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CENTRAL COALFIELDS LIMITED (CCL)

PROJECT REPORT (including Mining Plan) OF CHANDRAGUPT OCP (CAPACITY-15.0 MTY)

**NORTH KARANPURA COALFIELD
DIST – HAZARIBAGH (JHARKHAND)**

[TEXT & APPENDICES]

MARCH 2020

**REGIONAL INSTITUTE-III
CENTRAL MINE PLANNING & DESIGN INSTITUTE LIMITED
(A Subsidiary of Coal India Limited)
GONDWANA PLACE, KANKE ROAD, RANCHI – 834 031,
JHARKHAND, INDIA**

Sanjeev Kumar
**SANJEEV KUMAR
MANAGER
CHANDRAGUPTA OPENCAST PROJECT
CCL AMRAPALI-CHANDRAGUPTA AREA**



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cmpdi
A Mini Ratna Company

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(Approved by 408th Board of CIL held on 04.08.2020)

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SUMMARISED DATA

Sl. No.	Particulars	Unit	Value		
A.	GENERAL				
1	Name of Project		Chandragupt OCP (15.0MTY)		
2	Type of Project		New		
3	Name of Coalfield / Company		N.K. Coalfield/Central Coalfield Ltd.		
4	Nearest Railway Station from project	Name km	Ray 37km		
5	Nearest National / State Highway / Approach road	Name km	State Highway 7 5km		
B.	GEOLOGICAL				
1	Name of geological blocks considered	Name	Pachra & Pachra South		
2	Area of the geological blocks	sq. km	15.41 Sq. km		
3	Borehole Density within blocks	BHs / sq.km	10.6		
4	Description of all coal seams within block				
Stratigraphic Sequence	Thickness (m)	No. of borehole intersections	Net Geological Reserves (MT)	Remarks	
	Min.	Max.			
Soil/ Alluvium	0	12			
Barakar above IVD	16.76	26.95			
Seam-IVD	0.6	1	55	-	Reserve not considered
Parting	1.58	4.94			
Seam-IVC	0.23	0.84	61	-	Reserve not considered
Parting	2.41	6			
Seam-IVB	0.6	1.8	68	8.957	
Parting	5.97	11.27			
Seam-IVA	0.16	2.43	74	11.028	
Parting	0.4	8			
Seam-IV	3.87	10.11	76	73.126	
Parting	1.59	9.8			
Seam-III(Top)	2.74	4.71	53	31.185	
Parting	0	26.16			
Seam-III(Bottom)	1.71	5.31	67	41.439	
Seam-III(Combined)	7.83	10.11	30	29.985	
Parting	2.69	23.4			
Seam-II(Top)	0.27	4.96	111	33.293	
Parting	0.34	6.63			
Seam-II(Bot)	1.75	8.12	126	85.788	
Parting	1.49	23.48			
Seam-ITop	6.18	13.29	132	211.868	
Parting	1.28	5.50			
Seam-I(Bottom)	3.1	14.69	140	182.591	
TOTAL			709.260		
C.	TECHNICAL				
1	Area of the proposed mine block	sq. km	13.32		
2	Borehole density within mine area	BHs/sq. km	11.8		


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3	Mine parameters: Extent along strike (Avg.) Extent along dip (Avg.)	km km	Description of coal seams proposed to be worked along with the parting details					
4								
Name of seam	Thickness range considered (m)	Av. Thickness / Parting (m)	Av. Grade (C.V.) K. Cal/Kg	Av. gradient (1 in ...)	Depth range (m)	Mineable Reserves (Mt)	Volume of OB (Mcum)	Top OB
Seam-IVB	0.68-1.80	1.06	3660-4770	15	4.23-141.5	8.37		411.04
Parting	5.69-11.27	8.48					50.46	
Seam-IVA	0.16-2.43	1.29	2935-5450	15	3.8-148	10.74		
Parting	0.40-8.00	4.25					137.73	
Seam-IV	3.87-10.11	6.25	3690-5545	15	4.91-159	60.11		
Parting	1.59-9.80	5.34					58.19	
Seam-IIIT	2.74-4.71	3.26	4085-5420	15	5.4-169	24.35		
Parting	0.00-26.16	5.50					15.44	
Seam-IIIB	1.71-5.31	3.76	3379-5440	15	4.9-171	35.14		
Seam-IIIC	7.83-10.11	7.84	3620-4860	15	4.9-183	18.87		
Parting	2.69-23.40	11.48					73.68	
Seam-IIIT	0.27-4.96	1.93	2940-5305	15	5-197	24.95		
Parting	0.34-6.63	5.05					52.41	
Seam-IIB	1.75-8.12	4.74	3140-4885	15	5-214	66.02		
Parting	1.49-23.48	11.50					129.44	
Seam-IIT	6.18-13.29	10.09	3335-5110	15	5-240	149.17		
Parting	1.28-5.50	4.19					66.96	
Seam-IB	3.10-14.69	7.92	3130-4395	15	6-250	129.57		
Total Coal OB						527.30	995.34	
5	Av. Stripping Ratio	m ³ /t		1.89				
6	Method of Mining	Opencast by Shovel-Dumper, S.M. - Dumper Combination						
7	Target Output Normative production capacity (at 100%) Peak production Production capacity (at 85%)	Mt Mt Mt	15.00 20.00 12.75					
8	Year of achieving Target Production (from zero date)	6 th Year						
9	Year of start of Internal Dumping	4 th Year						
10	Production Phasing (from zero date upto target year)	Mt						
Year	Year 1	Year 2	Year 3	Year 4	Year 5	Year 6		
Coal (Mt)	2.80	4.50	8.00	11.00	13.00	15.00		
OB (Mcum)	7.39	10.89	15.37	17.57	19.16	21.34		
11	Total Mine Life (at Nom. production capacity)	Years	Years	Years	Years	Years		
	Pre-construction period	Years	Years	Years	Years	Years		
	Construction period	Years	Years	Years	Years	Years		
	Production build-up period	Years	Years	Years	Years	Years		
	Tapering / mine closure period	Years	Years	Years	Years	Years		

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12	Major HEMM Deployed for Coal	Capacity	Up to Tgt Yr	Max Beyond Tgt Yr
	Electric Hydraulic Shovel	5.5 – 6.5 Cum	1	1
	Surface Miner	3800-4200mm	4	4
	F.E. loader	05-07Cum	7	7
	Rear Dumper	60T	30	44
	Diesel RBH Drill	160mm	2	2
	Dozer with ripper attachment	410 HP	2	2
	Dozer	410 HP	1	2
13	Major HEMM Deployed for OB	Capacity	Up to Tgt Yr	Max Beyond Tgt Yr
	Electric Rope Shovel	20-22 Cum	-	2
	Electric Hydraulic Shovel	10-12 Cum	6	7
	Rear Dumper	190T	-	13
	Rear Dumper	100T	48	48
	Elec. RBH Drill	250 mm		5
	Diesel RBH Drill	160mm	9	10
	Dozer	750-850 HP	1	3
	Dozer	410 HP	7	7
14	Total Peak Manpower (CCL/MDO/Total)	Nos.	149/1098/1247	
15	Weighted average grade of coal (non-coking/coking)		Non-Coking Coal, Grade-G11	
16	Presence of Major Surface Constraints (nallas, road, power line, etc.)	(type)	Barki River in Western side and Chotki River within the mine boundary	
17	Coal Transport within the mine (In-pit belt conveying system or by Truck)		By Dumpers	
18	Surface Coal Transport to Siding/Despatch Point and Mode of Despatch		By Conveyor	
19	Any Railway Siding and distance		Proposed Amrapali Siding at 1-2 Km. from Project	
D.	ENVIRONMENTAL & OTHERS			
1	Total Land to be acquired	Ha	1495	
	Government land	Ha	332.44	
	Tenancy land	Ha	498.66	
2	Land to be acquired within minetake area (excavation area)	Ha	1333.15	
3	Land to be acquired outside minetake area (Beyond Excavation Area, such as Approach Road, Infrastructure, Colony, etc.)	Ha	161.85 (Excl. land in Amrapali OCP)	
4	Land required for external dumping	Ha	89.16 (in Amrapali OCP)	
5	Habitation & Rehabilitation			
	No. of villages within mine boundary No. of PAFs to be rehabilitated	Nos.	7 500	
6	Drainage of the Area (Name of river/nalla)		Barki River	
7	Any proposed diversion of nala or power line		Diversion of Chotki River & straightening a notch of Barki River	


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E.	FINANCE	Unit	Values
1	Total Capital Investment	Rs. crores	973.50
2	Estimated Cost of Production at 100% production level	Rs. / tonne	602.91
3	Estimated Cost of Production at 85% production level	Rs. / tonne	699.66
4	Estimated average selling price	Rs. / tonne	1023.25
5	Estimated Profit at 100% production level	Rs. / tonne	420.34
6	Estimated Profit at 85% production level	Rs. / tonne	323.59
7	Financial Internal rate of return (FIRR) at 100% production level	%	39.70
8	Financial Internal rate of return (FIRR) at 100% production level	%	30.08


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List of Appendices

S N	Appendix No.	Title of the Appendix	CCL	MDO	COMBINED
1	A	Statement showing Estimated total capital investment and its phasing	1X	1X	-
2	A.1	Estimated capital investment on land acquisition	2X	-	-
3	A.2	Estimated capital investment on buildings	-	2X	-
4	A.2.1	Estimated capital investment on residential buildings	-	3X-4X	-
5	A.2.1	Details of residential buildings (CCL part)	3X	-	-
6	A.2.2	Estimated capital investment on service buildings	-	5X-6X	-
7	A.2.2	Details of service buildings (CCL part)	4X	-	-
8	A.2.3	Building cost index	-	7X	-
9	A.3	Estimated capital investment on plant and machinery with phasing	-	8X	-
10	A.3.1	Estimated capital investment on P&M - HEMM	-	9X	-
11	A.3.2	Estimated capital investment on P&M - Electrical	-	10X-14X	-
12	A.3.3	Estimated capital investment on P&M - Workshop and stores	-	15X-23X	-
13	A.3.4	Estimated capital investment on P&M - pumps, pipes and fittings	-	24X-26X	-
14	A.3.5	Estimated capital investment on Coal Handling Plant	-	27X-31X	-
15	A.3.6	Estimated capital investment on other P&M	-	32X	-
16	A.3.7	Estimated capital investment on Telecommunication	-	33X	-
17	A.5	Estimated capital investment on Railway Siding	5X	-	-
18	A.6	Provision of Hired Vehicles	6X	34X	-
19	A.7	Provision of Prospecting and Boring	-	35X	-
20	A.8.1	Estimated capital outlay in mines	7X	36X	-
21	A.8.2	Estimated capital investment on roads and culverts	-	37X-42X	-
22	A.8.3	Estimated capital investment on water supply and sewerage arrangements	-	43X-51X	-
23	B	Statement showing jobwise/category wise requirement of Manpower	8X-9X	-	-
24	C	Estimated avg cost of production per te & profitability	-	-	1X
25	C.1	Estimated cost of production at 100% capacity utilization	10X	52X	2X
26	C.2	Estimated cost of production at 85% capacity utilization	11X	-	-
27	D	Cash flow statement for financial analysis at 100% of the capacity.	12X	-	3X
28	D.1	Cash flow statement for financial analysis at 85% of the capacity.	13X	-	4X

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 CCL AREA - CHANDRAGUPTA AREA



TEXT


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OCL AMBAPALLE CAMPUS
TAMRA

MINING PLAN


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CHAPTER- I

INTRODUCTION

1.1 Background of the Project Report:

The Pachra Block and Pachra South Geological Block lies in North Karanpura Coalfield of CCL command area. Both the blocks are adjacent and share common boundary. The area of the Pachra Block is 7.88 Sq. Km. and of Pachra South Block is 7.30 sq. km. The total area of the blocks is 15.18 sq. km.

The Blocks shares boundary with Non-CIL blocks in Eastern and Northern side in North Karanpura Coalfield. The Barki River flows in western side of the blocks. The Chandragupt OCP has been planned to exploit the coal of these blocks. The Amrapali OCP boundary is in the western side of the Barki River.

1.2 Agency wise Exploration Status :

Pachra Block - Total explored area is 7.88 Sq Km (6.94 Sq Km being coal bearing area).

Particulars	Year of Drilling	Mererage (m)	No. of Bore holes
GSI	1968-69	294.51	1
CMPDI	1991-95	9670.30	83
Total		9964.81	84

Borehole Density (per sq km) – 12.

Net geological reserves within the block are estimated at 271.612 MT of coal and 327.751 Mcum of overburden at a stripping ratio of 1.2 cum/te.

Pachra South Block - Total explored area is 7.30 Sq Km.

Particulars	Year of Drilling	Meterage (m)	No. of Bore holes
CMPDI	1994	382.90	2
CMPDI	1992-97	12852.15	78
Total		13235.05	80

Borehole Density (per sq km) – 11.

Net geological reserves within the block are estimated at 437.648 MT of coal and 873.765 Mcum of overburden at a stripping ratio of 2 cum/te.

1.3 Present Status of the mine/project:

Coal mining activity has not yet started in these blocks. Mining activity in the adjoining block to the west of Barki River, namely Amrapali OCP is undergoing. The block is covered by different land types viz., forest, tenancy, GMK, GMA and JJ.

1.4 Salient feature of present PR (Capacity, Capital, etc.)

The normative production of the project is 15.0 MTY of G-11 grade coal. The present report envisages the implementation of project in MDO Mode where Expenditure heads are as follows:

CCL	MDO
<ul style="list-style-type: none"> Land Railway siding Vehicles for Departmental Manpower Prospection & Boring (GR) R&R expenditure PR & EMP preparation 	<ul style="list-style-type: none"> Residential & service building for MDO Manpower Residential & service building for Departmental Manpower HEMM Other than HEMM Furniture & Fittings for MDO Manpower Furniture & Fittings for Departmental Manpower Vehicles for MDO Manpower Prospection & Boring (Production support) Capital Outlay in Mines other than R&R part Roads & culverts Water supply & Sewerage

1.5 Difficulties and constraints in mining with associated risk.

- The proposed mining block is surrounded by non-CIL coal bearing area. The adjoining blocks are as follows:
 - in the north: Sisai Block
 - in the East: Chatti-Bariatu / Chatti-Bariatu South Block
 - in the South: Peko Block (unexplored)
 - In the west: perennial river Barki
 as such there is severe space constraint for overburden dumping.
- The maximum depth of the mine is 240m and at places the dip (average 4-6 deg) increases to 11 deg. The proposed mining block is encountered by 18 (eighteen) numbers of faults of variable throw (maximum 90m).
- The infrastructural facilities like railway siding, roads, colony, power supply, etc are almost non-existent. Due to paucity of non-coal bearing area within the block, infrastructure facilities (such as initial OB dump, railway line, etc) are proposed to be shared with Amrapali OCP located in the west of the Barki River. A high level bridge over Barki River needs to be constructed to connect the proposed OCP with Amrapali OCP.
- Chotki River flowing through the proposed quarry needs to be diverted.
- Villages are located within the proposed quarry which needs to be shifted and rehabilitated.


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CHAPTER-II

PROJECT SITE INFORMATION

2.1 Location

The Chandragupt Opencast project falls within Pachra and Pachra South geological blocks. It is located in the northern part of North Karanpura Coalfields and is included in survey of India toposheet no. 73A/13 and 73E/1 in Hazaribagh district of Jharkhand. Pachra Integrated project is bounded between latitude 23°51'30" to 23°54'45"N and longitude 85°01'15" to 85°03'15".

Area of the Project: 14.95 sq km.

Limiting Boundaries of the Projected Area:

- Northern Boundary: Incrop of Seam-IB.
- Southern Boundary: Southern geological block boundary of Pachra South Block.
- Eastern Boundary: Geological block boundary between Pachra Block and Chatti Bariatu block and Pachra South Block and Chatti Bariatu South block.
- Western Boundary: Leaving a surface barrier of 60m from 'Barki River' and along the incrop of Seam IB.

2.2 Accessibility and Communication:

The State Highway No 7 connecting Tandwa with Hazaribagh (40km) via Barkagaon passes 4km south of the block. The SH-7 (starting from Bijupara) is connected to NH-75 (starting from Ranchi). The Tandwa village is about 92km from Ranchi. However, the block remains isolated from Tandwa during rainy season due to non-existence of bridge over Barki River flowing through the western boundary of the block. The block is approachable during dry season through a kutcha road of about 6km from Kerandari village.

The nearest railway station is Ray, which is at a distance of 37 km from the block on the Barkakana-Dehri-on-sone loop line of North-Eastern Railways. Tori is another railway station, located south-west of the block at a crow-fly distance of about 55 km on the above loop line.

2.3 Climate and Rainfall Data:

The climate is tropical with severe summer. The temperature during summer (March-June) goes as high as 45°C. Summer days are hot with dusty wind, but nights are generally pleasant. The minimum summer temperature is 20°C. The winter (November-February) is cold and the minimum temperature recorded is 1°C. The Rainy season is generally from June to October. The total rainfall on an average is 1055mm, 60% of which takes place in rainy season only.

2.4 Topography with drainage pattern of area:

The block is characterized by more or less flat terrain with gentle undulations. The maximum elevation of 500m is observed near borehole no CNKP-88 & CNKP-91. The minimum elevation is about 445m on the bank of the Barki River.

The drainage of the block is controlled by the Barki River flowing north to south along the western boundary. There is another small river called Chotki River flowing north-east to south-west that finally join Barki River near borehole no CNKP-174. There are other small nallas flowing across the block that finally join Barki River. The Barki river after meeting with Chundru River near Tandwa village flows further southwards in the name of Garhi river which is an important tributary of west to east flowing Damodar river.

2.5 Present Land Use Pattern

The details of the pre-mining land use pattern within the proposed leasehold boundary of the Chandragupt OCP (15MTY) are given in the following table:

Sl No	Type of land	Area (in Ha)
1	Forest Land	663.90
2	Non-Forest Land	
a.	GMK Land	332.44
b.	Tenancy land	498.66
	TOTAL	1495.00

The Land details are tentative and likely to be revised after actual survey by CCL. The Project affected Families (PAF) have been roughly estimated as 500. The actual number of Project affected Families (PAF) and Project affected person (PAP) will be assessed after Socio-Economic Survey.


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CHAPTER-III

GEOLOGY AND DEPOSIT APPRAISAL

3.1 Background/Introduction-

After the nationalization of Coal Industry and spurt in demand for power grade coal in the country large areas were identified in North Karanpura coalfield for exploration and exploitation of coal deposits at a shallower depth. With this background, the detail exploration in Tandwa 'C' block of Geological Survey of India was taken up by CMPDI in June 1991. Subsequently this block was divided into four sub-blocks viz. Pachra, Chatti-Bariatu, Pachra South and Chatti-Bariatu South. The present endeavor is limited to Pachra and Pachra South block.

3.1.1 Different GRs prepared at different period for the blocks under reference:

Sl No	Name of the GR	Year of preparation of GR
1	Geological report, Pachra Block	Feb, 1995
2	Geological report on Pachra South Block	July, 1997

3.1.2 Block Boundaries

Boundary	Pachra Geological Block	Pachra South Geological Block
Northern	Limit of Sisai block	Limit of Pachra block
Eastern	Limit of Chatti-Bariatu block	Limit of Chatti-Bariatu south block
Southern	Along fault F1	Roughly at the 250m depth line of lowermost Barakar seam
Western	Barki River flowing north to south	Barki River flowing north to south

3.1.3 Any other relevant details

The regional exploration activities of the GSI in the NK Coalfields resulted into identification of a series of quarriable blocks. Tandwa 'C' block is one of them. Pachra and Pachra South are two of the four blocks falling in Tandwa 'C' block

3.2 Exploration Status

3.2.1 Number of boreholes and meterage drilled by the various agencies and period of drilling thereof, in the block area


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Table 3.1: Summary of Exploratory Boreholes

Year	Agency	Block Name	Number of boreholes	Meterage
1	2	3	4	5
1968-69	GSI	Pachra	1	294.51
1991-95	CMPDI	Pachra	83	9670.30
1994	CMPDI	Pachra South	2	382.90
1992-97	CMPDI	Pachra South	78	12852.15

3.2.2 Density of boreholes in block area

Seam-wise number of borehole intersection, area & borehole density

Seam	No of boreholes encountered	Area (sq km)	Borehole density (per sq km)
IVD	62	6.01	10.3
IVC	70	6.12	11.4
IVB	81	6.48	12.5
IVA	88	7.10	12.4
IV	91	8.97	10.1
III Top	67	7.36	9.1
III Bottom	83	8.81	9.4
III Combined	38	4.26	8.9
II Top	132	12.74	10.4
II Bottom	146	13.22	11.0
I Top & Middle	157	13.93	11.3
I Bottom	167	14.58	11.5
K1	14		
K2	30		
K3	31		
K4	30		
K5	33		

3.2.3 Number of boreholes analysed band by band and seam overall proximate and ultimate analysis for projectised area only.

	Number of boreholes
Band by band analysis	119
Seam overall proximate analysis	133
Ultimate Analysis	20
Ash fusion range & HGI	19
Ash Analysis	12

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3.3 Geology and Structure of Block area

3.3.1 Brief geological setting along with generalized sequence within the block/coalfield

The North Karanpura Coalfield forms a prominent east-west trending valley between Hazaribagh plateau in the north and Ranchi plateau in the south, The Aswa Pahar in the south-east separates the North and South Karanpura Coalfields by east-west elongated metamorphic patch. However, they are interconnected near Bachra and Hindegir by a narrow tongue of Talchir outcrops. On the eastern side, North Karanpura Coalfield is separated from the West Bokaro Coalfield by a narrow stretch for metamorphic rocks having several outliers of Talchir Formation. In the west, it is separated by a stretch of about 20 kms wide metamorphic belt from Auranga Coalfield.

