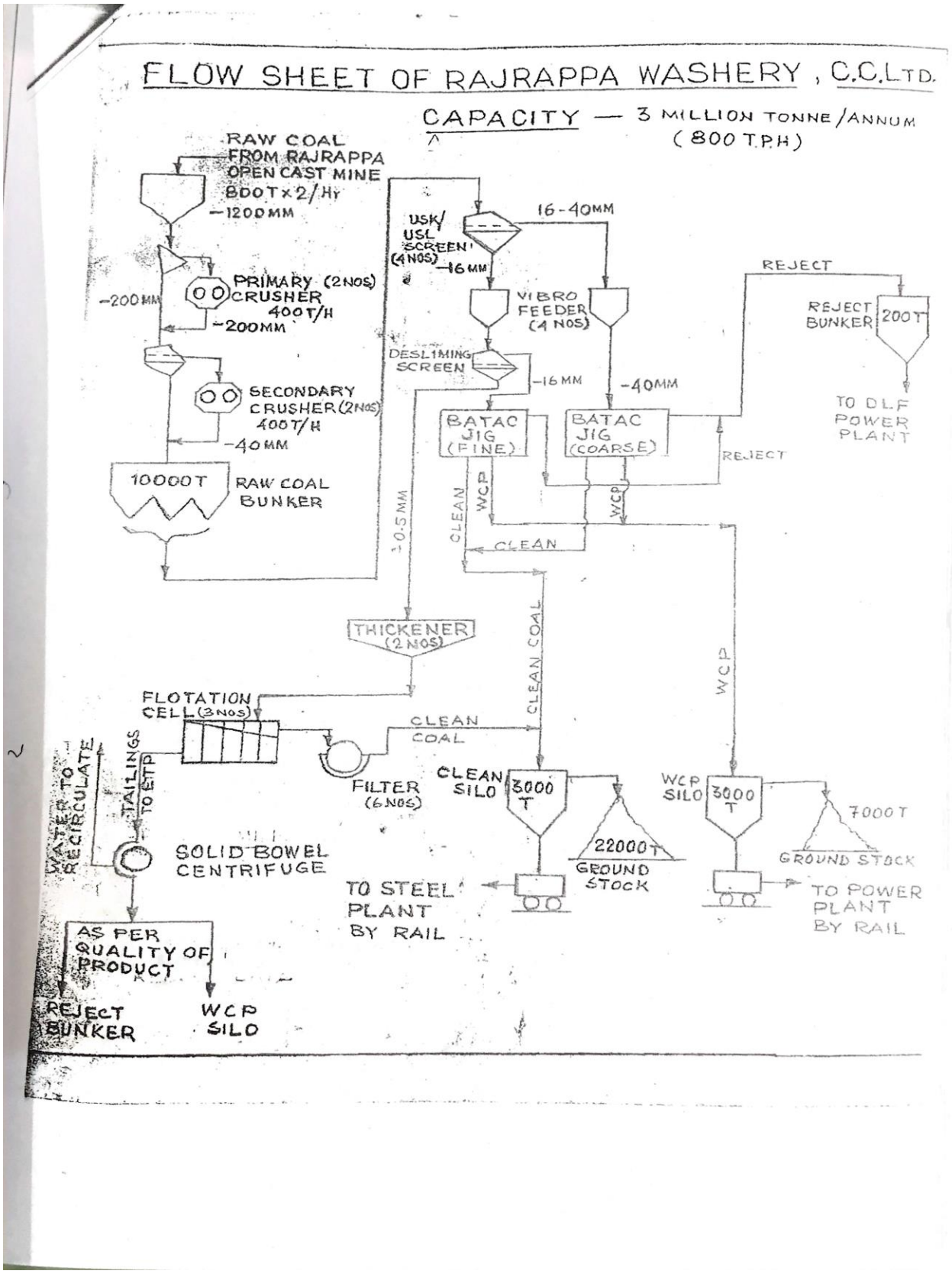
1	2018-19	1.75
2	2019-20	2.00
3	2020-21	2.20
4	2021-22	3.00
5	2022-23	3.00
6	2023-24	1.72
7	2024-25	2.06
8	2025-26	2.22
9	2026-27	3.00
10	2027-28	3.00
11	2028-29	3.00
12	2029-30	3.00
13	2030-31	3.00
14	2031-32	3.00
15	2032-33	3.00
16	2033-34	3.00
17	2034-35	3.00
18	2035-36	3.00
19	2036-37	3.00
20	2037-38	3.00
21	2038-39	3.00
22-29	2039-47	21.51
	Total	**78.46**

For the rated output of 3.0 MTPA of ROM coal, the balance life of the opencast mine is estimated as 29 years. The mine will achieve the targeted production in the year 2021-22.

5.3 Coal linkage to Washery

As mentioned earlier, the linkage of raw coal feed to the medium coking coal Rajrappa washery of 3.0 MTY capacity is from Expansion Rajrappa Opencast Project. Raw coal is being supplied to the washery by road through tipping trucks/dumpers.

5.4 Process Flowsheet of Washery



5.5 Land Use Planning

5.5.1 Land Use Plan during Mining

The total proposed project area of Rajrappa OCP is 2263.83 Ha including 585.65 Ha in Block II and 1678.18 Ha in Block I & IV. The existing Rajrappa washery is located in Block I of project area. The details of land for proposed Rajrappa OCP and Washery is as given below. Refer Plate IV for proposed land use plan during mining.

land Details within Project Area			
Type	Area in Ha		Total Area in Ha
	Block I&IV	Block II	
Forest	510.82	98.69	**609.51**
GMK JJ	293.61	178.46	**472.07**
Tenancy	750.99	230.26	**981.25**
GMK	122.76	78.24	**201.00**
Total	**1678.18**	**585.65**	**2263.83**

Status of Land

SN	Type of land	Area wise Status of acquisition	
		Area (Ha)	**Status**
1	Forest land	Block I, I&IV: 510.82 Block 2: 98.69 Ha	Obtained Stage II clearance of 510.82 Ha vide letter no: F.No: 8-105/2003-FC Dt.15.03.2007. Stage I under process.
2	GMK JJ	Block I, I&IV: 293.61 Block 2: 178.46 Ha	 Stage I under process.
3	Tenancy land	Block I, I&IV: 750.99 Block 2: 230.26 Ha	Acquired. Acquired.
4	GMK	Block I, I&IV: 122.76 Block 2: 78.24Ha	Acquired. Acquired.
Total		**2263.83 Ha.**	

Land use During Mining

Block I&IV

Sl.No.	Particulars	Forest Land Ha	GNK JJ Ha	Non-Forest Ha	Total Area in Ha
1	**Quarry**	183.09	34.76	219.79	**437.65**
2	**External Dump**	76.99	41.15	129.02	**247.16**
3	**Washery**	6.57	5.39	15.26	**27.22**
4	**Industrial Area**	4.35	2.28	12.04	**18.68**
5	**Residential Area**	21.88	3.79	108.68	**134.34**
6	**Rehabilation Site**	9.56	0.00	4.51	**14.07**
7	**Railway Line**	8.27	8.38	71.59	**88.23**
8	**safety/ Vacant land**	200.10	197.87	312.86	**710.83**
Total		**510.82**	**293.61**	**873.75**	**1678.18**

Block II

Sl.No.	Particulars	Forest Land Ha	GMK JJ (Ha)	Non-Forest Area in Ha	Total Area in Ha
1	Quarry	40.19	129.78	219.11	389.07
2	Infrastructure	41.60	22.51	50.15	114.25
3	Embankment	16.05	24.52	39.11	79.68
4	Safety Zone	0.85	1.66	0.13	2.64
	Total (in Ha)	98.69	178.46	308.50	585.65

Composite Land Use Plan of Block I, II &IV

Sl.No.	Particulars	Block II	Block I,IV	Total Area in Ha
1	Quarry	389.07	437.65	826.72
2	External Dump	0	247.16	247.16
3	Washery	0	27.22	27.22
4	Industrial Infrastructure	114.25	18.68	132.93
5	Residential Area	0	134.34	134.34
6	Rehabilation Site	0	14.07	14.07
7	Railway Line	0	88.23	88.23

8	safety Zone, Haul Road, Enbankment, Vacant land etc	82.32	710.83	793.15
	Total	585.65	1678.18	2263.83

5.5.2 Post-Mining Land Use Plan

Rajrappa Opencast Project is an operating coal mine under Rajrappa Area of Central Coalfields Limited, Jharkhand operating since 1976-77.

Dumping Strategy:

The total OB to be generated during the entire life of mine is 241.77 Mm^3 from Block I, II & IV. This overburden will be backfilled into the excavated mine void to be created in Block I&IV. The OB from Block II will be transported to Block IV by dumpers through proposed bridge across river Damodar.

5.5.2.1 Post Mining Reclamation Plan

The proposed post mining land use plan is as given below.