The generalized stratigraphic sequence of North Karanpura Coalfield as established has been given below:-

3.3.2 Coal bearing formations and their general behaviour

Geological Succession of North Karanpura Coalfield

Period	Group	Sub-Group	Formation	Lithology
Recent	-	-	Alluvium	Detrital & alluvial soil/sub-soil.
Jurassic	-	Co-ovals of Rajmahal Trap	Igneous intrusive	Dolerite and Mica Peridotite.
Triassic	Upper-Gondwana	-	Mahadeva	Massive coarse to conglomeratic, feldspathic & ferruginous sandstone, shale intercalations.
Upper permian to Lower Triassic	Lower Gondwana	-	Panchet	Yellowish to white coarse grained sandstone, red, chocolate coloured plastic clays. In the upper part yellowish friable sandstone whereas in the lower part greenish yellow sand/silt stone.
Upper Permian	-	-	Raniganj	Fine to medium grained quartzo-feldspathic & quartzitic sandstone often micaceous, interbanded shale & sandstone, carbonaceous shale and thin coal seams.
		Damuda	Barren Measures	Dark shale, sandy micaceous shale with sideritic interbanded shale and sandstones.
			Barakar	Conglomerate, sandstone, shale, intercalation siltstone & shale, carbonaceous shale, fire clay, coal seams.

Period	Group	Sub-Group	Formation	Lithology
			Karharbari	Dark mottled sandstone with occasional shale bands, fireclay, chocolate coloured clays and coal seams.
Permo-Carboniferous	-	-	Talchir	Rikba plant beds, boulders, conglomerates, varvites, sandstone, tilloids and tillites.
-----Unconformity-----				
Pre-Cambrian	-	-	Metamorphics	Granite gneisses, pegmatite, phyllites, mica schist, amphibolites and quartzites.

3.3.3 Sequence of coal seams and partings within the block area

Table 3.2: Sequence and brief description of Coal Seams in the block

Seam	Area of Development (sq. km)	Thickness range (m)	C.V. (kcal/kg)	Borehole intersection (s)	Borehole density	Geological Reserve (MT)
Soil/ Alluvium		0-12				
Barakar above IVD		16.76-26.95				
Seam-IVD	525.23	0.60-1.0	3290-4995	55	10.3	
Parting		1.58-4.94				
Seam-IVC	513.1	0.23-0.84	2825-4960	61	11.4	
Parting		2.41-6				
Seam-IVB	544.42	0.6-1.80	3560-4770	68	12.5	8.957
Parting		5.97-11.27				
Seam-IVA	597.83	0.16-2.43	2935-5450	74	12.4	11.028
Parting		0.40-8.00				
Seam-IV	721.42	3.87-10.11	3690-5545	76	10.1	73.126
Parting		1.59-9.80				
Seam-III (Top)	613.8	2.74-4.71	4085-5420	53	9.1	31.185
Parting		0.00-26.16				
Seam-III (Bottom)	730.04	1.71-5.31	3379-5440	67	9.4	41.439

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Seam	Area of Development (sq. km)	Thickness range (m)	C.V. (kcal/kg)	Borehole intersection (s)	Borehole density	Geological Reserve (MT)
Seam-III (Combined)	191.68	7.83-10.11	3620-4860	30	8.9	29.985
Parting		2.69-23.40				
Seam-II (Top)	1033.42	0.27-4.96	2940-5305	111	10.4	33.293
Parting		0.34-6.63				
Seam-II (Bot)	1067.46	1.75-8.12	3140-4885	126	11	85.788
Parting		1.49-23.48				
Seam-I (Top)	1108.99	6.18-13.29	3335-5110	132	11.3	211.868
Parting		1.28-5.50				
Seam-I (Bottom)	1133.15	3.10-14.69	3130-4395	140	11.5	182.591

3.3.4 Structural setting within the project area

The Pachra Integrated block comprises Barren measure, Barakar, Karharbari and Talchir formations. The Karharbari and Barren measure outcrop in northern, central and southern part of the block. Talchir do not cropout in the block. The outcrop of Barakar formations is the most potential and hosts all coal horizons. The predominant rock types of Barakar formations are sand stone, followed by shale, intercalation of shale and sand stone, carbonaceous horizons including coal seams, clays, etc.

3.3.5 Dip and Strike

The strike of the strata varies widely within the block. In the Pachra Block the strike is roughly east to west with southerly dip of 3-15deg except in the south eastern part where it has increased to 10-15deg. The dip varies from 3-6deg in eastern and central part. However steeper dips of 10-15deg are observed in the south eastern part of the block. In the Pachra South Block also the strike is roughly east to west with southerly dip. The dip varies from 3-5deg in northern part which becomes steeper (10-15deg) in the southern part of the block.

3.3.6 Faults and their characteristic features –

The two geological blocks under consideration has been traversed by 18 no. of faults.

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Brief Description of Faults in the Pachra block

Fault	Location	General Trend of fault trace	Amount of throw & direction	Evidence
F1	Continues from Amrapali block and forms the southern limit of the block.	NW-SE	North easterly (10-40m)	Based on stratum contours & CNKP-117
F3	Continues from Amrapali block and runs in the northern part of the block	E-W	Northerly (2-50m)	Encountered in boreholes CNKA-401, 412 & CNKP-155
F4	Runs almost parallel to F3	E-W	Northerly (15-53m)	Topographic expression in NE of the block
F5	Runs almost parallel to F3	E-W	Northerly (15-25m)	Based on stratum contours
F6	Runs almost parallel to F1	NW-SE	North easterly (5-25m)	Based on stratum contours
F7	Runs almost parallel to F3	E-W	Northerly (10-20m)	Based on stratum contours
F8	Runs parallel to F3 in northern part	E-W	Northerly (0-20m)	Based on stratum contours
F9	Runs in the north eastern part of the block.	NW-SE	South westerly (15m)	Based on stratum contours

Brief Description of Faults in the Pachra South block

Fault	Location	General Trend of fault trace	Amount of throw & direction	Evidence
F1	Continues from Amrapali block and forms the northern limit of the block	NW-SE	North easterly (10-40m)	Encountered in borehole CNKP-117.
FS2	Originates from F1 near BH CNKP-57 to CNKP-123	NW-SE	North easterly (0-10m)	Encountered in borehole CNKP-86.
FS3	Continues from Amrapali block between BH CNKP-249 and 56	E-W	Northerly (20m)	Based on stratum contours.
FS4	Continues from Amrapali block between BH CNKP-122, 295 and 109	E-W	Northerly (10-30m)	Omission of Seam-IB CNKP-109 and 290.
FS5	Originates from FS4 near BH CNKP-288 and extends upto CNKP-292	NW-SE	North easterly (0-10m)	Omission of Seam-IIT in CNKP-251.
FS6	Continues from Amrapali block in the south central part of the block	E-W	Northerly (20m-90m)	Omission of Seam-II in CNKP-251.

Fault	Location	General Trend of fault trace	Amount of throw & direction	Evidence
FS7	Originates from FS6 near BH CNKP-115.	NW-SE	Southerly (0-20m)	Omission of Seam-IIT in CNKP-118.
FS8	Originates from FS6 near BH CNKP-67.	E-W	Northerly (10-40m)	Based on stratum contours.
FS9	Originates from FS10 near BH CNKP-245.	E-W	Northerly (10m)	Based on stratum contours.
FS10	Originates near western boundary between BH CNKP-254 and CNKP-334	E-W	Northerly (0m-25m)	Based on stratum contours.
FS11	Originates near western boundary west of BH CNKP-255 in the southern part.	NW-SE-EW	Northerly (0m-20m)	Based on stratum contours.

3.3.7 Presence of dyke, sills (igneous intrusive), etc.

A dolerite dyke having roughly 1.76km length running from borehole no CNKP-149 to CNKP-155 has been noticed in the north part of the property. It has slight curvilinear trend and runs almost E-W. Its width in the eastern part is generally 3-4m which has thickened to around 10m in the west.

Fire clay horizons in three small isolated pockets (near KT-4, CNKP-12, 14, 16 & 17; CNKP-1 & 3; CNKP-21) have been noticed having a thickness range of 0.84m to 1.84m.

Surface burning has been recorded in 5 boreholes (CNKP-15, 46, 186 & 86, 118). The maximum depth of burning as recorded in CNKP-15 is 18.49m.

3.4 Description of Coal Seams

Four coal seams from Seam-I to Seam-IV of Barakar formation of the NK Coalfield occur in the Pachra Integrated block. In addition few split seams also occur in the block. Altogether, 12 no of seams viz., Seam-I Bottom, Seam-I Top, Seam-II Bottom, Seam-II Top, Seam-III Bottom, Seam-III Top, Seam-III Combined, Seam-IV, Seam-IVA, Seam-IVB, Seam-IVC and Seam-IVD occur within the blocks.

The Karharbari seams from K1 to K5 have been encountered but are generally less than 0.5m in thickness, except K5 which has a thickness of around 1.5-2.0m in localized area near the northern block boundary.

3.4.1 Important coal seams of the project area and their general behavior

The most potential coal seams of the block from thickness point of view are Seam-I Bottom, Seam-I Top, Seam-II Bottom, Seam-III Bottom, Seam-III Top, Seam-III Combined and Seam-IV.

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The incrop of coal seams run almost east to west. The coal seams of the block are non-coking. Although the quality data of Seam-I Bottom and Seam-I Top indicates semi to weekly coking, but due to high ash content (>35%), these seams has also been placed as non-coking coal.

3.4.2 Description of Individual coal seams of the project area:

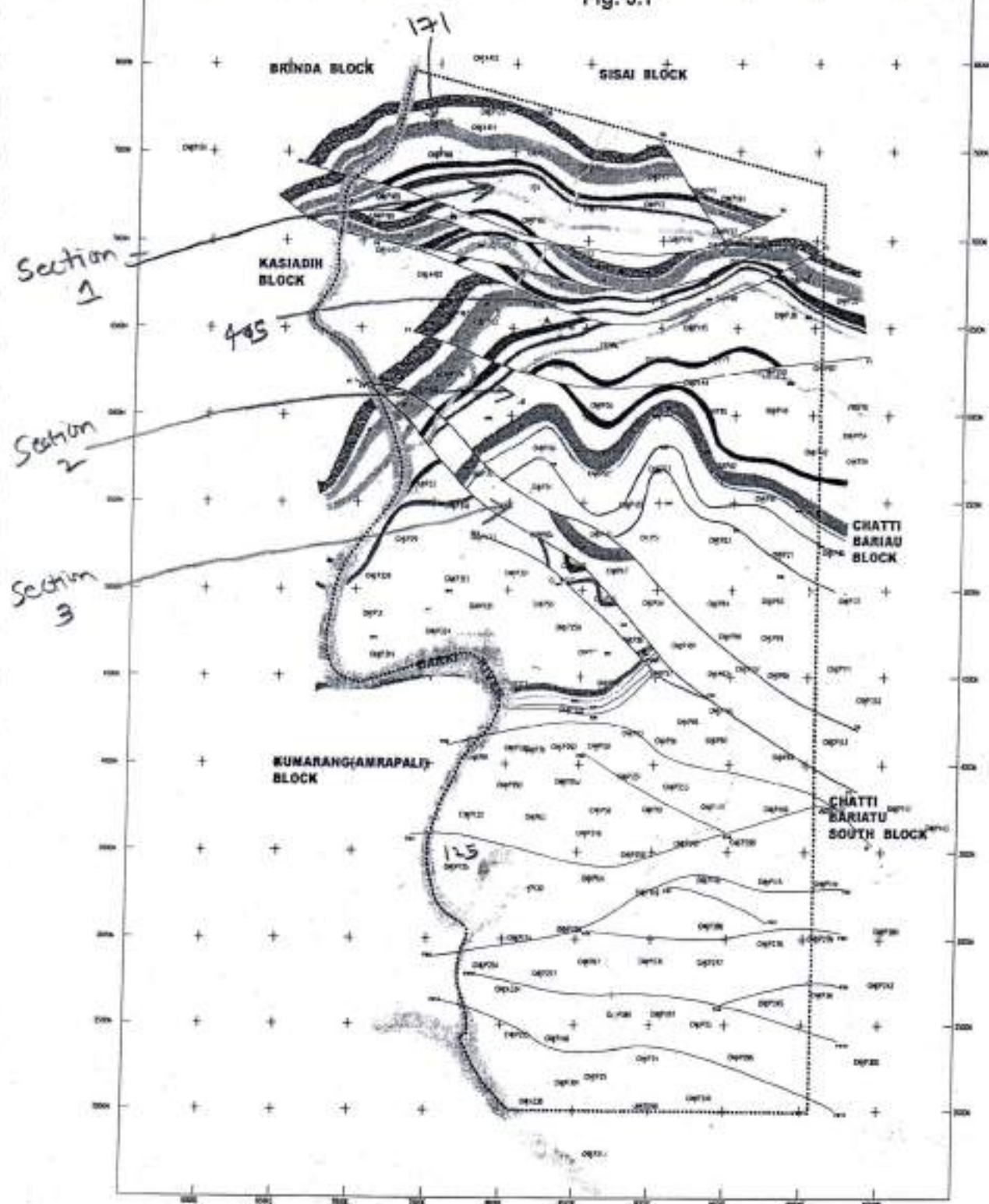
3.4.2.1 Details of splitting

Seam I is splitted into Seam I Bot and Seam I Top. I Bottom is the bottommost potential coal seam of the block. It incrops in the northern part of the property. Seam II is splitted into Seam II Bot and Seam II Top. The incrop runs almost parallel to the incrop Seam I Top. Seam III is splitted into Seam III Bot and Seam III Top. It has merged in the western part of the property where it has been named as III combined. Seam IV is splitted into Seam IV, IVA, IVB, IVC and IVD.

The details of incrop of each seam is shown in the geological plan of the combined blocks of Pachra and Pachra South. (Ref Fig No 3.1).


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Fig. 3.1



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3.4.4.2 Roof and floor characteristics

Coal Seam	Floor characteristics	Roof characteristics
IVB	Generally composed of carbonaceous shale or sandy shale	Shale or sandy shale.
IVA	Generally composed of carbonaceous shale and sandy shale.	Carbonaceous shale or shale.
IV	Immediate floor is generally shale or sandy shale.	Roof is carbonaceous shale or sandy shale.
III Top	Immediate floor is generally shaly sandstone or medium grained sandstone.	Roof is carbonaceous shale or sandy shale.
III Bot	Immediate floor is generally shale, sandstone and carbonaceous shale.	Roof is sandy shale or medium grained sandstone.
III Comb	Carbonaceous shale, sandy shale, grey shale and fine to medium grained sandstone.	Carbonaceous shale, fine to medium grained sandstone and grey shale.
II Top	Immediate floor is generally shale, sandy shale and medium grained sandstone.	Roof is sandy shale or carbonaceous shale.
II Bot	Floor is generally composed of carbonaceous shale and sandy shale.	Roof is carbonaceous shale or shale.
I Top	Immediate floor is generally sandy shale or fine grained sandstone.	Immediate roof is generally carbonaceous shale followed by fine to coarse grained sandstone.
I Bot	Immediate floor is generally carbonaceous shale.	Fine grained to medium grained sandstone.

3.4.2.3 Burning of coal seams

Surface burning has been noticed in the block near the borehole CNKP15, 46, 136, 86 and 180. The maximum depth of burning as recorded in CNKP15 is 18.49m. The burning is probably due to spontaneous combustion of coal in the geological past and was controlled mainly by the then water table. In the burning zone the rocks are characterized by whitish to pinkish clay, fused sandstone and shale and soil with either grey or white in colour.


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3.4.2.4 Quality parameters:

Coal Seam/ Parting	Dirt Band %	Proximate Analysis on 60% RH & 40D ₅₀ C (including bands)			Calorific Value K.Cal/kg	Grade (Incl. bands)	Ultimate Analysis on Dmmf basis	
		M%	Ash%	VM			C%	H%
IVB	12-15	3.8-10.4	25.2-44.6	21.0-25.3	3560-5010	D-G	80.8-	4.9-5.3
Parting								
IVA	15-20	3.7-8.5	22.7-52.6	17.9-24.4	2935-5450	D-UNG	78.8-	4.6-5.2
Parting								
IV	8-10	3.2-8.4	22.4-45.5	20.2-26.5	3690-5545	D-G	78.9-	4.5-5.3
Parting								
III Top	5-10	2.6-8.6	25.8-40.7	20.6-26.6	4085-5420	D-F	79.0-	4.4-5.2
Parting								
III Bot	8-10	2.7-8.6	24.0-46.5	20.4-26.8	3379-5440	D-G	79.8-	4.6-5.3
Parting								
III Comb	10-15	2.8-7.0	31.9-42.1	20.8-23.6	3620-4860	E-G	81.1-	4.5-5.3
Parting								
II Top	8-10	1.9-9.6	23.5-55.0	20.0-26.6	2940-5305	D-UNG	79.9-	4.7-5.3
Parting								
II Bot	18-20	1.4-7.1	28.2-52.6	18.1-24.7	3140-4885	E-UNG	79.9-	4.7-5.6
Parting								
I Top	18-20	1.5-7.4	30.8-49.6	20.1-26.5	3335-5110	E-G	79.8-	4.6-5.6
Parting								
I Bot	15-20	1.2-7.0	35.9-51.7	19.0-23.8	3130-4395	F-UNG	79.8-	4.7-5.7

3.4.2.5 Details of dirt bands and their general behavior.

Coal Seam	No of Dirt Bands	Cumulative Thickness of Dirt Band	No of Dirt Bands	Cumulative Thickness of Dirt Band	Non-Combustible Dirt Band
IVB	1	0.05-0.10	0-1	0-0.10	Nil
IVA	2-3	0.30-0.35	Nil	Nil	0-0.29
IV	1-2	0.3-0.5	0-1	0-0.15	0-0.26
III Top	2-3	0.1-0.3	0-1	0-0.15	0-0.69
III Bot	1-2	0.1-0.3	0-1	0-0.26	0-0.06
III Comb	1-4	0.4-1.0	0-3	0-0.69	0-0.39
II Top	1-2	0.1-0.2	0-1	0-0.06	
II Bot	3-6	0.6-1.2	0-1	0-0.39	

Coal Seam	Combustible Dirt Band		Non-Combustible Dirt Band	
	No of Dirt Bands	Cumulative Thickness of Dirt Band	No of Dirt Bands	Cumulative Thickness of Dirt Band
I Top	4-6	1.0-1.5	0-3	0-0.5
I Bot	2-6	0.5-1.5	0-4	0-0.84

3.5 Geological Reserves

The Reserve Estimation has been carried out for all the potential coal seams, viz., Seam-I Bottom, Seam-I Top, Seam-II Bottom, Seam-II Top, Seam-III Bottom, Seam-III Top, Seam-III Combined, Seam-IV, Seam-IVA, Seam-IVB, Seam-IVC and Seam-IVD have not been considered as their thickness is less than 1m.

3.5.1 Brief methodology adopted for reserve estimation

Isochore method of reserve estimation has been employed for each seam. The volume of reserves for individual areas between the isochore lines were multiplied with the corresponding specific gravity of the coal seam to get the "gross" geological reserve. A deduction of 10% was made from this to get the "net" geological reserve. Vertical excavation was considered for estimation.

3.5.2 Net Geological Reserves within the block:

Table 3.5: Depth-wise Geological Reserve

SEAM	Depth-wise Geological Reserve						
	DEPTH (in m)						TOTAL
	<50	50-100	100-150	150-200	200-250	>250	
IVB	0.00	0.21	3.77	3.82	0.97	0.08	8.957
IVA	0.00	0.98	4.54	4.42	2.02	0.08	11.028
IV	0.00	8.36	20.06	24.62	19.33	0.75	73.126
III Top	0.00	4.50	6.68	10.38	9.31	0.31	31.185
III Bot	0.32	9.55	7.96	12.44	10.73	0.45	41.439
III Comb	0.00	13.09	12.18	3.84	0.88	0.00	29.985
II Top	1.26	12.63	5.47	7.54	6.14	0.22	33.293
II Bot	5.44	30.43	20.03	16.53	12.91	0.45	85.788
I Top	25.28	67.90	37.40	46.46	33.38	0.95	211.868
I Bot	27.03	51.79	32.29	39.22	31.07	0.69	182.591
TOTAL	59.32	199.43	150.39	169.26	126.73	3.98	709.26


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Table 3.6: Grade-wise Geological Reserve

SEAM	GRADE					
	D	E	F	G	UNG	TOTAL
IVB	0.00	1.69	7.17	0.10	0.00	8.957
IVA	0.12	0.63	3.85	6.38	0.05	11.028
IV	3.56	59.47	9.96	0.14	0.00	73.126
III Top	0.87	25.41	4.91	0.00	0.00	31.185
III Bot	0.30	9.10	31.45	0.59	0.00	41.439
III Comb	0.00	7.32	22.57	0.10	0.00	29.985
II Top	0.40	8.61	20.84	3.44	0.00	33.293
II Bot	0.00	0.96	27.63	57.19	0.01	85.788
I Top	0.00	1.71	174.54	35.62	0.00	211.868
I Bot	0.00	0.00	79.86	102.73	0.00	182.591
TOTAL	5.25	114.90	382.76	206.29	0.06	709.260

3.6 Recommendation- Pachra and Pachra South block are both potential quarriable block in the northern part of the North Karanpura Coalfield with a total coal reserve of 709.26MT. The coal is usually inferior in quality, generally represented by 'F' grade.

3.6.1 Future exploration requirement – To further improve the fault, seam incrops interpretation in the Blocks during coal exploitation, few boreholes may be required to precisely locate their incrop. About 700m in Pachra block and about 1000m in Pachra South Block of drilling will be required.

3.6.2 Utility of coal – On account of being high in moisture and ash content and non-caking bituminous type, the coal from the blocks are suitable for thermal power generation, brick burning or for local house hold use.

3.7 Any other relevant issues – There is no bridge on Barki River flowing close to Tandwa village which completely disrupts communication network with the block. The kutchra road connecting the block from Kerandari village is also a constraint in approachability during rainy season due to non-existence of bridge/culvert on the nala flowing roughly 1km North of Kerandari village.

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CHAPTER-IV

MINE BOUNDARY, RESERVES AND MINE LIFE

4.1 Introduction

The Project Report for Chandragupt OCP proposes to exploit the coal seams from Seam I to Seam IV based on the "Geological Report, Pachra Block, North Karanpura Coalfield" prepared in Feb 1995 and "Geological Report, Pachra South Block, North Karanpura Coalfield" prepared in July 1997 for a rated capacity of 15.0 MTY of ROM coal to meet the growing demand of power grade coal from CCL / N.K. Coalfield, in order to cater the galloping needs of coal for Power sector in respect to linkage for new Power Station in the Public and Private sectors. The parameters of the opencast minefield and the technical condition of its development make it feasible by to produce 15.0 MT of ROM coal per annum with normal technical indices i.e., deployment of equipment, strike length of the quarry, annual advances of the faces, etc.

Ten numbers of mineable coal horizons, namely Seam-IB, Seam-IT, Seam-IIB, Seam-IIT, Seam-IIIB, Seam-IIIC, Seam-IIIT, Seam-IV, Seam- IVA & IVB are occurring within this mining block. The Seam-IB is the base seam of the quarry.

The mineable reserves within the proposed quarriable block have been estimated as 527.30MT of coal corresponding to a volume of OBR of 995.34 Mcum at an average stripping ratio of 1.89 cum/te. The life of the project is estimated as 41 years for a rated output of 15.0 Mtes of 'G-11' grade coal per annum.

4.2 Mine Boundaries:

a) Northern Boundary:

The northern floor boundary of the quarry has been fixed along the incrop of the seam-IB in the Pachra Geological Block.

b) Eastern Boundary:

The eastern boundary has been fixed along the geological block boundary between Pachra Block and Chatti Bariatu block and Pachra South Block and Chatti Bariatu South block leaving 7.5m of inter-quarry boundary.

c) Western Boundary:

The western surface boundary has been fixed leaving a minimum surface barrier of 60m from 'Barki River' and along the incrop of Seam IB. An embankment with a top RL of +465m has been proposed between Barki River and western surface boundary as a flood protection measure.

rainy season. It may be mentioned that the HFL for Barki River is +455m as indicated by villagers of the area.

d) Southern Boundary:

The southern surface boundary has been fixed leaving a barrier of 100m from the southern geological block boundary of Pachra South Block.

4.3 Mineable Reserves:

The quarry boundaries have been maximized to the extent possible and almost entire geologically explored area of Pachra and Pachra South mining block has been considered for mining up to the base seam-IB and the extractable reserves have been maximized to produce coal @ 15.00 MTY within the proposed boundaries of the quarries.

Seamwise Details of Mineable Reserves:

Name of seam	Area considered in Ha.	Thickness variation 'm'	Net Geo. Reserve (of Geological Block) (MT)	Mineable Reserve (MT)
Seam-IVB	544.42	0.6-1.80	8.957	8.37
Seam-IVA	597.83	0.16-2.43	11.028	10.74
Seam-IV	721.42	3.87-10.11	73.126	60.11
Seam-IIIT	613.80	2.74-4.71	31.185	24.35
Seam-IIIB	730.04	1.71-5.31	41.439	35.14
Seam-IIIC	191.68	7.83-10.11	29.985	18.87
Seam-IIT	1033.42	0.27-4.96	33.293	24.95
Seam-IIB	1067.46	1.75-8.12	85.788	66.02
Seam-IT	1108.99	6.18-13.29	211.868	149.17
Seam-IB	1133.15	3.10-14.69	182.591	129.57
Total			709.260	527.30

Section wise sector wise Mineable Reserves:

The calendar programme has been drawn by dividing the whole mining block into three sections namely Section-1, Section-2 & Section-3. To achieve the targeted capacity of 15MTY at the earliest, all the three sections are proposed to be opened concurrently. The details of the sections are as follows:

Section-1: It falls within Pachra Block and is bounded in the north, east & west by the northern, eastern & western boundary of the Pachra Integrated OCP respectively, whereas the southern boundary has been restricted to the upthrow Fault F3 (throw of upto 50m). For reserve estimation, it has been subdivided into 8 (eight) sectors. The sector-wise mineable reserve is as follows:

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(All Fig in MT)

SECTOR	1	2	3	4	5	6	7	8	TOTAL
COAL	1.98	1.86	4.16	5.63	7.34	5.10	7.46	8.39	41.93
IVB	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
IVA	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
IV	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
IIIT	0.00	0.00	0.00	0.00	0.01	0.01	0.00	0.00	0.02
IIIB	0.00	0.00	0.00	0.00	0.05	0.06	0.23	0.20	0.54
IIIC	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
IIT	0.00	0.00	0.03	0.46	0.63	0.37	0.13	0.19	1.80
IIB	0.03	0.06	0.51	0.94	0.99	0.62	0.92	0.89	4.95
IT	0.29	0.84	1.98	2.41	2.79	1.83	3.14	3.32	16.60
IB	1.66	0.96	1.65	1.82	2.87	2.21	3.05	3.79	18.02

Section-2: It falls in the southern part of Pachra Block. It is bounded in the east & west by the eastern & western boundary of the Pachra Integrated OCP respectively, whereas the Fault F3 forms the northern boundary and Fault F1 forms the southern boundary. For reserve estimation, it has been sub-divided into 9 (nine) sectors. The sector-wise mineable reserve is shown below:

(Fig in MT)

SECTOR	1	2	3	4	5	6	7	8	9	TOTAL
COAL	0.91	1.53	4.89	0.65	17.64	15.97	21.60	17.42	88.03	168.62
IVB	0.00	0.00	0.00	0.00	0.00	0.00	0.09	0.30	2.14	2.54
IVA	0.00	0.00	0.00	0.00	0.03	0.06	0.41	0.52	3.02	4.03
IV	0.00	0.00	0.00	0.00	0.00	0.35	2.35	2.66	10.33	15.69
IIIT	0.00	0.00	0.00	0.20	0.47	0.62	1.28	0.98	4.68	8.23
IIIB	0.01	0.01	0.10	0.26	1.60	1.32	1.56	1.16	5.74	11.77
IIIC	0.00	0.00	0.00	0.00	0.05	0.63	1.34	1.21	4.65	7.87
IIT	0.06	0.02	0.11	0.05	0.78	0.71	1.07	0.82	3.78	7.41
IIB	0.14	0.16	0.57	0.11	3.06	2.48	3.17	2.28	11.56	23.53
IT	0.00	0.24	2.48	0.04	7.29	5.60	6.07	4.46	22.62	48.80
IB	0.69	1.10	1.62	0.00	4.37	4.19	4.26	3.02	19.51	38.77

Section-3: It falls in the Pachra South Block. It is bounded in the east, west & south by the eastern, western & southern boundary of the Pachra Integrated OCP respectively, whereas the Fault F1 forms the northern boundary. For reserve estimation, it has been sub-divided into 16 (sixteen) sectors. The sector-wise mineable reserve is as follows:

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(Fig in MT)

SECTOR	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	TOTAL
COAL	4.2	10	23.9	12.4	10.9	7.8	6.1	7.5	12.4	26.5	14.0	13.8	20.2	18.5	71.9	54.7	316.75
IVB	0.0	0.0	0.1	0.1	0.2	0.1	0.1	0.3	0.7	0.5	0.6	0.2	0.4	0.8	1.3	0.4	5.8
IVA	0.0	0.1	0.1	0.1	0.2	0.1	0.2	0.2	0.6	0.6	0.6	0.3	0.5	1.0	1.5	0.8	6.9
IV	0.8	2.6	1.9	1.1	1.0	1.2	1.1	1.2	2.8	3.4	2.7	2.5	2.7	3.3	10.6	5.6	44.5
IIIT	0.0	1.1	0.4	0.2	0.1	0.1	0.4	0.3	0.9	1.4	0.9	0.9	1.0	0.9	4.8	2.7	16.1
IIIB	0.1	0.9	1.0	0.3	0.2	0.1	0.5	0.4	0.9	1.8	1.1	1.2	1.5	1.1	6.8	5.0	22.9
IIIC	0.0	0.0	0.7	0.8	1.4	1.5	1.0	0.6	0.8	1.6	0.6	0.6	0.6	0.8	0.1	0.0	11.0
IIT	0.4	0.7	2.0	0.5	0.5	0.4	0.4	0.3	0.5	1.2	0.6	0.6	0.9	0.7	3.2	2.6	15.5
IIB	0.9	1.4	3.9	1.2	1.3	0.9	1.0	0.8	1.3	3.3	1.6	1.6	2.4	1.9	7.4	6.7	37.5
IT	1.2	2.0	8.2	4.2	3.3	1.9	1.9	1.8	2.2	6.4	2.8	3.2	5.5	4.5	19.3	15.5	83.8
IB	0.8	1.2	5.7	3.7	2.7	1.6	1.6	1.5	1.7	6.3	2.6	2.8	4.6	3.6	17.0	15.4	72.7

4.4 Target Output & Mine Life:

The mine has been planned for a nominal production capacity of 15.00MT per annum of coal and peak production 20.00 MTY. The target has been assessed based on geological constraints, optimization of mining operations, size of the quarry, rate of advance, etc.

Mine Life:

The project will sustain a mine life at nominal production for a period of 41 years of mining operations. The break-up of total period is as follows:

- Construction period - Nil,
- Production build-up period - 6 years,
- Production period - 32 years,
- Tapering period - 3 years,
- Total period - 41 years.

The Section-1, Section-2 & Section-3 will sustain for a period of 10, 28 & 41 years of project life respectively.

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CHAPTER-V

METHOD OF MINING

5.1 General

Considering the geo mining characteristics of the mining block i.e. thick deposits at shallow depth, moderate gradient of the seams, occurrence of geological disturbances, and opencast method of mining with shovel-dumper combination is proposed to work in Chandragupt OCP.

5.2 Geo-Mining Characteristics

The Geo-Mining characteristics of the proposed Chandragupt OCP (15.0MTY) are given in the table below. A total no. of twelve coal horizons is occurring within the quarriable area. However reserves of two seams IVC and IVD has not been considered due to thickness less than 1m.

5.2.1 Seam Gradient – The dip of the formation varies from 4° - 6° towards south in major part of the area. However, steeper dips varying from 10° - 15° have been observed near the eastern side of faults F6 & F1.

5.2.2 Geological Disturbances

8 (eight) faults have been encountered in Pachra block as per the Geological Report of Pachra Block.

Fault	Extent	Trend	Direction & Amount of Throw
F1	Continues from Amrapali block and forms the southern limit of the block	NW-SE	North easterly (10-40m)
F3	Continues from Amrapali block and runs in the northern part of the block	E-W	Northerly (2-50m)
F4	Runs almost parallel to F3	E-W	Northerly (15-53m)
F5	Runs almost parallel to F3	E-W	Northerly (15-25m)
F6	Runs almost parallel to F1	NW-SE	North easterly (5-25m)
F7	Runs almost parallel to F3	E-W	Northerly (10-20m)
F8	Runs parallel to F3 in northern part	E-W	Northerly (0-20m)
F9	Runs in the north eastern part of the block.	NW-SE	South westerly (15m)

11 (eleven) faults have been encountered in Pachra South block based on the Geological Report of Pachra South Block.

Fault	Extent	Trend	Direction & Amount of Throw
F1	Continues from Amrapali block and forms the northern limit of the block	NW-SE	North easterly (10-40m)
FS2	Originates from F1 near BH CNKP-57 to CNKP-123	NW-SE	North easterly (0-10m)

Fault	Extent	Trend	Direction & Amount of Throw
FS3	Continues from Amrapali block between BH CNKP-249 and 56	E-W	Northerly (20m)
FS4	Continues from Amrapali block between BH CNKP-122, 295 and 109	E-W	Northerly (10-30m)
FS5	Originates from FS4 near BH CNKP-288 and extends upto CNKP-292	NW-SE	North easterly (0-10m)
FS6	Continues from Amrapali block in the south central part of the block	E-W	Northerly (20m-90m)
FS7	Originates from FS6 near BH CNKP-115.	NW-SE	Southerly (0-20m)
FS8	Originates from FS6 near BH CNKP-67.	E-W	Northerly (10-40m)
FS9	Originates from FS10 near BH CNKP-245.	E-W	Northerly (10m)
FS10	Originates near western boundary between BH CNKP-254 and CNKP-334	E-W	Northerly (0m-25m)
FS11	Originates near western boundary west of BH CNKP-255 in the southern part.	NW-SE-EW	Northerly (0m-20m)

5.2.3 Details of sequence of coal seam and parting

Name of seam/parting	Thickness range of coal/parting (m)
Soil/Alluvium	0.00-12.00
Barren Measure	13.20-19.77
Barakar above IVD	16.76-26.95
Seam IVD	0.60-1.0
Parting	1.58-4.94
Seam IVC	0.23-0.84
Parting	2.41-6
Seam IVB	0.6-1.80
Parting	5.97-11.27
Seam IVA	0.16-2.43
Parting	0.40-8.00
Seam IV	3.87-10.11
Parting	1.59-9.80
Seam IIIT	2.74-4.71
Parting	0.00-26.16
Seam IIIB	1.71-5.31
Seam IIIC	7.83-10.11
Parting	2.69-23.40
Seam IIT	0.27-4.96
Parting	0.34-6.63
Seam IIB	1.75-8.12
Parting	1.49-23.48
Seam IT+MC	6.18-13.29
Parting	1.28-5.50
Seam IB	3.10-14.69


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5.3 Mine parameters

Particulars	Minimum (m)	Maximum (m)
Dimension of the quarry along strike (on floor)	1500	2780
Depth of quarry	-	250
Dip rise length (on floor)	4650	5560
Final Quarry Floor area (sq. km)	11.46	
Final Quarry Surface area (sq. km)	13.33	
25 th Year Quarry Surface area (sq. km)	11.65	
Maximum depth of quarry at 25 th Year stage (m)	185	
Total Mineable reserves (Mt)	527.30	
Total OB (Mcum)	995.34	
Average Stripping Ratio (Cum/Tonne)	1.89	
Seam gradient (Avg. gradient of the quarry floor)	6 Degree (1 in 15)	

Section wise Details

Particulars	Section-1	Section-2	Section-3
Quarry Surface area (in Ha)	213.36	466.90	652.16
Max Depth (in m)	70	170	250
Avg. length along strike (in m)	2200	2500	1750
Mineable reserves (in MT)	41.93	168.62	316.75
Total OB (Mcum)	60.97	215.38	718.99
Avg. Stripping Ratio (cum/te)	1.45	1.28	2.27

5.4 Choice of Technology:

Shovel Dumper Combination

Keeping in view of the Geological and Mining parameters of Chandragupta mining block i.e. moderate gradient of the seam (4° - 8°) in major part of the block. For rated output of 15.00 MTY, Shovel-dumper for OB and surface Miner with FE Loader mining system with inclined slicing has been envisaged for the quarry. However, horizontal slicing has been proposed at places in Section-2 & 3 where steeper gradient of about 10° or more has been encountered.

Equipment Selection: Considering the average strike length of the quarry, gradient and thickness of the seam, annual load of excavation and lead the following equipment's have been selected.

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Particulars	Capacity / Year	Year						Max. beyond target year
		1	2	3	4	5	6	
Coal								
Elec Hyd. Shovel	5.5-6.5 cum	1	1	1	1	1	1	
Surface Miner	SM 3800-4200		1	2	3	4	4	
Diesel RBH Drill	160mm	2	2	2	2	2	2	
Rear Dumpers	60T	5	9	16	22	26	30	
FE Loader	5-7 Cum		2	4	5	7	7	
Dozer with ripper attachment	410 HP	1	1	1	1	2	2	
Dozer	410 HP	1	1	1	1	1	2	
OB								
Elec Hyd Shovel	20-22 cum						2	
Elec Hyd Shovel	10-12 cum	3	3	5	5	6	7	
Rear Dumpers	190T						13	
Rear Dumpers	100T	17	25	36	41	45	48	
Electric RBH Drill	250 mm						5	
Diesel RBH Drill	160mm	5	5	8	8	9	10	
Dozer	410 HP	4	4	6	6	7	7	
Dozer	750-850HP	1	1	1	1	1	3	
Common								
Diesel Hyd. Backhoe	4.3-5 cum	1	1	1	1	1	1	
Diesel Hyd. Shovel	3.2-3.5 cum	1	1	1	1	1	1	
Grader	500 HP	2	3	3	3	3	3	
AT crane	80T-100T						1	
RT crane	40T	1	1	2	2	2	2	
RT crane	20T	1	1	2	2	2	2	
Mobile Crane	8-14T	2	2	2	2	2	2	
FE Loader	5-7 Cum.	1	1	2	2	2	2	
Water Sprinkler	70 KL	1	2	2	2	2	2	
Water Sprinkler Mist Spray	28KL	2	2	2	2	2	2	
Wheel Dozer	460 HP	2	2	2	2	2	2	
Dump Trucks	12-15 T	5	6	6	6	6	6	
Diesel Browser	16KL	1	1	2	2	2	2	
Fire Tender		1	2	2	2	2	2	
Hyd. Rock Breaker		1	1	1	1	1	1	
Cable Handler		2	2	2	2	2	2	
Tyre Handler	35KN	2	2	2	2	2	2	
Reclamation								
FE Loader	5-7 cum	1	1	1	1	1	1	
Dozer	410 HP	1	1	1	1	1	1	
Grader	280 HP	1	1	1	1	1	1	
Water Sprinkler	70KL	1	1	1	1	1	1	
Water Sprinkler Mist Spray	28KL	1	1	1	1	1	1	
Dumper	60T							

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CHANDRA

5.5 Mining System and system parameters

Inclined mining system with shovel-dumper combination has been adopted considering the geo-mining conditions. However, in a small part of the quarry, the dip of the seam varies between 10° - 15° (near the eastern side of faults F6 & F1). In this portion, mining will be done by horizontal slicing with shovel-dumper combination. Following mining system parameters have been considered in the project:

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

1. Mining Benches

- | | |
|--|----------------|
| a) Maximum Bench Height for 10 - 12 Cum Hyd. shovel Bench | -12-15m |
| b) Minimum working Bench Width for 10 - 12 Cum Hyd. shovel | - 50m |
| c) Non-working Bench width for 10 - 12 Cum Hyd. shovel | - 30m |
| c) Maximum Bench Height for 20 - 22 Cum Hyd. shovel Bench | -15-18m |
| d) Minimum working Bench Width for 20 - 22 Cum Hyd. shovel | - 60m |
| e) Non-working Bench width for 20 - 22 Cum Hyd. shovel | - 40m |
| f) Working Bench of Surface Miner | -60m |
| 2. Width of the permanent haul road | - 30 m. |
| 3. Width of the temporary transport ramp | - 25 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° |
| Coal bench | - 70° |
| Dump bench | - 37° |
| Overall pit slope | - 37° |


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CHAPTER-VI

MINING & DUMPING STRATEGY

6.1 Constraints on Mine Development

Presence of River and its diversion: Chotki River passes through the proposed quarriable area of Chandragupt OCP. This river must be diverted before the start of the quarry operation to sustain the production schedule. Minor earth cutting is required for this diversion to maintain the water flow.

➤ A small notch of Barki River bounded by boreholes CNKP120, CNKP124 and CNKP125 also needs to be diverted.

There is constraints of dumping in lease hold area of Chandragupt OCP and the dumping in initial year has been proposed in adjacent Amrapali OCP, hence a bridge over Barki River must be constructed before the mine operation at suitable place.

6.2 Mining Strategy / Mining Sequence

Chandragupt OCP is a new mine. The mine is proposed to be worked in three sections concurrently to build up to the rated capacity of 15MTY by the 6th of quarry operation.

The quarry is proposed to be worked by inclined slicing method by shovel-dumper combination. Horizontal slicing by shovel-dumper combination will also be employed at places with steeper gradient. A haul road in the western flank has been proposed on the floor of base seam.

Section-1 will be opened near the north-west of BH no CNKP171 from the incrop of Seam I Bottom and has a life of 10 years of quarry operation. The coal and OB both will be transported through the western flank.

Section-2 is proposed to be opened near BH no CNKP405 from the incrop of Seam I Bottom and has a life of 28 year of quarry operation. The coal will be transported through western flank and OB will be transported through the eastern flank.

Section-3 is proposed to be opened near BH No. CNKP405 from the incrop of Seam II Bottom and has a life of 41 years quarry operation. The coal will be transported through western flank and OB will be transported through the eastern flank.

6.3 Mining Parameters:

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

1. Mining Benches:

- a) Maximum Bench Height

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- 20-22 Cum Electrical Hyd. shovel Bench - 15-18m
- 10-12 Cum Electrical Hyd. shovel Bench - 12-15m

b) Minimum Bench Width:

	Working Bench Width for 20-22cum Hyd Shovel	- 50m
	Working Bench Width for 10-12cum Hyd Shovel	- 40m
	Non-working Bench width for 10-12cum Hyd Shovel	- 25m
2.	Width of the permanent haul road	- 30 m.
3.	Usual height of the spoil dump bench	- 30 m.
4.	The width of the active dump bench	- 60 m.
5.	Bench Slope (working)	
	O.B. bench	- 70°
	Coal bench	- 70°
	Dump bench	- 37°
6.	Overall pit slope	- 37°

6.4 Dumping Strategy

Spoil Dump

Total volume of overburden from all the 3 (three) sections of the proposed OCP has been estimated as 995.34 Mcum. 48.38 Mcum OB will be dumped at Amrapali out of total 70.38 Mcum during the first 5th year of quarry operation. From 4th year onwards, overburden of Section 1, Section 2 and Section 3 has to be dumped internally.