Post Mining Landuse Plan

	During Mining		Post mining	
Sl.No.	**Particulars**	**Total Area in Ha**	**Particulars**	**Area in Ha**
1	Quarry	826.72	Mine void filled with water	389.07
			Plantation on Backfilled Quarry	437.65
2	External Dump	247.16	Plantation on External Dump	247.16
3	Washery	27.22	Washery for Future Use	27.22
4	Industrial Infrastructure	132.93	Infrastructure for Future Use	132.93
5	Residential Area	134.34	For CCL Use	134.34
6	Rehabilation Site	14.07	Rehabilation Site	14.07
7	Railway Line	88.23	Railway Line	88.23
8	safety Zone, Haul Road, Enbankment, Vacant land etc	793.15	Haul Road for Transporation of Coal and Other Roads	66.00
			Plantation on Safety Zone, Vacant Land and Embankment	727.15
	Total	2263.83	Total	2263.83

In the Post mining stage, it is proposed to reclaim 1411.71 Ha of land with plantation. This includes plantation on existing external OB dump and quarry area in Block I&IV, and safety zone/ vacant land in project area. Till date, 425 Ha of project area has been reclaimed with plantation as a part of progressive mine closure.

5.6 Amenities/Facilities

Rajrappa OCP is an existing project. The facilities for industrial purposes like workshop, washery, offices, Magazine site etc. have already been set up. Further, amenities for working manpower like Residential colony, schools, hospitals, community centres have already been established. Also, site for rehabilitation of PAFs have been earmarked within the project area.

Chapter 6

Infrastructure

6.1 Existing Infrastructure

Rajrappa OCP has been operating in Block I&IV since 1976-77. The facilities for industrial purposes like workshop, washery, offices, Magazine site etc as per approved PR have already been set up. Further, amenities for working manpower like Residential colony, schools, hospitals, community centres proposed as per PR have already been established. Also, site for rehabilitation of PAFs have been demarcated within the project area.

6.2 Proposed Infrastructure

It is proposed to set up industrial infrastructure like pit office, Magazine site, stock yard etc in Block II. 114 Ha of land in Block II has been identified for establishment of infrastructure. Further, it is proposed to construct a bridge across river Damodar to provide connectivity to Block II from Block I & IV so as to transport OB and coal.

6.3 Drinking water Management

The approximate domestic water demand of the project is 1600 Cu.m/day. This demand is majorly satisfied by the mine discharge. Bhera river flowing along the southern boundary of project serves as an alternative water source.

6.4 Sewerage System

The approximate sewage generated from all domestic sources is around 1.00 MLD. This sewage is collected through sewerage systems and treated at sewage Treatment Plant. The installed capacity of STP in the project is 1.50 MLD.

The STP is installed with aerators, primary and secondary settling tanks. Further, the dried up sludge is being dumped into mine void and covered with OB.

6.5 Industrial Waste water Management:

The effluent generated from workshop due to washing of HEMM is being treated in ETP installed with oil & grease trap, and settling pond.

The slurry generated from washery is allowed to settle in sludge settling tanks. 5 no. of sequential settling tanks were constructed for treatment of slurry. The sludge settled in the settling tanks is removed periodically and dried in sludge drying beds.

6.6 Solid waste Management

The total OB to be generated during the entire life of mine is 241.77 Mm^3 from Block I, II & IV. This overburden will be backfilled into the excavated mine void to be created in Block I&IV. The OB from Block II will be transported to Block IV by dumpers through proposed bridged across river Damodar.

Further, municipal solid waste from the colony are being dumped into mine void and covered with OB.

Chapter 7

Rehabilitation & Resettlement

7.1 Status of R&R

Mael, sewai & Bhuchundih Villages falling within the core zone were resettled. Around 192 PAFs were identified in these villages for Rehabilitation and Re-settlement in Block I & IV. Till date, 172 families have been rehabilitated and rehabilitation of 20 PAFs is under process. Rehabilitation sites have been developed at S.K.Nagar, New Chilamtungri and kewat Tola. Around 13.66 Cr has been allotted for carrying R&R.

Further, 850 Project Affected People have been provided with employment.

7.1.1 R&R Policy of CIL

The R&R Policy of CIL was revised with effect from 5th April, 2012 for implementation of Rehabilitation Action Plan. The salient features in brief are given below.

R&R Policy of CIL

Compensation For Land
One Employment per 2 acres to land losers (plots can be clubbed together) Or monetary compensation @ Rs.5.0 Lakh per acre subject to a minimum of Rs.0.50 Lakh. The compensation can be paid in form of annuity also on monthly, quarterly, annually etc upto 60 years of age or life of project, whichever is earlier.
Note: A person receiving employment forgoes all claims to monetary compensation and a person receiving monetary compensation forgoes all claims to employment.