		Volume of OB (M cum)
1	External Dump (at Amrapali)	48.38
2	Internal Dump	946.96
	Total	995.34

The maximum RL of the external dump (at Amrapali) and internal dump is +550m & +500m respectively.

Top Soil Management

The salvaging, stockpiling and re-application of top soil to be used as growth medium in the reclamation of Internal & External overburden dumps within the mining area is a major environment protection programme. Soil management in opencast mine is necessary to re-establish the stability & productivity of lands disturbed due to mining activity.


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Year-wise external and internal dumping:

(Fig in Mcum)

YEAR	Volume of External dumping	Volume of Internal dumping	Total
1	7.39	0.00	7.39
2	10.89	0.00	10.89
3	15.37	0.00	15.37
4	6.73	10.84	17.57
5	8.01	11.15	19.16
6	-	21.32	21.32
7	-	21.30	21.30
8	-	21.41	21.41
9	-	20.62	20.62
10	-	21.31	21.31
11	-	22.10	22.10
12	-	23.11	23.11
13	-	25.67	25.67
14	-	28.83	28.83
15	-	32.10	32.10
16	-	32.60	32.60
17	-	32.60	32.60
18	-	32.60	32.60
19	-	32.60	32.60
20	-	32.09	32.09
21	-	32.09	32.09
22	-	32.09	32.09
23	-	32.09	32.09
24	-	32.10	32.10
25	-	32.09	32.09
26	-	31.81	31.81
27	-	30.81	30.81
28	-	27.94	27.94
29	-	23.50	23.50
30	-	23.50	23.50
31	-	23.50	23.50
32	-	23.50	23.50
33	-	23.50	23.50
34	-	23.50	23.50
35	-	23.50	23.50
36	-	23.50	23.50
37	-	23.50	23.50
38	-	22.27	22.27
39	-	17.85	17.85
40	-	13.84	13.84
41	-	8.25	8.25
Total	48.38	946.96	995.34

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6.5 Sequence of Dumping Operations and Stage-Wise Details

Sl. No.	Particulars	Section-1	Section -2	Section -3
1.	Coal Mined (MT)	41.93	168.62	316.75
2.	OB removed (M cum)	60.97	215.38	718.99
3.	Stripping Ratio (M cum/t)	1.45	1.28	2.27
4.	Excavated quarry area (Ha)	217.53	471.40	641.94
5.	Internal dump (Mcum)	180.00	324.00	442.96
6.	External dump (Mcum)	16.64	16.25	15.50

Dumping Arrangements

The Maximum height of OB dump above ground level is 60m with maximum overall slope of 37°. The height of the individual bench is 30m with facing berm width of 30m and side berm width of 20m (Internal Dump), where as in case of external dump the berm width is kept 20m on all sides.

The maximum RL of the internal dump is +500m. However, the internal dump may require to be raised further by few meters during the quarry operation, which will subsequently be brought down to +500m at the final stage of quarry operation so as to maintain the pre-mining topography of the area.

✓ The void left at the end of mine life is 64.59 Ha in the southernmost part of the quarry.


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CHAPTER-VII

MINING SCHEDULE & EQUIPMENT PHASING

7.1 Design criteria:

Following design criteria has been adopted for the mining operation.

- Working Regime

This opencast mine will work on 3 shift/day basis and 7 days/week schedule and the number of working days /year are adopted as 330 considering annual public holidays, unscheduled delays and bad weather effect particularly in rainy season.

- Average Specific Gravity of different coal seams:

	<u>Seam</u>	<u>Avg Sp Gr</u> (te/m^3)
i)	Seam IVB	1.62
ii)	Seam IVA	1.67
iii)	Seam IV	1.59
iv)	Seam IIIT	1.59
v)	Seam IIIB	1.62
vi)	Seam IIIC	1.62
vii)	Seam IIT	1.63
viii)	Seam IIB	1.68
ix)	Seam IT	1.64
x)	Seam IB	1.67

7.2 Calendar Programme of Excavation

The mining schedule has been formulated based on the adopted sequence of opencast mine development at optimum conditions of mining operations for the entire life of Chandragupt opencast mine.

The total extractable reserves have been estimated as 527.30Mtes corresponding to a volume of OBR of 995.34Mcum at an average stripping ratio of 1.89 cum/te. The rated output of 15.0 MTY would be achieved in the 6th year of quarry operation. The quarry is proposed to be worked in 3 (three) sections **concurrently**. Peak overburden load for the project has been estimated as 32.60 Mcum during the 16th to 19th years of quarry operation. The Section-wise seam-wise coal and OB is given in the Tables below:


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MANAGER
CHANDRAGUPTA OPENCAST PROJECT
CCL, AMRAPALI-CHANDRAGUPTA AREA

Detailed Calendar Programme of Section-1

YEAR	IVB	IVA	IV	IIIT	IIIB	IIIC	IIT	IIB	IT	IB	TOTAL COAL (MT)
1	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.02	0.22	1.26
2	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.05	0.76	1.19
3	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.03	0.46	1.90	1.62
4	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.37	0.81	2.16	1.65
5	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.42	0.71	1.95	1.88
6	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.41	0.65	1.87	2.02
7	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.28	0.61	1.88	2.13
8	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.09	0.62	2.10	2.04
9	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.11	0.55	2.01	2.21
10	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.10	0.47	1.75	2.00
TOTAL	0.00	0.00	0.00	0.00	0.00	0.00	0.00	1.80	4.95	16.60	41.93

SECTION-1 COAL (MT)

SEAM

TOTAL COAL (MT)

Detailed Calendar Programme of Section-2

YEAR	TOP OB	IVB-IVA	IVA-IV	IV-III/III/III	III-III/III/III	III-III/III/III	IIT-IIB	IIB-IIT	IIT-IB	TOTAL OB (M CUM)	S.R. (cum/t)
1	1.00	0.00	0.00	0.00	0.00	0.00	0.00	1.26	1.85	4.10	2.73
2	2.30	0.00	0.00	0.00	0.00	0.05	0.39	1.48	1.27	5.49	2.74
3	1.60	0.00	0.00	0.00	0.00	0.69	1.26	2.28	1.22	7.05	1.76
4	1.58	0.00	0.00	0.00	0.00	0.99	1.08	2.31	1.09	7.04	1.41
5	1.80	0.00	0.00	0.00	0.00	0.81	0.97	2.37	1.07	7.03	1.41
6	2.35	0.00	0.00	0.00	0.00	0.60	0.86	2.02	1.19	7.02	1.40
7	3.16	0.00	0.00	0.00	0.00	0.40	0.75	1.38	1.31	7.00	1.40
8	2.25	0.00	0.00	0.00	0.00	0.76	1.07	1.91	1.02	7.01	1.40
9	2.20	0.00	0.00	0.00	0.00	0.37	0.68	1.64	1.13	6.02	1.20
10	0.04	0.00	0.00	0.00	0.00	0.23	0.51	1.39	1.03	3.21	0.72
TOTAL	18.28	0.00	0.00	0.00	0.00	4.90	7.57	18.05	12.17	60.97	1.45

SECTION-1 OB (M CUM)

PARTING BETWEEN

TOTAL OB (M CUM)

S.R. (cum/t)

YEAR	IVB	IVA	IV	IIIT	IIIB	IIIC	IIT	IIB	IT	IB	TOTAL COAL (MT)
1	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.12	0.00	0.61
2	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.03	0.16	0.22	1.09
3	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.06	0.29	1.22	0.88
4	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.10	0.37	1.31	0.84
5	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.01	0.18	0.69	1.59
6	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.01	0.22	0.86	2.06
7	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.01	0.22	0.86	2.06
8	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.05	0.22	0.84	1.99
9	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.05	0.22	0.77	1.75
10	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.05	0.22	0.77	1.75
11	0.02	0.10	0.44	0.37	0.63	0.38	0.37	1.21	2.58	1.89	8.00

SECTION-2 COAL (MT)

SEAM

TOTAL COAL (MT)

CHANDRAGUPTA OPENCAST PROJECT
CCL: AMHAPALI-CHANDRAGUPTA
MANAGER
SANJEEV KUMAR

YEAR	TOP OB	SECTION-2 OB (M CUM)								TOTAL OB (M CUM)	S.R. (cum/t)
		PARTING BETWEEN									
		I/B-IVA	IVA-IV	IV-III/III/III	III-III/III/III	III-III/III/III	III-III/III/III	III-III/III/III	III-III/III/III		
		III-III/III/III	III-III/III/III	III-III/III/III	III-III/III/III	III-III/III/III	III-III/III/III	III-III/III/III	III-III/III/III		
1	1.50	0.00	0.00	0.00	0.00	0.53	0.03	0.07	0.15	2.28	2.85
2	2.00	0.00	0.00	0.00	0.00	0.00	0.35	0.46	0.31	0.28	2.27
3	2.50	0.00	0.00	0.00	0.00	0.00	1.01	0.42	0.96	0.42	5.32
4	3.00	0.00	0.00	0.00	0.00	0.00	1.17	0.43	1.00	0.42	6.03
5	3.50	0.00	0.00	0.00	0.00	0.64	0.89	0.49	1.06	0.57	7.14
6	3.61	0.00	0.00	0.00	0.00	0.83	1.10	0.62	1.39	0.74	8.30
7	3.61	0.00	0.00	0.00	0.00	0.83	1.10	0.62	1.39	0.74	8.30
8	3.62	0.01	0.05	0.28	0.64	1.03	0.63	1.41	0.73	8.40	1.68
9	3.51	0.03	0.23	1.23	0.00	0.79	0.66	1.46	0.68	8.60	1.72
10	3.51	0.03	0.23	1.23	0.00	0.79	0.66	1.46	0.68	8.60	1.72
11	0.49	0.23	0.48	2.14	0.00	1.13	0.94	2.15	1.02	8.60	1.07
12	0.55	0.52	0.66	2.40	0.00	0.92	0.76	1.85	0.93	8.60	1.08
13	0.55	0.52	0.66	2.40	0.00	0.92	0.76	1.85	0.93	8.60	1.08
14	1.47	0.57	0.49	2.03	0.00	0.74	0.64	1.74	0.93	8.60	1.07
15	1.89	0.59	0.41	1.86	0.00	0.66	0.58	1.69	0.92	8.60	1.07
16	2.09	0.65	0.38	1.52	0.00	0.96	0.54	1.55	0.91	8.60	1.08
17	2.28	0.71	0.35	1.18	0.00	1.25	0.51	1.42	0.89	8.60	1.07
18	2.28	0.71	0.35	1.18	0.00	1.25	0.51	1.42	0.89	8.60	1.07
19	2.28	0.71	0.35	1.18	0.00	1.25	0.51	1.42	0.89	8.60	1.07
20	2.28	0.71	0.35	1.18	0.00	1.25	0.51	1.42	0.89	8.60	1.07
21	3.07	0.63	0.31	1.03	0.00	1.10	0.45	1.24	0.78	8.60	1.23
22	3.07	0.63	0.31	1.03	0.00	1.10	0.45	1.24	0.78	8.60	1.23
23	3.07	0.63	0.31	1.03	0.00	1.10	0.45	1.24	0.78	8.60	1.23
24	3.07	0.63	0.31	1.03	0.00	1.10	0.45	1.24	0.78	8.60	1.23
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RI-3, CMPDI											

RI-3, CMPDI

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12	0.03	0.19	0.85	0.47	0.58	0.49	0.39	1.17	2.24	1.57	8.00
13	0.05	0.17	0.85	0.47	0.58	0.49	0.39	1.17	2.24	1.57	8.00
14	0.11	0.25	1.08	0.46	0.55	0.53	0.38	1.09	2.11	1.44	8.00
15	0.15	0.28	1.19	0.45	0.53	0.55	0.38	1.05	2.04	1.38	8.00
16	0.18	0.28	1.04	0.44	0.53	0.49	0.36	1.05	2.05	1.58	8.00
17	0.19	0.25	0.96	0.43	0.52	0.42	0.34	1.05	2.06	1.78	8.00
18	0.19	0.25	0.96	0.43	0.52	0.42	0.34	1.05	2.06	1.78	8.00
19	0.19	0.25	0.96	0.43	0.52	0.42	0.34	1.05	2.06	1.78	8.00
20	0.19	0.25	0.96	0.43	0.52	0.42	0.34	1.05	2.06	1.78	8.00
21	0.16	0.22	0.83	0.37	0.46	0.37	0.30	0.92	1.80	1.56	7.00
22	0.16	0.22	0.83	0.37	0.46	0.37	0.30	0.92	1.80	1.56	7.00
23	0.16	0.22	0.83	0.37	0.46	0.37	0.30	0.92	1.80	1.56	7.00
24	0.16	0.22	0.83	0.37	0.46	0.37	0.30	0.92	1.80	1.56	7.00
25	0.16	0.22	0.84	0.37	0.46	0.37	0.30	0.92	1.80	1.56	7.00
26	0.14	0.18	0.72	0.32	0.39	0.32	0.26	0.79	1.54	1.33	6.00
27	0.14	0.18	0.72	0.32	0.39	0.32	0.26	0.79	1.54	1.33	6.00
28	0.11	0.15	0.58	0.26	0.32	0.26	0.21	0.63	1.24	1.07	4.82
TOTAL	2.54	4.03	15.69	8.23	11.77	7.87	7.41	23.53	48.80	38.77	168.62

SANJEEV KUMAR
MANAGER

CHANDRAGUPTA OCP
CCL, ANAND, GUJARAT

YEAR	SECTION-3 COAL (MT)												TOTAL COAL (MT)
	SEAM												
	IVB	IVA	IV	IIIT	IIIB	IIIC	IIIT	IIIB	IIIT	IIIB	IT	IB	
1	0.00	0.00	0.09	0.00	0.01	0.00	0.05	0.11	0.14	0.09	0.50		0.50
2	0.00	0.01	0.19	0.00	0.02	0.01	0.10	0.22	0.28	0.18	1.00		1.00
3	0.00	0.01	0.28	0.00	0.03	0.01	0.14	0.33	0.42	0.27	1.50		1.50
4	0.01	0.02	0.70	0.21	0.19	0.01	0.24	0.51	0.68	0.42	3.00		3.00
5	0.01	0.02	1.03	0.43	0.36	0.02	0.29	0.57	0.80	0.47	4.00		4.00
6	0.02	0.03	1.11	0.44	0.40	0.05	0.38	0.74	1.14	0.70	5.00		5.00
7	0.01	0.01	0.40	0.08	0.22	0.15	0.43	0.83	1.69	1.18	5.00		5.00
8	0.01	0.01	0.40	0.08	0.22	0.15	0.43	0.83	1.69	1.18	5.00		5.00
9	0.01	0.01	0.40	0.08	0.22	0.15	0.43	0.83	1.69	1.18	5.57		5.57
10	0.01	0.01	0.45	0.09	0.24	0.17	0.48	0.92	1.88	1.31	7.00		7.00
11	0.06	0.06	0.63	0.13	0.21	0.41	0.38	0.82	2.35	1.96	7.00		7.00
12	0.08	0.08	0.65	0.13	0.17	0.48	0.30	0.69	2.34	2.07	7.00		7.00
13	0.12	0.12	0.63	0.08	0.11	0.88	0.36	0.85	2.11	1.74	7.00		7.00
14	0.09	0.09	0.83	0.07	0.09	1.11	0.36	0.85	1.89	1.58	7.00		7.00
15	0.09	0.10	1.02	0.16	0.19	1.19	0.38	0.85	1.63	1.39	7.00		7.00
16	0.15	0.15	0.98	0.31	0.40	0.78	0.38	0.83	1.63	1.39	7.00		7.00
17	0.29	0.24	1.13	0.27	0.38	0.53	0.31	0.75	1.68	1.41	7.00		7.00
18	0.37	0.42	1.39	0.47	0.51	0.45	0.25	0.70	1.37	1.06	7.00		7.00
19	0.31	0.35	1.27	0.45	0.50	0.44	0.27	0.75	1.44	1.21	7.00		7.00
20	0.13	0.15	0.91	0.37	0.48	0.41	0.32	0.87	1.70	1.65	7.00		7.00
21	0.14	0.17	1.04	0.42	0.55	0.47	0.36	1.00	1.93	1.90	8.00		8.00
22	0.14	0.17	1.04	0.42	0.55	0.47	0.36	1.00	1.94	1.89	8.00		8.00
23	0.30	0.30	1.39	0.49	0.58	0.35	0.35	0.89	1.75	1.60	8.00		8.00
24	0.35	0.33	1.48	0.50	0.59	0.32	0.35	0.86	1.69	1.53	8.00		8.00
25	0.10	0.15	1.43	0.54	0.70	0.32	0.35	0.93	1.85	1.62	8.00		8.00
26	0.13	0.18	1.47	0.55	0.75	0.33	0.40	1.03	2.22	1.92	9.00		9.00
27	0.18	0.22	1.21	0.46	0.68	0.28	0.40	1.07	2.44	2.06	9.00		9.00
28	0.24	0.33	1.42	0.52	0.74	0.33	0.44	1.11	2.75	2.31	10.18		10.18
29	0.50	0.79	1.89	0.58	0.72	0.47	0.45	1.20	2.99	2.41	12.00		12.00
30	0.34	0.53	1.77	0.71	0.96	0.20	0.50	1.21	3.12	2.66	12.00		12.00
31	0.22	0.34	1.68	0.80	1.13	0.01	0.53	1.23	3.21	2.84	12.00		12.00
32	0.22	0.34	1.68	0.80	1.13	0.01	0.53	1.23	3.21	2.84	12.00		12.00
33	0.22	0.34	1.68	0.80	1.13	0.01	0.53	1.23	3.21	2.84	12.00		12.00
34	0.22	0.34	1.68	0.80	1.13	0.01	0.53	1.23	3.20	2.84	12.00		12.00
35	0.22	0.34	1.68	0.80	1.13	0.01	0.53	1.24	3.21	2.83	12.00		12.00
36	0.15	0.24	1.43	0.69	1.11	0.00	0.56	1.38	3.31	3.13	12.00		12.00
37	0.10	0.17	1.25	0.61	1.10	0.00	0.58	1.49	3.37	3.35	12.00		12.00

RI-3, CMPDI

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Detailed Calendar Programme of Section-3

TOTAL	25	26	27	28
3.07	0.63	0.31	1.03	0.00
1.24	0.45	1.10	0.00	0.00
0.78	0.60	8.60	1.23	1.38
0.54	0.67	7.30	4.44	0.92
20.39	0.54	0.67	7.30	0.92
36.23	0.85	1.06	0.94	0.38
14.59	0.31	0.38	0.94	0.75
27.22	0.00	0.00	0.89	0.71
2.94	0.00	0.00	0.89	0.21
27.48	0.00	0.00	0.89	0.21
7.25	0.31	0.26	0.54	0.43
10.65	0.63	0.26	0.54	0.43
68.63	3.07	3.57	2.57	0.63

SANJEEV KUMAR
MANAGER

38	0.10	0.17	1.25	0.61	1.10	0.00	0.58	1.48	3.37	3.35	12.00
39	0.08	0.14	1.04	0.51	0.92	0.00	0.48	1.24	2.80	2.79	10.00
40	0.06	0.11	0.83	0.40	0.74	0.00	0.39	0.99	2.24	2.23	8.00
41	0.04	0.07	0.52	0.25	0.46	0.00	0.24	0.62	1.40	1.40	5.00
TOTAL	5.84	7.71	43.42	16.11	22.86	11.02	15.74	37.49	83.78	72.78	316.75

YEAR	SECTION-3 OB (M CUM)												TOTAL OB (M CUM)	S.R. (cum/t)
	PARTING BETWEEN													
	TOP OB	IVB- IVA	IVA-IV	IV- IIIT/ IIIC	IIIT- IIIB	IIIB/ IIIC- IIT	IIT- IIIB	IIB-IT	IT-IB					
1	0.15	0.01	0.23	0.27	0.24	0.01	0.02	0.04	0.03	1.00	2.00	2.00		
2	0.30	0.01	0.46	0.54	0.49	0.02	0.04	0.08	0.06	2.00	2.00	2.00		
3	0.45	0.02	0.69	0.80	0.73	0.04	0.06	0.12	0.09	3.00	3.00	2.00		
4	0.61	0.02	1.31	1.03	0.92	0.06	0.11	0.30	0.14	4.50	4.50	1.50		
5	0.72	0.02	1.70	0.93	0.81	0.07	0.14	0.45	0.16	5.00	5.00	1.25		
6	0.77	0.03	1.82	1.15	0.96	0.08	0.21	0.70	0.29	6.00	6.00	1.20		
7	1.18	0.04	0.64	1.08	0.75	0.09	0.32	1.25	0.63	6.00	6.00	1.20		
8	1.18	0.04	0.64	1.08	0.75	0.09	0.32	1.25	0.63	6.00	6.00	1.20		
9	1.18	0.04	0.64	1.08	0.75	0.09	0.32	1.25	0.63	6.00	6.00	1.20		
10	4.14	0.05	0.72	1.20	0.83	0.10	0.36	1.40	0.70	9.50	9.50	1.71		
11	8.55	0.44	0.66	0.54	0.36	0.11	0.38	1.59	0.87	13.50	13.50	1.93		
12	10.20	0.57	0.57	0.19	0.11	0.10	0.35	1.53	0.87	14.50	14.50	2.07		
13	12.33	0.65	1.70	0.09	0.10	0.12	0.31	1.08	0.68	17.06	17.06	2.44		
14	14.27	0.48	3.21	0.07	0.07	0.16	0.26	1.09	0.63	20.24	20.24	2.89		
15	14.64	0.70	5.35	0.09	0.10	0.30	0.26	1.43	0.63	23.50	23.50	3.36		
16	12.45	1.48	5.77	0.22	0.20	0.54	0.46	2.09	0.80	24.00	24.00	3.43		
17	12.60	1.55	4.61	0.52	0.19	0.80	0.66	2.19	0.88	24.00	24.00	3.43		
18	14.19	2.32	4.25	0.35	0.27	0.83	0.37	0.87	0.54	24.00	24.00	3.43		
19	14.65	1.88	4.03	0.33	0.27	0.79	0.43	1.05	0.57	24.00	24.00	3.43		
20	15.55	0.51	3.36	0.28	0.27	0.69	0.59	1.58	0.66	23.50	23.50	3.36		
21	14.42	0.59	3.84	0.31	0.30	0.78	0.68	1.81	0.76	23.50	23.50	2.94		
22	14.42	0.59	3.84	0.31	0.30	0.78	0.68	1.81	0.76	23.50	23.50	2.94		
23	9.94	1.78	6.49	0.42	0.28	0.93	0.84	2.06	0.75	23.50	23.50	2.94		
24	8.76	2.10	7.19	0.45	0.28	0.97	0.89	2.12	0.75	23.50	23.50	2.94		
25	10.95	0.71	6.03	0.37	0.23	1.04	0.92	2.34	0.91	23.50	23.50	2.94		
26	10.86	0.81	5.33	0.36	0.23	1.16	1.10	2.57	1.07	23.50	23.50	2.61		
27	13.54	0.90	2.66	0.25	0.18	1.14	1.23	2.46	1.15	23.50	23.50	2.61		
28	14.44	0.82	2.42	0.23	0.16	1.04	1.12	2.24	1.05	23.50	23.50	2.31		
29	5.84	3.42	6.11	0.49	0.29	1.17	1.59	2.69	1.90	23.50	23.50	1.96		
30	8.04	2.28	4.53	0.94	0.14	1.74	1.38	3.02	1.42	23.50	23.50	1.96		
31	7.80	1.82	4.03	1.31	0.07	2.27	1.40	3.53	1.27	23.50	23.50	1.96		
32	7.80	1.82	4.03	1.31	0.07	2.27	1.40	3.53	1.27	23.50	23.50	1.96		
33	7.80	1.82	4.03	1.31	0.07	2.27	1.40	3.53	1.27	23.50	23.50	1.96		
34	7.80	1.82	4.03	1.31	0.07	2.27	1.40	3.53	1.27	23.50	23.50	1.96		
35	7.80	1.82	4.03	1.31	0.07	2.27	1.40	3.53	1.27	23.50	23.50	1.96		
36	8.04	1.41	3.99	1.54	0.10	2.69	1.39	2.96	1.37	23.50	23.50	1.96		
37	8.19	1.13	3.96	1.70	0.13	2.98	1.39	2.57	1.44	23.50	23.50	1.96		

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YEAR	COMBINED COAL (MT)												TOTAL COAL (MT)
	SEAM												
	IVB	IVA	IV	IIIT	IIIB	IIIC	IIIT	IIIB	IT	IB			
1	0.00	0.00	0.09	0.00	0.02	0.00	0.10	0.26	0.36	1.96	2.80		
2	0.00	0.01	0.19	0.00	0.03	0.01	0.12	0.43	1.25	2.46	4.50		
3	0.00	0.01	0.28	0.00	0.08	0.01	0.23	1.08	3.53	2.78	8.00		
4	0.01	0.02	0.70	0.35	0.44	0.01	0.71	1.69	4.15	2.91	11.00		
5	0.01	0.03	1.04	0.59	0.80	0.03	0.90	1.97	4.34	3.30	13.00		
6	0.02	0.04	1.11	0.58	0.90	0.06	1.01	2.25	5.07	3.96	15.00		
/	0.01	0.03	0.40	0.22	0.76	0.16	0.93	2.31	5.63	4.54	15.00		
8	0.01	0.04	0.43	0.23	0.81	0.21	0.74	2.29	5.78	4.47	15.00		
9	0.01	0.06	0.51	0.27	0.75	0.35	0.76	2.15	5.44	4.70	15.00		
10	0.01	0.06	0.56	0.28	0.76	0.36	0.80	2.17	5.39	4.62	15.00		
11	0.08	0.17	1.07	0.50	0.83	0.79	0.75	2.03	4.93	3.85	15.00		
12	0.11	0.26	1.50	0.61	0.75	0.97	0.70	1.87	4.58	3.65	15.00		
13	0.17	0.30	1.48	0.55	0.69	1.37	0.75	2.03	4.35	3.32	15.00		
14	0.21	0.36	1.91	0.53	0.64	1.65	0.75	1.94	4.00	3.02	15.00		
15	0.24	0.38	2.21	0.61	0.73	1.74	0.76	1.89	3.68	2.77	15.00		
16	0.33	0.43	2.02	0.75	0.93	1.27	0.73	1.88	3.69	2.98	15.00		
17	0.49	0.49	2.09	0.70	0.90	0.96	0.65	1.80	3.74	3.19	15.00		
18	0.56	0.67	2.35	0.90	1.03	0.87	0.58	1.75	3.45	2.85	15.00		
19	0.50	0.60	2.23	0.87	1.02	0.87	0.62	1.81	3.50	2.98	15.00		
20	0.32	0.40	1.87	0.80	1.00	0.84	0.66	1.93	3.75	3.44	15.00		
21	0.31	0.39	1.88	0.80	1.01	0.84	0.66	1.92	3.74	3.45	15.00		
22	0.31	0.39	1.88	0.80	1.01	0.84	0.66	1.91	3.75	3.45	15.00		
23	0.47	0.52	2.22	0.86	1.04	0.72	0.66	1.79	3.56	3.16	15.00		
24	0.51	0.55	2.33	0.88	1.05	0.69	0.65	1.80	3.47	3.06	15.00		
25	0.26	0.37	2.27	0.91	1.16	0.69	0.65	1.85	3.65	3.18	15.00		
26	0.27	0.37	2.17	0.87	1.14	0.65	0.65	1.83	3.78	3.26	15.00		
27	0.32	0.40	1.93	0.78	1.08	0.60	0.66	1.86	3.99	3.39	15.00		
28	0.36	0.48	1.96	0.76	1.04	0.59	0.64	1.78	4.01	3.37	15.00		
29	0.50	0.79	1.90	0.58	0.72	0.47	0.45	1.20	2.98	2.40	12.00		
30	0.34	0.53	1.78	0.71	0.96	0.20	0.50	1.23	3.10	2.65	12.00		
31	0.22	0.34	1.68	0.80	1.13	0.01	0.53	1.23	3.21	2.84	12.00		
32	0.22	0.34	1.68	0.80	1.13	0.01	0.53	1.23	3.21	2.85	12.00		
33	0.22	0.34	1.68	0.80	1.13	0.01	0.53	1.23	3.21	2.84	12.00		
34	0.22	0.34	1.68	0.80	1.13	0.01	0.53	1.23	3.21	2.84	12.00		
35	0.22	0.34	1.68	0.80	1.13	0.01	0.53	1.24	3.21	2.83	12.00		
36	0.15	0.24	1.43	0.69	1.11	0.00	0.56	1.38	3.30	3.14	12.00		
37	0.10	0.17	1.25	0.61	1.10	0.00	0.58	1.48	3.37	3.35	12.00		

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Combined Detailed Calendar Programme

38	6.96	1.13	3.96	1.70	0.13	2.98	1.39	2.57	1.44	22.27	1.85
39	5.10	0.94	3.30	1.41	0.11	2.48	1.16	2.14	1.20	17.85	1.79
40	3.64	0.75	2.64	1.13	0.08	1.99	0.93	1.72	0.96	13.84	1.73
41	1.88	0.47	1.65	0.71	0.05	1.24	0.58	1.07	0.60	8.25	1.65
TOTAL	324.13	39.81	130.48	30.71	12.50	41.55	30.26	75.16	34.39	718.99	2.27

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38	0.10	0.17	1.25	0.61	1.10	0.00	0.58	1.48	3.36	3.35	12.00
39	0.08	0.14	1.04	0.51	0.92	0.00	0.48	1.24	2.80	2.79	10.00
40	0.06	0.11	0.83	0.40	0.74	0.00	0.39	0.99	2.24	2.23	8.00
41	0.04	0.07	0.52	0.25	0.46	0.00	0.24	0.62	1.40	1.40	5.00
TOTAL	8.37	11.74	59.11	24.35	35.14	18.87	24.95	66.02	149.17	129.57	527.30

YEAR	TOP OB	COMBINED OB (M CUM)										TOTAL OB (M CUM)	S.R. (cum/1)
		PARTING BETWEEN											
		I/A- I/B-	I/A-IV	IV- III/III/	III- III-	III- III-	III- III-	III- III-	III- III-	III- III-	III- III-		
1	2.65	0.01	0.23	0.27	0.24	0.55	0.05	1.37	2.03	7.39	2.64		
2	4.60	0.01	0.46	0.54	0.49	0.43	0.88	1.87	1.61	10.89	2.42		
3	4.55	0.02	0.69	0.80	0.73	1.74	1.75	3.36	1.72	15.37	1.92		
4	5.19	0.02	1.31	1.03	0.92	2.22	1.62	3.62	1.65	17.57	1.60		
5	6.02	0.02	1.70	0.93	1.44	1.76	1.60	3.88	1.81	19.16	1.47		
6	6.73	0.03	1.82	1.15	1.79	1.79	1.69	4.11	2.22	21.32	1.42		
7	7.95	0.04	0.64	1.08	1.58	1.59	1.70	4.03	2.68	21.30	1.42		
8	7.05	0.05	0.70	1.36	1.39	1.88	2.03	4.57	2.38	21.41	1.43		
9	6.89	0.07	0.88	2.31	0.75	1.25	1.66	4.36	2.44	20.62	1.37		
10	7.69	0.08	0.95	2.44	0.83	1.13	1.53	4.26	2.41	21.31	1.42		
11	9.04	0.67	1.14	2.67	0.36	1.24	1.32	3.74	1.90	22.10	1.47		
12	10.75	1.10	1.24	2.59	0.11	1.02	1.11	3.38	1.80	23.11	1.54		
13	12.88	1.18	2.36	2.49	0.10	1.04	1.07	2.93	1.62	25.67	1.71		
14	15.74	1.04	3.70	2.10	0.07	0.90	0.89	2.83	1.55	28.83	1.92		
15	16.53	1.29	5.76	1.94	0.10	0.96	0.84	3.12	1.56	32.10	2.14		
16	14.54	2.13	6.15	1.74	0.20	1.50	1.00	3.65	1.71	32.60	2.17		
17	14.88	2.27	4.96	1.70	0.19	2.05	1.17	3.61	1.77	32.60	2.17		
18	16.47	3.04	4.60	1.54	0.27	2.08	0.88	2.29	1.43	32.60	2.17		
19	16.93	2.59	4.38	1.52	0.27	2.05	0.94	2.47	1.46	32.60	2.17		
20	17.83	1.23	3.71	1.46	0.27	1.94	1.10	3.00	1.55	32.09	2.14		
21	17.49	1.21	4.15	1.35	0.30	1.88	1.12	3.05	1.54	32.09	2.14		
22	17.49	1.21	4.15	1.35	0.30	1.88	1.12	3.05	1.54	32.09	2.14		
23	13.01	2.41	6.80	1.45	0.28	2.03	1.29	3.30	1.53	32.09	2.14		
24	11.83	2.73	7.50	1.48	0.28	2.07	1.33	3.36	1.53	32.10	2.14		
25	14.02	1.33	6.33	1.41	0.23	2.13	1.36	3.58	1.69	32.09	2.14		
26	14.42	1.35	5.59	1.25	0.23	2.10	1.49	3.64	1.74	31.81	2.12		
27	16.10	1.43	2.92	1.14	0.18	2.08	1.62	3.52	1.82	30.81	2.05		
28	15.07	1.25	2.63	0.94	0.16	1.79	1.43	3.09	1.59	27.94	1.86		
29	5.84	3.42	6.11	0.49	0.29	1.17	1.59	2.69	1.90	23.50	1.96		
30	8.04	2.28	4.53	0.94	0.14	1.74	1.38	3.02	1.42	23.50	1.96		
31	7.80	1.82	4.03	1.31	0.07	2.27	1.40	3.53	1.27	23.50	1.96		
32	7.80	1.82	4.03	1.31	0.07	2.27	1.40	3.53	1.27	23.50	1.96		
33	7.80	1.82	4.03	1.31	0.07	2.27	1.40	3.53	1.27	23.50	1.96		
34	7.80	1.82	4.03	1.31	0.07	2.27	1.40	3.53	1.27	23.50	1.96		
35	7.80	1.82	4.03	1.31	0.07	2.27	1.40	3.53	1.27	23.50	1.96		
36	8.04	1.41	3.99	1.54	0.10	2.69	1.39	2.96	1.37	23.50	1.96		
37	8.19	1.13	3.96	1.70	0.13	2.98	1.39	2.57	1.44	23.50	1.96		

YEAR	COAL						OB			SR
	Combined	Section 1	Section 2	Section 3	Combined	Section 1	Section 2	Section 3		
1	2.80	1.50	0.80	0.50	7.39	4.10	2.28	1.00	2.64	
2	4.50	2.00	1.50	1.00	10.89	5.49	3.40	2.00	2.42	
3	8.00	4.00	2.50	1.50	15.37	7.05	5.32	3.00	1.92	
4	11.00	5.00	3.00	3.00	17.57	7.04	6.03	4.50	1.60	
5	13.00	5.00	4.00	4.00	19.16	7.03	7.14	5.00	1.47	
6	15.00	5.00	5.00	5.00	21.32	7.02	8.30	6.00	1.42	
7	15.00	5.00	5.00	5.00	21.30	7.00	8.30	6.00	1.42	
8	15.00	5.00	5.00	5.00	21.41	7.01	8.40	6.00	1.43	
9	15.00	5.00	5.00	5.00	20.62	6.02	8.60	6.00	1.37	
10	15.00	4.43	5.00	5.57	21.31	3.21	8.60	9.50	1.42	
11	15.00	8.00	7.00	7.00	22.10		8.60	13.50	1.47	
12	15.00	8.00	7.00	7.00	23.11		8.60	14.50	1.54	
13	15.00	8.00	7.00	7.00	25.67		8.60	17.06	1.71	
14	15.00	8.00	7.00	7.00	28.83		8.60	20.24	1.92	
15	15.00	8.00	7.00	7.00	32.10		8.60	23.50	2.14	
16	15.00	8.00	7.00	7.00	32.60		8.60	24.00	2.17	
17	15.00	8.00	7.00	7.00	32.60		8.60	24.00	2.17	
18	15.00	8.00	7.00	7.00	32.60		8.60	24.00	2.17	
19	15.00	8.00	7.00	7.00	32.60		8.60	24.00	2.17	
20	15.00	8.00	7.00	7.00	32.09		8.60	23.50	2.14	
21	15.00	7.00	8.00	8.00	32.09		8.60	23.50	2.14	
22	15.00	7.00	8.00	8.00	32.09		8.60	23.50	2.14	
23	15.00	7.00	8.00	8.00	32.09		8.60	23.50	2.14	
24	15.00	7.00	8.00	8.00	32.10		8.60	23.50	2.14	
25	15.00	7.00	8.00	8.00	32.09		8.60	23.50	2.14	
26	15.00	6.00	9.00	9.00	31.81		8.30	23.50	2.12	
27	15.00	6.00	9.00	9.00	30.81		7.30	23.50	2.05	
28	15.00	4.82	10.18	27.94		4.44		23.50	1.86	
29	12.00		12.00	23.50				23.50	1.96	
30	12.00		12.00	23.50				23.50	1.96	
31	12.00		12.00	23.50				23.50	1.96	
32	12.00		12.00	23.50				23.50	1.96	
33	12.00		12.00	23.50				23.50	1.96	
34	12.00		12.00	23.50				23.50	1.96	
35	12.00		12.00	23.50				23.50	1.96	
36	12.00		12.00	23.50				23.50	1.96	
37	12.00		12.00	23.50				23.50	1.96	
38	12.00		12.00	22.27				17.85	1.79	
39	10.00		10.00	13.84				8.25	1.65	
40	8.00		8.00							
41	5.00									
TOTAL	527.30	41.93	168.63	316.75	995.34	60.97	215.38	718.99	1.89	

38	6.96	1.13	3.96	1.70	0.13	2.98	1.39	2.57	1.44	22.27	1.86
39	5.10	0.94	3.30	1.41	0.11	2.48	1.16	2.14	1.20	17.85	1.79
40	3.64	0.75	2.64	1.13	0.08	1.99	0.93	1.72	0.96	13.84	1.73
41	1.88	0.47	1.65	0.71	0.05	1.24	0.58	1.07	0.60	8.25	1.65
TOTAL	411.04	50.46	137.73	58.19	15.44	73.68	52.41	129.44	66.96	995.34	1.89

7.3 Type and Size of Main Mining Equipment

Loading and transportation of coal and OB, blast hole drilling and face preparation have been proposed to be carried out by deploying heavy earth moving machine (shovel – dumper/Surface Miner-FE Loader - Dumper combination).. Elec. Hyd shovels 20-22 cum have been provided for Top OB and other big/ consistent partings. Due to multiple seam /parting scenario and inconsistent load, electric hydraulic shovels of smaller sizes of (5-6 Cum) for Coal and (10-12 Cum) for parting have been provided for other partings to ensure flexibility of operation. Coal winning is proposed to be carried out largely using Surface Miner – FE Loader-Dumper combination and partly using shovel – dumper combination.

Equipment Schedule:

Particulars	Capacity / Year	1	2	3	4	5	6	Max. beyond Target year
Coal								
Elec Hyd. Shovel	5.5-6.5 cum	1	1	1	1	1	1	1
Surface Miner	SM 3800-4200		1	2	3	4	4	4
Diesel RBH Drill	160mm	2	2	2	2	2	2	2
Rear Dumpers	60T	5	9	16	22	26	30	44
FE Loader	5-7 Cum		2	4	5	7	7	7
Dozer with ripper attachment	410 HP	1	1	1	1	2	2	2
Dozer	410 HP	1	1	1	1	1	1	2
OB								
Elec Hyd Shovel	20-22 cum							2
Elec Hyd Shovel	10-12 cum	3	3	5	5	6	6	7
Rear Dumpers	190T							13
Rear Dumpers	100T	17	25	36	41	45	48	48
Electric RBH Drill	250 mm							5
Diesel RBH Drill	160mm	5	5	8	8	9	9	10
Dozer	410 HP	4	4	6	6	7	7	7
Dozer	750-850HP	1	1	1	1	1	1	3
Common								
Diesel Hyd. Backhoe	4.3-5 cum	1	1	1	1	1	1	1
Diesel Hyd. Shovel	3.2-3.5 cum	1	1	1	1	1	1	1
Grader	500 HP	2	3	3	3	3	3	3
AT crane	80T-100T							1
RT crane	40T	1	1	2	2	2	2	2
RT crane	20T	1	1	2	2	2	2	2
Mobile Crane	8-14T	2	2	2	2	2	2	2
FE Loader	5-7 Cum.	1	1	2	2	2	2	2
Water Sprinkler	70 KL	1	2	2	2	2	2	2
Water Sprinkler Mist Spray	28KL	2	2	2	2	2	2	2
Wheel Dozer	460 HP	2	2	2	2	2	2	2
Dump Trucks	12-15 T	5	6	6	6	6	6	6

Particulars	Capacity / Year	1	2	3	4	5	6	Max. beyond Target year
Diesel Browser	16KL	1	1	2	2	2	2	2
Fire Tender		1	2	2	2	2	2	2
Hyd. Rock Breaker		1	1	1	1	1	1	1
Cable Handler		2	2	2	2	2	2	2
Tyre Handler	35kN	2	2	2	2	2	2	2
Reclamation								
FE Loader	5-7 cum		1	1	1	1	1	1
Dozer	410 HP		1	1	1	1	1	1
Grader	280 HP		1	1	1	1	1	1
Water Sprinkler	70KL		1	1	1	1	1	1
Water Sprinkler Mist Spray	28KL		1	1	1	1	1	1
Dumper	60T		2	3	3	3	3	3

7.4 Drilling & Blasting Operation:

Salient Physico-Mechanical Features of OB Rock and coal

Overburden rocks consist of medium grained sandstone to coarse grained sandstone. Assumed category of rock is 50% of CAT-3 + 50% of CAT-4.

Type and capacity of drills

The blasthole drills of 250/160mm diameter drills for OB/ partings and coal benches has been envisaged.

Elements of Drilling and Blasting:

Drilling of coal & OB benches is recommended to be done vertically at 90°. 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. Mine shall create proper explosive storage capacity to cater daily explosive requirement to meet the annual coal target.

The blasthole pattern (along with Burden & Spacing) will depend on actual site condition. Special precaution needs to be taken during drilling and blasting so that formation of boulders and/ or mixing of coal with OB is avoided.

Operating conditions of the drills

Provision for secondary blasting should be kept to a minimum. Proper blasthole design of the OB and coal bench will reduce the necessity of secondary blasting. The burden and spacing of each bench should be designed in such a manner that it should produce the necessary fragmentation with due consideration to safety of men and machine. The actual blast-hole design should be done only after conducting field trials and controlled blasting should be practised.

✓ A dolerite dyke having roughly 1.76km length has been encountered in the northern part of the property. Additional precaution for drilling and blasting needs to be taken to negotiate the same.