Compensation For Homestead
Compensation for homestead building as per standard valuation method under LA Act subject to a minimum of Rs. 2 Lakh per household
Payment of Rs 3.0 Lakh in lieu of alternate housing site, assistance in designing & shifting, compensation for construction cattle shed and working shed etc.
Subsistence allowance to each affected family @ 25 days Minimum Agricultural Wages per month for one year.
Compensation For Sharecroppers, Land lessees, Tenants, Day labourers, Landless tribals etc. @ Rs. 5 lakh per household in lieu of livelihood loss.
Affected landless tribal families will be provided one time financial assistance equivalent to 500 days MAWs as a compensation for loss of customary rights.
Assistance to PAPs to take up non-farm self employment through petty contracts or

formation of co-operatives.
Contractors will be persuaded to give jobs to eligible PAPs on preferential basis.

Chapter 8

Project Schedule & Cost Estimates

8.1 Capital Expenditure

The DPR for Rajrappa OCP for a rated capacity of 3.0 Mt of ROM coal and 8.50 M Cum of overburden per annum was sanctioned by the Govt. on 17.6.83, at an estimated capital investment of Rs. 91.46 crores. A revised RCE and capital cost of Rs. 510.85 Lakhs was prepared and approved by CIL board in its 364 th meeting dated 23/12/2009.

The PR of Rajrappa washery was prepared in Aug 1974 for an input coal capacity of 03 MTY. The total capital expenditure as per approved PR is 2576.89 Lakhs.

8.2 Environmental Capital Expenditure

8.2.1 Cost of Environmental Control Measures of Rajrappa OCP as per approved PR

SN	Particulars	Amount (Rs. In Lakh)
1	Capital for Bio reclamation of External and Internal dumps	293.67
2	Water Sprinklers (5 Nos., 28 KL each)	150.46
3	Industrial Sewage treatment plant	59.87
4	Haul Road Construction and Maintenance	93.10
5	Sewage Treatment	19.70
6	Water Treatment Plant and Distribution System	60.00
7	Strom water Drains and other development measures in Township	29.60
8	Arboriculture	4.00
9	Baseline Data generation and Monitoring costs	25.00
12	Other Pollution Control Measures	54.40
Total		789.90

8.2.2 Cost of Environmental Control Measures of Rajrappa washery

A	**Air Pollution Control**	
(i)	Dust Control Equipment in Coal Crusher House	Rs. 20.00 Lakh
(ii)	Dust Controls Measures for ground raw coal storage /	Rs. 10.00 Lakh

	Water sprinkling, Enclosures etc.	
(iii)	Dust Control Measures for CHP	Rs. 5.00 Lakh
(iv)	Water Sprinklers	Rs. 40.00 Lakh
(v)	Green Belt	Rs. 15.00 Lakh
(vi)	Road Widening & Black Topping	Rs. 50.00 Lakh
	Sub-Total	**Rs. 140.00 Lakh**
	Water Pollution Control	
(i)	Washery effluent Treatment Facility	Rs. 25.00 Lakh
	Grand Total	**Rs. 165.00 Lakh**
B	**Mine Closure Cost as per approved mine closure Plan**	**37816 Lakhs**

Chapter 9

Analysis of Proposal

Rajrappa OCP & Washery is an operating project under Rajrappa Area of Central Coalfields Limited, Jharkhand. The DPR for Rajrappa OCP for a rated capacity of 3.0 Mt of ROM coal per annum was sanctioned by the Govt. on 17.6.83, at an estimated capital investment of Rs. 91.46 crores. A revised RCE has been prepared with a capital outlay of Rs. 510.85 Cr and was approved by CIL board in its 364th meeting dated 23/12/2009.

Rajrappa washery is also an existing project located in Block I&IV within the leasehold area of Rajrappa OCP. Rajrappa washery was designed for a rated capacity of 03 MTY ROM in 1975 with a capital outlay of Rs. 2576.89 Lakhs and has obtained Environmental Clearance vide letter no. J-11015/4/85-IA dated 30.01.1987.

Pre-feasibility report of Rajrappa OCP and Washery is being prepared for the rated capacity of 03 MTPA within the project area of Ha for making an application in Form I for EC as per MoEFCC notification no: S.O 1530 (E) dt. 06.04.2018.

Central Coalfields Limited is facing increasing demand of coal because of increased demand from industry and steel sector. Continuing of coal production from the 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 63.405 Mt. of coal during 2017-18 to 88.0 MTPA by 2020-21. Continuation of coal production from Rajrappa OCP will help to a certain degree to meet the growing demand of coking coal in the Country.