SANJEEV KUMAR
 CHANDRAGUPTA OPENCAST PROJECT
 CCL, ANAPALI-CHANDRAGUPTA AREA
 MANAGER

CHAPTER-VIII

COAL QUALITY

8.1 INTRODUCTION

There are standard co-relatable coal seams of Barakar formation occurring in Pachra Integrated OC. Seam I Bot, II Top, II Bot, III Top, III Com, III Bot, IV Top, IV A and IVB

8.2 QUALITY ANALYSIS

Presence of in seam band seam wise (Numbers and thickness of each band, total band thickness).

The average in band quality of different seams has been summarised below:

Table 8.1 – In Band Seam Quality – PIT-1

Average Quality Parameters				Seam/ Parting	
Ash%	Moisture%	VM%	CV(Kcal/kg)	Grade	
29.97	11.69	33.03	4092.27	G11	IVB
39.14	6.49	21.46	3928.62	G12	IVA
30.68	8.20	22.36	4508.93	G10	IV
31.22	8.91	22.67	4317.97	G10	III Top
34.33	7.90	23.0	4197.56	G11	III Comb.
33.94	7.03	22.27	4331.68	G10	
31.92	7.44	22.98	4415.67	G10	II Top
40.43	5.75	21.73	3919.62	G12	II Bottom
42.47	5.39	22.93	3962.74	G12	I Top
42.58	5.20	22.20	3798.62	G12	I Bottom

Table 8.2 – In Band Seam Quality – PIT-2

Average Quality Parameters				Seam/ Parting	
Ash%	Moisture%	VM%	CV(Kcal/kg)	Grade	
33.61	11.69	28.73	4055.33	G11	IVB
40.67	6.49	21.20	4006.37	G11	IVA
30.68	8.20	23.10	3775.54	G12	IV
31.22	8.91	22.89	4280.62	G11	III Top
34.33	7.90	22.75	4222.58	G11	III Comb.
33.94	7.03	22.35	4270.82	G12	
31.92	7.44	22.73	4379.92	G10	II Top
40.43	5.75	21.56	4538.41	G10	II Bottom
42.47	5.39	22.4	3766.06	G12	I Top
42.58	5.20	21.95	4055.33	G11	I Bottom

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Table 8.3 – In Band Seam Quality – PIT-3

Average Quality Parameters				Seam/ Parting	
Ash%	Moisture%	VM%	CV(Kcal/kg)	Grade	
36.75	6.72	22.69	4132.11	G11	IVB
41.24	5.78	20.29	3844.33	G12	IVA
32.18	5.40	23.10	4735.52	G9	IV
33.85	5.06	22.83	4633.32	G9	III Top
36.54	4.17	22.27	4487.52	G10	III Comb.
38.17	4.37	21.98	4339.39	G10	III Bottom
38.91	4.30	22.81	4230.58	G11	II Top
44.44	3.71	21.09	3829.03	G12	II Bottom
41.52	3.17	22.72	4181.97	G11	I Top
45.32	2.74	21.52	3909.07	G12	I Bottom

8.3 PROJECTED COAL QUALITY

The overall grade of the product mix of project will be 'G11'.

Table 8.4 – Year wise quality

Year	Ash%	Moisture%	VM%	CV (Kcal/kg)
Y1	39.73	4.93	22.39	4167
Y2	39.65	4.89	22.35	4149
Y3	39.53	5.10	22.36	4113
Y4	39.45	5.12	22.36	4113
Y5	39.40	5.12	22.36	4124
Y6	39.42	5.04	22.34	4130
Y7	39.54	5.00	22.34	4126
Y8	39.57	5.01	22.35	4119
Y9	39.53	5.07	22.35	4103
Y10	39.57	5.00	22.34	4108
Y11	39.41	4.79	22.27	4118
Y12	39.47	4.80	22.27	4105
Y13	39.43	4.83	22.27	4095
Y14	39.42	4.84	22.30	4093
Y15	39.38	4.82	22.30	4097
Y16	39.34	4.79	22.29	4106
Y17	39.30	4.80	22.28	4115
Y18	39.18	4.82	22.27	4122
Y19	39.22	4.81	22.27	4118
Y20	39.35	4.78	22.29	4107
Y21	39.53	4.65	22.28	4116
Y22	39.53	4.65	22.28	4116

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Year	Ash%	Moisture%	VM%	CV (Kcal/kg)
Y23	39.47	4.66	22.26	4125
Y24	39.43	4.68	22.26	4126
Y25	39.46	4.66	22.29	4127
Y26	39.67	4.52	22.27	4134
Y27	39.69	4.52	22.26	4130
Y28	39.91	4.36	22.24	4141
Y29	40.76	3.75	22.16	4174
Y30	40.76	3.75	22.16	4174
Y31	40.76	3.75	22.16	4174
Y32	40.76	3.75	22.16	4174
Y33	40.76	3.75	22.16	4174
Y34	40.76	3.75	22.16	4174
Y35	40.76	3.75	22.16	4174
Y36	40.76	3.75	22.16	4174
Y37	40.76	3.75	22.16	4174
Y38	40.76	3.75	22.16	4174
Y39	40.76	3.75	22.16	4174
Y40	40.76	3.75	22.16	4174
Y41	40.76	3.75	22.16	4174
TOTAL	39.82	4.52	22.26	4132.55

Although coal seam, overburden / interburden will be worked separately having separate benches, yet, there is a chance of deterioration in quality of coal due to admixtures from roof and floor of the seam and by the inclusion of bands (<1m) within the seam. It is envisaged that the roof of the seam is properly cleaned before blasting. A proper organization and strict quality control measures are necessary to maintain the quality of coal at faces with all precautions for quality control to reduce contamination at each contact point of coal & OB or parting.

As evident from above table the average product Mix quality of seams for all pits shall be G11 with average GCV range of 4000 - 4300 Kcal /kg.

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CHAPTER-IX

PUMPING AND DRAINAGE

9.1 INTRODUCTION

The pumping system of Chandragupt OCP of CCL has been designed to dewater the inflow of water due to precipitation within the active pit limit during the monsoon and non-monsoon season and the ground water discharged from aquifers to enable the mining activity to continue round the year. The planning of dewatering the mine has been done in such a way that the working faces and haul roads will remain dry as far as possible. The layout of the quarry provides suitable gradient along the quarry floors and the benches to facilitate self drainage of water to the sump at the lowest level of the quarry.

9.2 SOURCE OF WATER

The intake of rainwater to the opencast mine is non-uniform during the year. The maximum rainwater intake will be during the period of about four months (middle of June to middle of October) in a year. During dry season, seepage from strata is expected to be moderate and the same can be dealt by running required number of pumps provided for pumping during monsoon. During this period, repair & overhauling of the pumps will be done by rotation.

It is proposed to make garland drains around the quarries and divert the surface water including rainwater from catchments area to nearby natural course of water / nallah.

The capacity of main pumps is selected to pump out the expected make of water accumulated in the mine due to maximum rainfall in a day.

During the heavy monsoon period, the work in lower most benches may have to be stopped as it has been proposed to use a part of the lower most benches as sump.

Water accumulated in the sump will be pumped out to the surface and discharged into the nallah flowing outside the quarry. It is proposed to create a sedimentation lagoon by constructing a series of check dams across the nallah. The lagoon will help to separate the suspended solids from the mine water.

Water overflowing the check dams would join near-by Barki River.

SURFACE DRAINAGE AND FLOOD PROTECTION

All the smaller natural channels of water and nallah, finally join the Barki river form the group representing the surface water resources in the region. A suitable garland drain is proposed to arrest the rainwater entering into the mine.

9.4 THE SURFACE DRAINAGE AND FLOOD PROTECTION SYSTEM FOR THE MINE WILL INCLUDE

- Diversion of water courses to other water courses away from the mining area.
- Diversion dams/ bunding arrangement as part of water course diversions to prevent water entering the mining area.
- Cross drainage structures where the haul road and other access roads cross diversions.
- Various inlet, outlet and erosion protection structures.

9.5 IN-PIT DRAINAGE WORK

During the rainy season, water will be allowed to accumulate in the sump on the floor of lower most Seam of the quarry. Sumps are provided for the dewatering pumps which will transfer in-pit water for controlled discharge off the site. The planning of dewatering the mine shall be done in such a way that the working faces and haul roads in the quarry shall remain dry as far as possible. The layout of the quarry provides suitable gradient along the quarry floors and the benches to facilitate self drainage of water to the sump at the lowest level of the quarry.

Water accumulated in the mine sump will be pumped out to the surface and finally discharged into the near- by Barki river.

9.6 GENERAL CONSIDERATIONS

9.6.1 The pumping requirement has been calculated on the basis of the following general considerations:-

- The geographical location of the Project.
- Meteorological data from the area / nearest rain-gauge station concerning rainfalls.
- Life of the mine and percentage probability of maximum rainfall in one day during the life of the mine.
- General climatic conditions, Surface features of the terrain beyond the boundary of the mine / opencast working.
- Catchments area: Mined out areas and areas beyond excavation, and dumped / spoil dump area.
- Run-off characteristics of the area.
- Depth of the quarries at different stages.
- Inflow to the quarry of UG water & seepage from nearby nallah/ river.


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- Desired location at the surface where the quarry water can be discharged, considering the Surface drainage system.
- Maximum number of days to pump out the accumulated water in the quarry during peak rainfall in monsoon and the number of pumping operation hours per day-5 days @ 20 hours per day
- Geological characteristics of OB and coal seams.
- Desired location at surface where quarry water can be discharged considering the surface drainage system.
- Effective working hours – 20 hours/day for pumping calculation, but in monsoon period pumping may be done round the clock.

9.6.2 BASIC DATA

The following data has been taken into consideration for arriving at the volume of water accumulating in the quarry and the size of the pumps:-

Table-10.1: Basic data for Quarry Pumping

(a)	Maximum depth of the proposed mine	:	PIT1-90m, PIT2-165m, PIT3-220m
(b)	Probable maximum rainfall in a day in monsoon period from the probability curve	:	150mm
(c)	Depth and Catch-ment area stage wise	:	Given in the stage wise calculation of water volume.
(d)	Run-off Co-efficient considered	:	i) For mined out area = 0.5
		:	ii) For internal dump area = 0.10
		:	iii) For area beyond excavation = 0.10
(e)	Inflow of water to the quarry due to seepage and underground precipitation	:	10% of probable water accumulation due to nearby Barki river.
(f)	The rainfall data has been adopted as recorded.	:	IMD Hazaribagh

9.7

ASSEMENT OF MAXIMUM RAINFALL IN A DAY

This has been drawn from the probability curve of rain-fall data received from IMD Hazaribagh, for last 10 years. The calculation has been done taking into consideration the entire area of the quarry of the proposed mine for its entire years of operational life. The probable maximum daily rainfall has been taken as 150mm for calculation purpose.

9.7.1 CALCULATIONS AND ASSESSMENT OF VOLUME OF WATER TO BE PUMPED

The calculation has been done taking into consideration the entire area of the quarry of the proposed mine. Pumping system has been designed for the volume of water accumulated in the mine at the final stage of production considering probable maximum daily rainfall as 150mm. Pumping capacity worked out as under (considering water to be pumped out in 100 hrs @ 20 hrs pumping per day). The volume of maximum precipitation of water in the mine taking 10% for seepage and underground precipitation due to nearby Barki river on the day of maximum rainfall has been as under:

Table-9.2: Calculation of Volume of water

PIT-1

At the end of year	Catchment's area in Sq. km				Depth of mine (m)	Max. ^m probable rainfall in a day (mm)	Volume of water ('000 Cum/day)
	Total quarry area	Mined-out area	Internal dump area	Area beyond excavation			
5 th	0.87150	0.83	0.500	0.04150	58	150	36.160
10 th	2.2470	2.14	1.950	0.1070	90	150	49.616

PIT-2

At the end of year	Catchment's area in Sq. km				Depth of mine (m)	Max. ^m probable rainfall in a day (mm)	Volume of water ('000 Cum/day)
	Total quarry area	Mined-out area	Internal dump area	Area beyond excavation			
6 th	1.0710	1.02	0.800	0.0510	50	150	32.192
13 th	2.7825	2.65	1.200	0.1325	80	150	141.611
18 th	3.0975	2.95	1.420	0.1475	95	150	152.089
23 rd	3.8640	3.68	2.340	0.1840	130	150	152.196
28 th	4.5675	4.35	3.110	0.2175	165	150	157.204

PIT-3

At the end of year	Catchment's area in Sq. km				Depth of mine (m)	Max. ^m probable rainfall in a day (mm)	Volume of water ('000 Cum/day)
	Total quarry area	Mined-out area	Internal dump area	Area beyond excavation			
6 th	0.5565	0.53	0.310	0.0265	60	150	23.702
13 th	1.5750	1.50	0.510	0.0750	80	150	91.328
18 th	2.1420	2.04	1.150	0.1020	95	150	94.083
23 rd	3.2550	3.10	2.300	0.1550	90	150	106.508

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28 th	4.3470	4.14	3.100	0.2070	125	150	139.706
33 rd	4.4100	4.20	4.000	0.2100	150	150	85.965
38 th	5.4600	5.20	4.600	0.2600	180	150	129.690
41 st	6.6150	6.30	5.300	0.3150	220	150	175.148

9.9 PUMPING CAPACITY

PUMPING CAPACITY REQUIRED :

Probable water accumulation on the day of maximum rainfall taking 10% for seepage and underground precipitation:-

PIT-1

5th Year = 36160 Cum., Pumping capacity/hr = 362 cum/hr (100 lps)

10th Year = 49616 Cum., Pumping capacity/hr = 496 cum/hr (137 lps)

PIT-2

6th Year = 32192 Cum., Pumping capacity/hr = 322 cum/hr (89 lps)

13th Year = 141611 Cum., Pumping capacity/hr = 1416 cum/hr (392 lps)

18th Year = 152089 Cum., Pumping capacity/hr = 1521 cum/hr (421 lps)

23rd Year = 152196 Cum., Pumping capacity/hr = 1522 cum/hr (422 lps)

28th Year = 157204 Cum., Pumping capacity/hr = 1572 cum/hr (435 lps)

PIT-3

6th Year = 23702 Cum., Pumping capacity/hr = 237 cum/hr (66 lps)

13th Year = 91328 Cum., Pumping capacity/hr = 913 cum/hr (253 lps)

18th Year = 94083 Cum., Pumping capacity/hr = 941 cum/hr (261 lps)

23rd Year = 106508 Cum., Pumping capacity/hr = 1065 cum/hr (295 lps)

28th Year = 139705 Cum., Pumping capacity/hr = 1397 cum/hr (387 lps)

33rd Year = 85965 Cum., Pumping capacity/hr = 860 cum/hr (238 lps)

38th Year = 129690 Cum., Pumping capacity/hr = 1297 cum/hr (359 lps)

41st Year = 175147 Cum., Pumping capacity/hr = 1751 cum/hr (485 lps)

9.10 SELECTION OF PUMPS AND DELIVERY RANGES:

On the basis of the calculation and providing standby pumping capacity, the pumps have been provided for the quarry as under:-

PIT-1

a) PUMPS:-

Main Pumps

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Three nos. of 120 lps x 130 m head pumps have been provided for the quarry. Out of three pumps, two will be working & one standby.

Low Head Pumps

Two nos. of 38 lps x 60 m head pumps have been provided during initial mining operation. Out of two pumps, one pump has been kept as standby.

Face Pumps and Slurry Pumps

Two nos. of Face Pumps of 15 lps x 60 m head and two nos of Slurry Pumps of 22 lps x 45 m head capacities have been provided to pump out the water & slurry respectively accumulated near the working faces of the quarry. Out of these pumps, one pump each has been kept as standby.

Diesel Pump

One number of 80 lps x 130 m head diesel pump has been provided for emergency requirement of the quarry.

PIT-2

a) PUMPS:-

Main Pumps

Five nos. of 120 lps x 220 m head pumps have been provided for the quarry. Out of five pumps, four will be working & one standby.

Low Head Pumps

Three nos of 120 lps x 130 m head and three nos. of 38 lps x 60 m head pumps have been provided during initial mining operation. All the three pumps of 120 lps x 130 m head will be working. Out of three pumps of 38 lps x 60 m head, two will be working & one has been kept as standby.

Face Pumps and Slurry Pumps

Four nos. of Face Pumps of 15 lps x 60 m head and four nos of Slurry Pumps of 22 lps x 45 m head capacities have been provided to pump out the water & slurry respectively accumulated near the working faces of the quarry. Out of these pumps, one pump each has been kept as standby. One pump each of Face & Slurry pump will come to PIT-2 after their utility is over in PIT-1.

Diesel Pump

One number of 80 LPS x 220 m head diesel pump has been provided for emergency requirement of the quarry.

PIT-3

a) PUMPS:-

Main Pumps

Five nos. each of 120 lps x 260 m head and 120 lps x 180 m head pumps have been provided for the quarry. Out of these each five pumps, four will be working & one standby.

Low Head Pumps

Four nos of 120 lps x 130 m head and three nos. of 38 lps x 60 m head pumps have been provided during initial mining operation. Out of these pumps, one pump each has been kept as standby.

Face Pumps and Slurry Pumps

Five nos of Face Pumps of 15 lps x 60 m head and five nos of Slurry Pumps of 22 lps x 45 m head capacities have been provided to pump out the water & slurry respectively accumulated near the working faces of the quarry. Out of these pumps, one pump each has been kept as standby. One pump each of Face & Slurry pump will come to PIT-3 after their utility is over in PIT-1. Two pumps each of Face & Slurry pump will come to PIT-3 after their utility is over in PIT-2.

Diesel Pump

One number of each 80 lps x 260 m and 80 lps x 130 m head diesel pump has been provided for emergency requirement of the quarry. One number of 80 lps x 130 m head diesel pump will come to PIT-3 after its utility is over in PIT-1.

b) SELECTION OF DELIVERY RANGES

The delivery ranges have been selected on the basis of the pumping capacity during probable maximum rainfall and velocity of flow within the reasonable limit. The delivery ranges for different capacity of pumps have been selected for nominal diameters as 250mm, 200mm, 150mm and 100mm for the pumps as per manufacturer's standard.


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CHAPTER-X

COAL HANDLING & DESPATCH ARRANGEMENTS

10.1 INTRODUCTION

The Project report for Chandragupt OCP has been prepared for the production of 15.0 Mty of ROM coal. The total production of coal has been proposed from three sections, namely Section-1, 2 & 3. The coal production have proposed through surface miner as well as shovel dumper. A Coal handling plant has been proposed at surface near quarry mouth to cater entire production either through surface miner or shovel dumper. Accordingly facilities of receiving, crushing, storage & loading /conveying arrangement has been envisaged. Crushing facility has been envisaged to cater the entire production of ROM coal through Shovel - Dumper.

10.2 DESIGN PARAMETERS

10.2.1 BASIC DATA

The following parameters has been considered while designing & planning of different units of coal handling plant:

Sl. No	Particulars	Considered Summarised Data
(a)	Coal production of mine	15.0 Mty
(a)	Coal Handling Plant Capacity	15.0 Mty
(b)	Number of working days/year	30
(c)	Number of working shift/day	3 (8 hrs. each)
(d)	Number of effective working hours/day	15
(e)	Type of unloading dumper at receiving pit of CHP	Rear Discharge Dumper
(f)	Feed size of ROM. coal (in mm)	1200 mm from shovel dumper & (-)100 mm through Surface miner.
(g)	Despatch size (in mm)	(-) 100 mm
(h)	Type of loading	i) By belt conveyors to Silo & RLS into wagons.
(i)	Loading hours	Round the clock.
(j)	Average Grade of coal	Power grade
(k)	H.G.I.	40-60
(l)	Consumer	Power station.
(m)	Mode of Despatch	By conveyer & RLS


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10.2.2 CHP WORKING SCHEDULE

The coal handling plant will be working in three shifts per day and seven days a week basis with its all units like receiving of ROM coal, conveying, storage in ground bunker, reclamation and load out system through belt conveyers & RLS.

10.2.3 SYSTEM CAPACITY

The handling capacity of the CHP has been planned to match with the production capacity of the mine. Ten nos. of receiving hoppers have been envisaged to receive coal produced through surface miners. Coal produced through surface miners (about 75-80%) will be brought at surface by rear discharge and unloaded in to receiving hoppers. Total ten nos. (2x5 hoppers) have been provided to receive surface miner coal (-100 mm). Each truck receiving hoppers have been provided with electromagnetic vibrating feeder to reclaim coal at under width conveyors. Two nos. of conveyors each having nominal capacity 2000tph and 1600 mm width have been provided under set of 5 nos. of hoppers. Out of five nos. of hopper in each series only four will be operative.

Coal produced through blasting will about 20-25%. As such one no. of sizer having nominal capacity of 1500 TPH have been envisaged for receiving, crushing in two stages and conveying of coal up to bunkers through belt conveyors.

The coal will be stored in two nos. of bunkers at surface. This has been selected to meet any fluctuations of coal output from the mine or due to irregularities of despatch / transport system and seasonal fluctuations. For coal produced through surface miner the nominal system capacity has been selected as 2000 tph for each stream. One stream of nominal capacity 1500 tph has been proposed for coal receiving, crushing conveying for coal produced through shovel dumpers. The nominal capacity of each reclaim or loading conveyors from ground bunker to Silo have been kept 1800 tph. For key plan of proposed coal handling system, please refer drawing.

10.2.4 SALIENT FEATURES

The following factors have been considered in finalising the location and system of proposed Coal handling System:

- Mine boundary, surface, flak and quarry floor
- Mine entry
- Conveying and Loading / feed arrangement
- Topography
- Availability of space
- Receiving arrangements (size of coal and type of dumpers)
- Crushing facility for part of coal produced from shovel dumpers


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- Power supply and distribution network
- Miscellaneous facilities like dust control system, fire fighting and ventilation system. Plant cleaning and infrastructure for preventive maintenance are also envisaged.
- Necessary Electrical, interlocking, signalling and communication facilities.

10.2.5 SYSTEM DESCRIPTION

The CHP will have the following functional units as shown in the key plan of CHP. Receiving Pits for ROM shovel dumpers & surface miner coal, Sizers & belt conveyors

- Ground storage bunkers & Reclamation
- Conveying up to railway siding through belt conveyors.
- Loading of coal through Silo & RLS.
- Loading of sized /Crushed coal (-100mm) through Silo & RLS
- Dust control system
- Dust suppression system
- Noise control system
- Fire Protection system
- Plant cleaning system
- Plant preventive maintenance
- Weighment

10.2.6 PLANT DESCRIPTION

10.2.6.1 Receiving and Crushing Arrangement

Entire ROM coal produced from mine /Project either through Shovel - Dumper combination or Surface miner (-100 mm coal) will be transported by dumpers at surface and discharged to respective receiving hoppers.

For shovel dumper, coal crushing system (at Receiving pit) near mouth of quarries has been provided. One no. of primary and subsequently one secondary sizer of suitable capacity (nominal 1500 tph capacity) has been envisaged for crushing of this coal. The coal will be crushed up to (-) 100 mm size in two stages by primary and secondary sizers. There is one independent stream for crushing of coal up to (-) 100 mm size having nominal capacity 1500 tph. ROM Coal from receiving hopper will be fed to primary sizer through apron feeder. The crushed coal from primary sizer (nominal capacity 1500 TPH each) will be collected by conveyors (1C3) and fed to secondary sizer (nominal capacity 1500 TPH each). The crushed coal from secondary sizer will be collected by conveyor (2C3) and fed to any tripper conveyors (3C3 or 3C4) respectively. This coal from tripper conveyors will spread and stored in ground bunker- 2 of 20,000 te Capacity.

Width and nominal capacity of all above conveyors (1C3& 2C3) in proposed CHP system will be 1600 mm and 1500 tph respectively.

For coal produced through surface miner (-100 mm size): Ten nos. of receiving hoppers have been envisaged at receiving pit near quarries mouth to receive coal produced through surface miners. Coal produced through surface miners (About 10.5 MTY) will be brought at surface by rear discharge and unloaded in to receiving hoppers. Total ten nos. (2x5 hoppers) have been provided to receive surface miner coal (-100 mm). Each truck receiving hoppers have been provided with electromagnetic vibrating feeder to reclaim coal at under width conveyors. Two nos. of conveyors each having nominal capacity 2000 tph and 1600 mm width have been provided under hoppers. Each conveyors will cater set of 5 nos. of hoppers. Out of five nos. of hopper fitted with Vibrating feeders in each series only four will be operative at a time. The surface miner coal from receiving hoppers will be collected by either of conveyors (1C1 & 1C2) and fed to any conveyor (2C1 & 2C2). Coal from conveyors (2C1 & 2C2) will be fed to tripper conveyors (3C1 or 3C2) respectively. This coal from tripper conveyors will spread and stored in ground bunker- 1 of 20,000 te Capacity.

Width and nominal capacity of all above conveyors (1C1 & 1C2 /2C1 & 2C2/3C1 & 3C2) in proposed CHP system will be 1600 mm and 2000 tph respectively. Key plan and Coal flow arrangement of the proposed coal handling system has been shown in drawing.

10.2.6.2 Storage Bunker and Reclamation system

The crushed coal received through crushing system will be fed to respective tripper conveyors as stated above. The coal from the tripper conveyors (3C1-3C2 & 3C3-3C4) will uniformly discharge coal from one end of the bunker to other end with the help of trippers & cascading chute. This ground bunkers (above ground) have been provided for total storage facility of 40,000 te capacity (2x20000 te) to meet the requirement of fluctuation of coal production. The bunker shall be designed & constructed in a manner so that minimum sloping angle of 55 deg. to the horizontal may be achieved and it will have two slits type opening (in each bunker) for plough feeder at the bottom for reclamation of coal. Below the bunker slits opening reclaim conveyors are provided to collect coal reclaimed through plough feeders. The nominal capacity of the each reclaim conveyors (4C1 - 4C2 & 4C3 - 4C4) and plough feeders shall be of 1800 tph and width 1600 mm. Each bunker have been provided with four nos. of plough feeders out which two will be working at a time in each bunker.

Reclaim conveyors (4C1 - 4C2 & 4C3 - 4C4) shall feed coal to (5C1 - 5C2 & 5C3 - 5C4) belt conveyors which shall finally feed to 4000te to 2 no silos.

Width and nominal capacity of all above reclaim conveyors in proposed CHP system will be 1600 mm and 1800 tph respectively.

Width and nominal capacity of all above reclaim conveyors in proposed CHP system will be 1600 mm and 1500 tph respectively.

10.2.6.3 Load out and despatch system

Following facilities have been envisaged for conveying, loading despatch of coal from the proposed CHP. The total nominal rated coal production of the Project will be 15.0 Mty.

Sized coal (-) 100 mm stored in bunkers of CHP will be reclaimed through 4 nos. of plough feeders (2 nos. in each bunker). The respective pair of reclaim conveyors fitted below each bunkers will receive sized raw coal from bunkers. Coal reclaimed through plough feeders will be collected by any reclaim conveyors (4C1-4C2 & 4C3-4C4) as per system requirement. Reclaim conveyors (4C1 - 4C2 & 4C3 - 4C4) shall feed coal to (5C1 - 5C2 & 5C3 - 5C4) belt conveyors which shall finally feed to 4000te size to 2 no silos.

Width and nominal capacity of each reclaim conveyor will be 1600 mm and 1800 tph respectively.

Two nos. Silo having capacity of 4000te each have been envisaged on the proposed Chandragupt (Amrapali) railway siding for loading and despatch of coal. Coal from Silo will be loaded into railway wagons through Rapid load out system (capacity 6500 tph) for final despatch of coal to the desired customers.

10.2.6.4 Dust Control System

The Dust control system envisages both dust extraction as well as dust suppression system.

10.2.6.5 Dust Suppression System

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

10.2.6.6 Noise Control

Noise pollution causes fatigue to operating personals. Provision will therefore be made to keep down the noise level to the extent possible. All machine mountings will have in their foundations anti-vibration pads/sheets for reducing the vibration and thereby noise. All transfer chutes and hoppers shall have wear resistant rubber or ultra-high molecular weight plastic / synthetic liners of various thickness as per design requirement and their suitability.

10.2.6.7 Fire Fighting System

Necessary fire fighting system has also envisaged for the plant, which includes fire hydrant tees at strategic locations in sufficient quantity with suitable water supply pipe lines to cover the entire plant. Also portable type fire extinguishers to deal with electrical / oil / ordinary fires shall be provided at all strategic locations in the plant.

10.2.6.8 Plant cleaning system

To facilitate cleaning at strategic locations ample number of high pressure water serving points have been envisaged. These service points will be so located that entire working area in the plant or equipment working place can be reached. These service points will be provided with quick connecting hose couplings for easy fixing and dismantling of hoses.

To handle discharge from plant effluent and washing of the plant area, sump pumps of suitable design and capacities have also been envisaged where required. Plant effluent shall be discharged through open drain/ pipe.

10.2.6.9 Plant Preventive Maintenance

For effective maintenance of all the equipment, there will be sufficient working space around the equipment/machinery. All the equipment and conveyor discharge drums/transfer points, etc shall have covered and well ventilated housing complete with access stair ways, hand rails, platforms, cross-over ladders, etc as required.

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

10.2.6.10 Weighment

For the purpose of Weighment of coal handling and dispatched in the CHP, one belt weigher of suitable capacity have been provided in each receiving and despatch circuit of the CHP conveyors. Four nos. of road weigh bridges have also been provided for weighment of coal during initial years of mine operations.

Three nos. in motion rail weigh bridges have also been provided for weighment of empty and loaded rakes for dispatch of coal.

10.3 ELECTRICALS

The electrical system shall comprise:

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


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- Centralized welding circuit
- Earthing

10.4 DRAWINGS

A tentative key plan and coal flow of the proposed coal handling system has been given in the drawing.

10.5 RAILWAY SIDING

The proposed railway siding with MGR bulb facilities of adjacent Amrapali Project will be used for loading and dispatch of coal from the mine. The siding would take-off from Manatu station (Near Shivpur) of the proposed Arterial (Tori-Shivpur) line. The approximate distance of the proposed alignment taking off from Manatu station of main Arterial to railway siding of the Amrapali OCP is about 14 Km for single link line and yard portion with MGR bulb. Considering the volume of coal to be despatched through rail, provision for double link line with necessary yard facilities have been envisaged in the proposed siding system. Necessary rail lines in the yard / MGR has been envisaged to accommodate three nos. Silo for loading of coal into railway wagons through RLS. The coal of Chandragupt mine may also be evacuated through this railway siding. As such additional lines in link as well as in yard portion may be required.

Provision has been made in the proposed siding to inter-link in MGR systems so that loading of rakes will be made by any silos & RLS to any consumer wagons for loading and despatching of coal from this project. As such additional rail lines in yard have been proposed to facilitate loading through any Silo simultaneously.

For the proposed production, coal from this Project will be loaded at Amrapali siding through Silo and RLS. Sufficient rail lines in yard and link portion at Amrapali siding has been envisaged to facilitate the loading operation. Provision has been envisaged that two loading chutes of RLS fitted below each silo will be placed on two different rail lines for loading of coal into rail wagons.


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CHAPTER -XI

WORKSHOP & STORE

11.1 INTRODUCTION

The project report for Chandragupt OCP has been prepared for a targeted production of 15.0 MTY. So a new unit workshop has been proposed.

This unit workshop will have two parts – Excavation and E&M workshop. Apart from this, Project store and other common facilities have been provided. A schematic layout plan of the workshop is shown in drawing No. R 3 E & M M 03005 for departmental option.

11.1.1 MAINTENANCE FACILITIES

This unit workshop is envisaged to cater the need of daily maintenance, scheduled maintenance, lubrication, routine inspection, minor/medium repair and replacement of parts/sub-assemblies of HEMM such as- Dumpers, Dozers, Shovels, and Drills etc.

Minor repair of assemblies and sub-assemblies of pumps, CHP, Electrical etc. deployed in the project will also be performed in this workshop. Planning of this unit workshop and project store has been done based on a routine maintenance and repair programme to achieve the high level equipment availability, reliability and longer life.

Maintenance and repair load of this unit workshop has been assessed on the basis of annual operating time, life of the equipment / assemblies/ sub-assemblies etc.

Space requirement for maintenance & repair activities, parking facilities of HEMM, washing of equipment, requirement of open and covered space/sheds etc. have also been worked out based on the number & size of HEMM to be deployed in this mine.

11.1.2 SCOPE OF WORK

This Unit workshop will have two parts- Excavation and E&M workshop. Apart from this, Project store and other common facilities like- canteen, fuelling station, washing station, security post, firefighting etc. have been provided.

Any major overhaul of equipment and manufacturing of spares on large scale are beyond the scope of this workshop. These works will be carried out in nearby Regional workshop or Central workshop, Barkakana.

11.1.3 EXCAVATION WORKSHOP

This part of unit workshop will have the facilities for attending to the scheduled maintenance, daily maintenance, minor/medium repair or replacement of parts/ sub-assemblies

of face and transport equipment such as dumpers, shovels, drills, dozers, cranes, grader and other miscellaneous equipment used for mining operation.

All dumpers and dozers coming to workshop for their daily as well as scheduled maintenance will be first washed at the washing stations provided in the workshop and then brought to the respective maintenance shops.

In Daily maintenance shop, the equipment will be checked for lubrication, tyre inflation, oil levels etc.

The equipment for scheduled preventive maintenance as per recommended schedule of the manufacturers will be directed to Schedule maintenance shop where their complete lubrication will be taken care of along with diagnosis of their technical state. After evaluation of the condition, they will be sent to the Dumper repair shop.

Maintenance and minor repair of Face equipment e.g. shovels & drills will be carried out at the site. The components/ assemblies requiring further repair will be dismantled from the machine and the dis-assembled components will be brought to workshop for new replacement. In case of major repair, these will be sent to central workshop.

11.1.4 E & M WORKSHOP

Considering the nature of repair and maintenance of E&M equipment, which is different from that of the HEMM, a separate E&M workshop has been provided.

This part of the workshop will have the facilities for scheduled maintenance, day-to-day maintenance and minor repair by parts / unit replacement method of all E&M equipment deployed in the project such as Pumps, D.G sets & electrical equipment, CHP etc.

11.2 PROPOSED FACILITIES

Broadly Excavation workshop will have the following functional shops: -

- i) Machine shop
- ii) Electrical repair shop
- iii) Engine repair shop
- iv) Assembly and sub-assembly repair shop
- v) Radiator repair shop
- vi) Welding & Structural shop
- vii) Dumper repair shop
- viii) Dumper Daily Maintenance shop
- ix) Schedule Maintenance (Inspection and lubrication) shop
- x) Dozer repair shop
- xi) Heavy repair shop


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- xii) Field Service equipment
- xiii) Washing Station
- xiv) Stores & common facilities

And E& M workshop will have the following functional shops: -

- i) Machine shop
- ii) Mechanical repair shop
- iii) Electrical repair shop
- iv) L.M.V repair shop
- v) Store

11.3 EXCAVATION WORKSHOP

i) **MACHINE SHOP**

This shop will have the necessary machine tools for restoration of worn-out parts and manufacture of small non-complicated spare parts, which are in short supply, and required for repair of HEMM.

ii) **ELECTRICAL REPAIR SHOP**

This shop will have the facilities for carrying out the minor and medium repairs of the electrical components of the mining equipment. The repair facilities have been limited to the parts replacement and repair of self-starter, Dynamo, Battery charging etc.

iii) **ENGINE REPAIR SHOP**

This shop will have facilities for minor and medium repair and adjustment of Diesel Engine fitted with all types of Dumpers, Dozers, and Scrapers etc. working in the mine.

iv) **ASSEMBLY AND SUB-ASSEMBLY REPAIR SHOP**

Assembly & sub-assembly shop will have the facilities for repairing the assembly and sub-assembly of motor transport equipment. Since most of the machine will be of similar make and model, they will be treated under unit replacement method. The repaired assemblies will be drawn from the shop and fitted to the equipment of same make and model.

v) **RADIATOR REPAIR SHOP**

This shop will carry out the repair and over-hauling of radiators. It is equipped with water tap for proper flushing and cleaning of radiators, testing stand and other repair tools and equipment.

vi) **WELDING & STRUCTURAL SHOP**


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This shop will take-up the welding of buckets of shovels and other jobs of dumpers etc. It will also under take other non-standard welding works.

vii) DUMPER REPAIR SHOP

This shop will cater to the need of repair/replacement of parts/components of the dumpers needing repair after their proper inspection & diagnosis of defects in the Schedule Maintenance shop.

The dumpers, which experience incidental problem in the field and require minor & medium repair will also be attended in this shop.

All dumpers coming for repair must be first washed at the washing station before entering this shop.

viii) DUMPER DAILY MAINTENANCE SHOP

Checking of water and oil levels, greasing of lubrication points, checking of air pressure of tyres, brake testing etc. will be performed in this shop.

ix) DUMPER SCHEDULE MAINTENANCE (LUBRICATION AND INSPECTION) SHOP

The schedule maintenance (lubrication and inspection) of the dumpers as per schedules recommended by the manufacturers will be done in this shop. For this purpose pressurized lubrication system has been provided.

x) DOZER REPAIR SHOP

This shop is meant for carrying out the maintenance and repairs of dozers. The repairs will be done mainly by the replacement of parts, unit and sub-assemblies.

xi) HEAVY REPAIR SHOP

This shop will deal with the medium repair/replacement of component and sub-assemblies of shovels, drills etc, which will be dismantled from the equipment working in the mine and brought to this shop.

xii) FIELD SERVICE EQUIPMENT

Mobile workshop van & Mobile service van have been provided for the maintenance and lubrication of the equipment at the site of their working.

xiii) WASHING STATION

High-pressure multi jet washing unit for dumper and high-pressure water & steam jet washing unit for dozer have been envisaged for washing.

xiv) STORES & COMMON FACILITIES

A small store is provided for storage of 10 days consumption of spares & consumables required for repair & maintenance of HEMM & other mining equipment. The different repair shops will draw day-to-day requirement of spares & other consumables from this store.

A fully equipped fuelling station is also provided for fuelling the vehicles and transport equipment.

11.4 E&M WORKSHOP

I) MACHINE SHOP

This shop will undertake machining and reconditioning of spares. It will also manufacture small spares, which are in short supply and required for the repair of E&M equipment.

II) MECHANICAL REPAIR SHOP

The equipment like pumps and pumping installation experiencing incidental problem in the field and requiring minor repair will be brought to this shop where they will be inspected and repaired. Apart from this the normal maintenance/repair of the pumps will be done in this shop.

III) ELECTRICAL REPAIR SHOP

This shop will deal with the testing and minor repairing of electrical components of CHP equipment, pumps, switchgears etc.

IV) LIGHT MOTOR VEHICLE REPAIR SHOP

This shop will cater to the need of schedule maintenance, minor & medium repair and replacement of components of light and medium duty vehicles such as Jeeps, Cars, Ambulance, Trucks, and School Buses etc. The vehicles will be thoroughly washed at the washing station (meant for light & medium duty vehicles) before going to this shop for repairs.

V) STORES & COMMON EQUIPMENT

A small store is provided for storage of 10 days consumption of spares & consumables required for repair & maintenance of E&M equipment.

11.5 WORKSHOP & STORE LAYOUT

A schematic layout plan of the workshop & project store is shown in drawing no. R3 E&M M 03005.


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11.6 WORKSHOP AND STORE PLANT & MACHINERY

The detail list of required workshop/store P&M has been provided in Appendix-A.3.3

11.7 PROJECT STORE

A project store has been provided to meet the total requirement of proposed workshop as well as additional requirement of entire project.

This full-fledged store is provided adjacent to the workshop boundary with a view to minimize the time for collection of spares and consumables required for the repair & maintenance of HEMM in this unit workshop.

11.8 DRAWINGS

A general Layout plan of both Excavation and E&M workshops along with project store has been shown in Drg. No. R3 E&M M 03005.


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CHAPTER-XII

POWER SUPPLY, ILLUMINATION AND COMMUNICATION

12.1 POWER SUPPLY

12.1.1 Location and existing source of power

The proposed Chandragupt opencast project is located in the North Karanpura Coalfield. This project comes under administrative control of M&A Area of Central Coalfields Limited. This project report has been prepared for a rated production capacity of 15.0 MT of coal per annum. Nearest source of power for this coal block is the upcoming Tandwa Substation of DVC from where a double circuit feeder at 33 kV may be drawn to provide power to Chandragupta OCP.

Proposed scheme of power supply

Considering the population of electrical HEMMs, CHP, Pumping and other common loads proposed in this report, 2 nos 2X10 MVA 33/6.6kV substation has been envisaged for fulfilling the power requirement of the project. Both the sub-stations will receive power at 33 kV from DVC switching station being constructed for feeding power to the upcoming projects of this coalfield, through independent double circuit overhead line feeders. Both the substation will have provision for receiving power at 33kV through 2 nos. 33 kV incoming feeders and facility for distributing the same at 6.6 kV to the different load centers of the project through suitable nos. outgoing 6.6 kV feeders.

Substation-I will be located near the CHP complex and will feed power to Section-1, Section-2, CHP, workshop, quarry and surface illumination etc. Substation II will be located near southeastern boundary of the Section-3 and cater the power requirement of Section-3 quarry & surface illumination and colony.

2 nos. 33 kV double circuit incoming feeders each approx. 12 km long with WOLF or equivalent AAA conductor in double rail pole structure will be constructed from said DVC switching station for receiving power.

Single line diagram of proposed substations have been shown in enclosed drawing no. R3: E&M: 0E2970 and R3: E&M: 0E2971.

12.1.2 Electrical Parameters

Based on the deployment of different equipment / installations of the project, power balance has been prepared to estimate the maximum power demand, annual energy consumption and other electrical parameters. Salient electrical parameters of the project are tabulated below.

Table: 12.1 Salient Electrical Parameters

Sl No	Description	Values
1	Connected Load (kW)	26135
2	Load in operation (kW)	22282
3	Maximum power demand (kVA)	10046
4	Annual Energy Consumption (MkWh)	59.12
5	Energy consumption per tonne of coal production (kWh/te)	3.9

12.1.3 Mine Substations

To meet the power requirement of the project, two nos of 2 X 10 MVA, 33/6.6 kV substation has been envisaged. The transformers capacity for the substation have been selected considering maximum demand of power connected to the substation at an overall power factor of 0.98, with 100 % stand-by transformer capacity. Calculated maximum power demand for the mine will be 10046 kVA.

Both the 2 X 10 MVA, 33/6.6 kV substation proposed for the project will be identical in construction. Each substation will have the following major outdoor and indoor installations.

- **Outdoor Installations.**

- 33 kV terminal structures, bus Sections for receiving power.
- 33 kV, Isolators with / without earthing switch / with earthing switch & D.O fuses.
- 33 kV, VCBs.
- L.A. for 33 kV system voltages.
- 33 kV CTs & PTs
- Power transformer, 10 MVA, 33/6.6 kV -4 Nos.
- Neutral Grounding Resister for power transformers.
- Station transformers, 160 kVA, 33/415 kV
- Lighting transformers, 100 kVA, 33/0.23 kV (L-L)
- 6.6 kV, VCBs
- Capacitor Bank, of required kVar, 6.6 kV.
- Outdoor Illumination System.
- Earthing and lightning protection system.

- **Indoor Installations**

- Remote control panels for 33 KV outdoor type circuit breakers with VCB.
- Remote control panels for 6.6 KV outdoor type circuit breakers with VCB.
- 415V Switch Board for control of station transformer.


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- iv) 230V (L-L) Lighting distribution board
- v) Indoor Illumination.
- vi) 110 V D.C. Distribution Board.
- vii) Battery, Battery Chargers.
- viii) Indoor control panel for Capacitor banks, 6.6 KV, 2795 kVAR capacitor-2 Nos with APFCR
- ix) Earthing with Grid.

- **6.6 kV outdoor VCBs**

The various functions of the VCBs in the outdoor switchyard energized from the secondary of the 10 MVA 33/6.6 kV power transformers installed at the substation will be as single line diagram:

- **415 V distribution board**

It is proposed to install an indoor type 415V switch board in the substations which will receive power from the secondary side of 160 kVA 33/0.415 kV transformer and distribute the power to various loads of the substation such as float cum charger, oil filtration machine, automatic fire fighting arrangement installations etc. This switch board will comprise of required number of ACB / MCCB.

- **230 V (L-L) Lighting main distribution board**

The 230 V (L-L) switchboards energised from the secondary of the 100 kVA, 33/ 0.23 kV (L-L), pole mounted type lighting transformers installed at the both substation shall comprise 1 number 3 pole MCCB as incoming and required nos. 2 pole MCBs as outgoing control.

- **Protection of substation, Controlling & Signaling.**

33 kV VCB type circuit breakers will be used for primary control of all the 33/6.6 kV 10 MVA transformers of proposed Substations. The circuit breakers, in conjunction with Current transformers, provide protection to the transformers against over current, short circuit, and earth fault. These circuit breakers shall also trip for internal fault of transformers actuated by oil/winding temperature relay and Buchholtz relays activated by gas / oil pressure due to incipient fault inside the transformer. Similar circuit breakers will be used for control of both the incoming feeders and also as a bus coupler.

The transformers will also be provided with differential protection.

6.6 kV VCBs will be used for secondary control of transformers, control of 6.6 kV outgoing feeders & bus-coupler. These VCBs will have provision for protection against over current, short circuit and earth fault.

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For protection against lightning, lightning arrestors conforming to IS: 3070 and IS: 4004 will be provided in the substation yard. Shield wires will be provided for protection of outdoor equipment against direct lightning strokes. For protection of building from lightning strokes, spikes will be provided over the building and these spikes will be interconnected by means of GI flats to form a grid. This grid will be connected to the earth pits at the four corners of the building by means of down conductors.

Remote control and operation of 33 kV circuit breakers will be performed by the control switches provided in the control panel in the substation room.

- **Signaling system in the substation will be provided as under:**

- a) Signaling to inform the personnel about automatic tripping of circuit breakers due to fault.
- b) Warning signal about occurrence of abnormality in any particular device.
- c) Signaling to show actuation of automatic and protective relays.

Similar remote control and signaling devices will be provided in the 6.6 kV outdoor circuit breakers units and indoor control panels also.

- **Interlocking**

The air break isolators associated with the 33 KV circuit breakers in the proposed substations shall be interlocked with the circuit breakers to avoid mal- operation.

The 33 kV and 6.6 kV sectionaliser circuit breaker installed in the 33 kV and 6.6 kV outdoor bus respectively will have electrical interlock with the respective incoming circuit breakers to avoid parallel operation of transformers.

Primary and secondary C.B.s of respective transformers shall be interconnected so that secondary control C.B. shall trip automatically when the primary control C.B. trips.

- **Earthing System**

Main earthing grid shall be provided around the periphery of the substations for interconnection of earth pits as well as to earth all the electrical equipment.

The transformer body and the lightning arrestors provided for the transformers shall be earthed separately as per IE rules but the earth pits shall be interconnected to minimize the earth resistance so that protections to the transformers is most effective. The LAs shall be located as close to the transformers as possible.

Substation earthing shall conform to IS: 3043 (current). The resistance to earth shall not exceed 1 ohm. Separate earth pits would also be constructed around workshop sheds and CHP etc. for proper earthing of equipment. GI strips of adequate size connecting the main earth bus laid around the workshop and CHP would properly earth all the drives in the workshop and CHP.

Restricted neutral earth system shall be provided for 6.6 kV distributions. The neutral of both the 33/6.6 kV power transformers in the proposed substation shall be earthed through earthing resistors to restrict the earth fault current within 50 Amp.

The 6.6/0.415 kV transformer shall be provided with solidly earthed neutral system. The station lighting transformer with voltage 230 V (L to L), shall operate in un-earthed system.

12.1.4 Power Tariff

Estimated power bill has been calculated based on prevailing tariff of DVC as tabulated below:

Table: 12.3 Power Tariff

Sl No	Description	Rupees
1.	Normal Demand Charges (Rs. /kVA/month)	600
2.	Energy Charges (Rs./kVAh)	2.95
3.	Electricity Duty (Rs./kWh)	0.20

12.1.5 Energy Consumption

Estimated maximum annual energy consumption of the project at targeted rate of production works out to be 59.12 M kWh.

12.1.6 Utilization Voltage

The utilization voltages of various equipment / installation of the project are as given below.

Table: 12.4 Utilization Voltage

Sl. No.	Equipment	Voltage
1	Incoming Supply to Proposed project Substations	33 kV
2	Pump-110 kV and above	6.6 kV
3	Pumps-below 110 kW	0.415 kV
4	Workshop Equipment	0.415 kV
5	CHP Equipment	6.6/0.415 kV
6	Quarry /Mine Area Lighting	230 Volt (L-L)

12.1.7 Power Factor Improvement

2 sets of capacitor banks each rated at 6.6 kV would be installed at each bus section of the 6.6 kV split – bus installed in the switchyard of both substations. Capacity of each set of capacitor banks for main substation will be as per requirement having automatic power factor correction mechanism. The capacitor banks would have the facility to connect or disconnect the required number of units automatically through contactor and automatic power factor correction and relay panel combination depending upon the loading pattern at the substation. These capacitor banks can also be controlled by remote control panel installed in the substation buildings.

12.1.8 Quarry Power Supply & Distribution

Power supply to HEMM

Power supply to the HEMMs will be provided through dedicated HEMM feeders drawn from both the substations.

Power supply to Pumps

Two numbers 6.6 kV overhead line feeders originating from the both substations are proposed to be drawn up to a convenient location near main sump of the quarries for feeding power to various pumps installed in the project. The overhead line feeders shall receive power at 6.6 kV from the outgoing structures installed in the switchyard of both the substation. Depending upon the various stages of quarry operation these feeders may have to be shifted or extended.

For distributing power to the main pumps, two nos. kiosk type 9 panels and one no. kiosk type 7 panel of outdoor 6.6 kV sectionalised switchboard has been envisaged. This switch board will be installed near the main sump. Power shall be tapped from 6.6 kV overhead feeders by means of outdoor type isolators and power cables to energize the switchboard.

Individual HT pump will receive power from the switchboard through dedicated switch and cable. The location of switchboard will be suitably changed with the change in the location of main sump.

For distributing power to 415V operated pumps, 4 (Four) nos. 400kVA, 6.6kV/415V utilised substations along with three nos 415V suitable distribution panel has been envisaged. These utilised substations will receive power at 6.6kV from 6.6kV pump feeders and feed power to different 415V pumps through said distribution panels.

Power Supply to CHP

Power at 6.6 kV shall be made available to coal handling plant through 6.6 kV overhead line feeders drawn from the Proposed 2X10 MVA, 33/6.6 kVA Sub-substation-I. Provision for drawl of overhead line including terminal structure has been made in the Appendix of electrical P&M. The estimated cost of electrical Substations/ electrical P&M / sequence control operation, Illumination for CHP etc. has been included in the related Appendix for CHP.

Power Supply to Workshop

Power at 6.6 kV shall be made available to workshop through 6.6 kV overhead line feeders drawn from the Proposed 2X10 MVA, 33/6.6 kVA substation to workshop sub-station-I. Provision for drawl of overhead line including terminal structure has been made in the Appendix

of electrical P&M. 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.

Power Supply to Township

It has been presumed that Colony will be located at about 5 km from the substation. Different type of residential quarters has been proposed. In addition to above, service buildings such as Staff Rest House, Officers Guest House, Dispensary, Community Hall, Officers Club, School, Post office, Bank, Training Centre etc has been proposed. Power for colony will be received at 6.6kV from Substation-II through a double circuit overhead line feeder and the same will be stepped down to 415V through 250kV 6.6/0.415kV distribution transformers installed at different locations in the colony. Power at 415V/230V will be distributed to the quarters and service buildings with 415V overhead line, cables etc.

12.1.9 Illumination

6.6 kV overhead line feeder originating from both substations are proposed to be drawn up to a convenient location in the quarry for feeding power to the lighting transformers installed in the different location of the mine. The overhead line feeder will receive power at 6.6 kV from the outgoing structure installed in the switchyard of the project substation. Depending upon the various stages of quarry operation these feeders may have to be shifted or extended.

Haul Road Illumination

For illumination of permanent haul roads, 150 W LED lamps and luminaires mounted on 11/13 m (approx.) high steel poles have been envisaged. Temporary haul roads shall be illuminated according to the position of working, through 300 W LED lamp fitted in flood light fixtures mounted on skid mounted / mobile lighting towers.

Illumination of Quarry General Area/ Dump Area

Illumination of working face will be done with 2*300 W LED lamp (High Bay) fitted in flood light fixtures mounted on mobile lighting towers. Illumination of quarry general area/dump area etc. will be done with 2*300 W LED lamp (High Bay) fitted in flood light fixtures mounted on skid mounted lighting towers.

Service Road Illumination

150 W LED lamps in street light luminaires will be used for illumination of service roads of the project. The luminaires will be mounted in 11/13 m steel tubular poles installed at a suitable interval for achieving desired level of illumination.

Sufficient no. of 25/10 kVA, 6.6 kV / 0.23 kV (L – L) lighting transformers have been provided for feeding power to the light fittings installed in the mine.

Township Street Illumination

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4.5 km colony road has been proposed in this report. In addition to this there will be approach road of 5 km for the colony. 150W LED lamps in street light luminaires will be installed on steel tubular poles of 415V colony power distribution line / street lighting poles for colony and approach road illumination.

12.2 TELECOMMUNICATION

12.2.1 Communication

Coal production has become highly capital intensive due to large scale mechanisation for production and transportation using the modern technology. To cope up with mechanisation to maintain safety and also to improve the efficiency, there is a need to establish an efficient means of voice and data communication. The effectiveness and reliability of decision making process depends on a reliable means of information exchange among the different units of surface, which totally depends upon the integrated telecommunication systems for voice and data.

12.2.2 Proposed Communication System

The proposed communication system should cater the need of voice communication among personnel related to mine operation, administration and equipment maintenance. The system also takes into account the data communication requirement for mine operation and planning along with the latest office automation facilities.

While preparing the system, due consideration has been given to the state-of-art networking architecture involving the communication of voice and data over the proposed network path to avoid duplicated investment in network and proper conservation of bandwidth.

12.2.3 External Communication

20 (twenty) telephone lines have been provided for communication and access to public communication grid. These telephone sets would be located in the residences and offices of key personnel of the project, sub-station, railway siding, CHP, workshop, etc. and 4 lines shall also be terminated on the exchange for trunking. Besides fixed line telephones, 25 nos. of Mobile connection with sets may also be provided to key personnel of the project.

12.2.4 Voice and data networking

There shall be an IP exchange with a capacity of 300/150 lines upgradable to 500 lines. The proposed exchange shall be housed at mine office, for providing effective and transparent communication. The IP Exchange shall have all the latest features like SIP extension and trunk, High Capacity Server, Media Gateway (single/multiple gateways), Redundancy (Server,

Network), Encryption and Mobility facility like Wi-fi etc. The IP Exchange shall be interfaced with fixed lines for extending external communication having STD & ISD facility.

12.2.5 Technical Specifications

Technical Specification of EPABX

The IP exchange should provide Management and Control of audio video & data traffic from a single source and also provides Mobile Communication solution, Networking application and Computer to Telephone integration application. It should have latest SIP Enabled IP based communication server, fully modular and fully Non-blocking type having distributed Client-Server with redundant server architecture, full feature transparency, CLI facility, ISDN PRI/BRI, together with all latest feature and configuration of a modern communication server.

It should ready to adopt present and future technologies.

It should support 270 analog extension and 30 digital extension. It should also have trunkports and Communication redundancy.

Exchange shall have both voice and data switching capacity.

System software shall have auto-diagnostic programme to detect the faults and localise them.

The exchange should support multi-media application as per latest trend. It should be possible to connect PC's, host computers etc. without modem through Digital/ISDN line.

Exchange shall be DoT/TRC approved with ISDN facility.

Networking Facility

Exchange is required to operate in any one of the following and shall be suitable for both.

- i) Service Provider Junction.
- ii) Exchange should also be able to inter-face directly with other exchanges, if required.

System should be capable to network with the following types of lines:

- a. Direct inward dialling trunk and outward dialling trunk.
- b. ISDN line.

FEATURES

- a. Flexible numbering scheme
- b. Privacy of calls
- c. DID facility junctions.
- d. Conferencing
- e. Automatic call back on busy extn.
- f. Call transfer and Call pick up.
- g. Last number radial.


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- h. SIP extension and trunk
- i. High Capacity Server
- j. Media Gateway
- k. Server and Network redundancy
- l. Encryption
- m. Mobility like SIP and Wi-Fi
- n. IP Telephony feature
- o. IP enhancement facilities
- p. Full active VoIP recording

12.2.6 24 port L3 Switch

The managed L3 Switch shall be a workgroup switch 24/48 port 10/100 having a gigabit uplink port. The switch shall have sufficient backplane and throughput along with QoS features for both voice and data connectivity. This Managed L3 switch should be installed near the telephone exchange.

A. TECHNICAL SPECIFICATION

- 24/48 Nos. 10/100BaseTX + 4 Nos. GBIC (min.)
- The Modules should support 1000 Base SX /1000 Base LX/1000 BaseZX.
- Chassis based Multi-service Switch with minimum 7 Slots
- Redundant CPU
- Redundant Power Supply.
- Backplane: 64 Gbps Switching.
- Forwarding Rate: 48 Million packets per second of L2 & L3 & L4 Packets.
- MAC address : 12000 MAC address support
- Must have L3 (IP Routing) and Layer 4 Support
- MAC Address support for 32000
- Built In 512 MB SDRAM
- Must support the following protocols:
- IEEE 802.3X (flow control)
- IEEE 802.1p (prioritisation)
- IEEE 802.1Q (V-LAN tagging)
- IEEE 802.1D (Spanning Tree Protocol)
- RIP-V.1 & RIP-V.2
- Should support access control list
- Should support Link Aggregation


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- Management- Should have built-in SNMP, RMON, Web based and Command Line Interface for Management. Switch should be supplied with Network Management Software (latest version)

12.2.7 L2 Switch (24 Port 10/100 BaseT + 2*Expansion Slots)

- a. Non-blocking, wire speed switching and routing.
- b. Configuration: 24 Nos. 10/100 Autosensing Ports + Two Module expansion slots which will accommodate the 1000 SX or 1000 Base LX or 1000Base-Long haul(70Km).
- c. MAC Address support: 8000 MAC Address min.
- d. Backplane: 8 Gbps min.
- e. Forwarding Rates: 6.5 Million PPS min. for supporting wirespeed switching.
- f. The switch should support QoS classification of incoming packets for QoS flows based on Layer 2, Layer 3 and Layer 4 fields.
- g. Standard Compliance- support IEEE 802.3 x (flow control), IEEE 802.1p), IEEE 802.1Q (V-LAN Trunking), IEEE 802.1d (spanning tree protocol)
- h. Weighted Round Robin (WRR) queuing algorithm to ensure that low priority queues are not starved.
- i. Power supply should have integrated IEEE 802.3 of compliant POE (Power over Ethernet)
- j. Stackable
- k. Management- Have built-in SNMP, Web based and Command Line Interface for Management. SNMP v1/v2/v3, RMON.
- l. Support link aggregation for increasing Backbone bandwidth.

12.2.8 LAN and Internet

It is proposed to deploy electronic data processing facilities for production planning, control and project management etc. The system envisages to play a key role in establishment of highly effective Data Base Management System (DBMS) and Management Information System (MIS) etc.

The type of computer would be small business computer with broad facilities and also have specific facilities to carry out:

- Pay rolls
- Financial accounting
- Inventory control
- Material management
- HEMM utilisation, breakdown analysis, idle time analysis etc.
- Production, despatch schedule and variances.
- Accident records etc.


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- Resource utilisation & MIS.

Before initiating action for installation and implementation of the above EDP system, a detailed system study would have to be carried out with clearly defined system objectives for identifying the data processing needs and management information system needs of the project. Based on the results and findings of the study, the system configuration and specification have to be decided.

A Local Area Network with 25/10 PCs is proposed for this project. The PCs will be connected to the L3/L2 switches. The proposed network structure will be that of a workgroup. Suitable OS and other application software will be provided. Suitable printers, plotters CD/DVD writer shall be provided. A server with Windows XP/Windows 2008 or higher shall also be provided.

1 Nos. of L3 & 2 Nos. of L2 switches are proposed.

Internet connection shall also be provided through a 2/4 Mbps leased line at project office and some residences.

12.2.9 VHF Communication System

VHF dialling type Walkie-Talkie sets/trunked radio will be provided to important personnel for communication in the mine as mentioned in (outsourcing) option (Appendix-B). These will work in the band 150-174 MHz. with a channel spacing of 12.5 KHz/25KHz, with an output of 2W. Type of operation will be FM, simplex. The system shall have telephone patch facility for interfacing with the exchange. It should also have control channels for trunking facilities.

12.2.10 Wireless Radio System

1 set of point to point and 2 nos. of Point to Multipoint Radio (Base-1, Remote-3) are proposed for connecting the proposed LAN with important locations where cabling will not be possible. Another point to point radio is also proposed for connecting Project office with Area office.

SPECIFICATION

a.	Wireless Radio Unit	: Point to Point links
b.	Fade Margin	: Min10db for each hop
c.	Operating Frequency	: 5.8 GHz
d.	Modulation Techniques	: OFDM
e.	Wired LAN protocol	: 802.3 10/100 Base T
f.	Operating speed	: Max. 54 Mbps Min. 6 Mbps
g.	Receiver sensitivity	: -70 dbm at 54Mbps -92 dbm at 6 Mbps


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h.	Transmit power level	: + 24dbm max.
i.	Protocol	: 802.11a
j.	Configuration/Diagnostics	: Local/Remote configuration diagnostics, continuous signal quality Management.
k.	Operating Temperature	: 0°C - 55°C
l.	Humidity	: 0% to 100%
m.	Lightning protection	: Suitable surge suppressor should be included in the equipment
n.	Power supply	: 240 V AC +/- 10%
o.	Power over Ethernet	: Integrated IEEE 802.3 af compliant PoE.
p.	Management	: Web based, SNMP
q.	Security	: Radius, WEP, AES, 802.1x
r.	Safety Certifications	: UL 60950, CSA, CE Marking
s.	Electromagnetic Compatibility Certifications	: FCC part 15 Class B, CE Marking.

12.2.11 GPS Based Truck Monitoring System

An Integrated GPS-GPRS based vehicle tracking system along with RFID and other accessories is proposed for the mine. The proposed system shall have the following features:

- The system shall help for real-time tracking of vehicles fixed with GPS-GPRS based VMU (Vehicle mounted unit) along with integrated RFID tags for tracking along the route as well as at the entry/exit points like Weigh Bridge, Railway Siding, Security gates etc. These fixed points shall be installed with RFID Reader and other accessories for Access Control.
- Different vehicle locations & routes for tracking the vehicles on Map.
- Automatic event logging (viz. start and end of trip(s), emergency halts, accidents, breakdown of vehicles etc.) along with Time Stamp.
- Provide alerts on unauthorized stoppage and /or non-stoppage of the vehicles at designated vehicle stops/weighbridges/dumping yards/ Railway sidings, the scheduled stoppage point and route deviation by vehicles etc.

12.2.12 Dumper Collision Avoidance System

Directorate General of Mines Safety (DGMS) has given a circular no. DGMS (Tech)/cir.no.009 dated 02-12-2008, to ensure the safety of dumpers and to protect loss of equipment and human life and also for ensuring safe and efficient coal mining. As per this circular dumper

should be equipped with anti-collision system to avoid head to tail collision between dumpers and proximity warning along with reverse safety system to avoid collision between dumpers and blind objects.

This system consists of a Display Unit, Control Unit, GPS, Proximity Sensors and Antenna Unit. This system provides following three layers of safety:-

1. **Layer 1** provides safety by detecting objects within 10 Meter range. This layer consists of proximity sensors mounted on Dumpers on three sides.
2. **Layer 2** provides Distance & Directional information of other dumpers present in the vicinity of 100 Meters thus enabling operator to have better view of the situation. This layer consists of GPS, RF Link and RS232 Interface.
3. **Layer 3** provides Positional information of the Dumper through GPRS to central base station by sending SMS. This layer consists of GPRS module and RS232 interface.

Antenna Assembly Unit consists of Tx Antenna, Rx Antenna, and GPS Antenna with frame base. Display Unit is placed in Driver's cabin in front of Driver. Control Unit is mounted on a bracket within Driver's cabin on rear side. Power supply is taken from Engine Ignition available on Dumper. Local SIM card is inserted in Control Unit. Proximity sensors are mounted on the Dumpers to provide driver with awareness of the objects within 10 m range on the sides.

The system is also equipped with the following special additional features:

- i) **Proximity warning from other objects:** The dumpers are equipped with Pulsed Radar based proximity sensors at three sides to warn against impending collision with any other vehicle, human being and blind object entering in its coverage range of approx.0-10 meters.
- ii) **Reverse Safety System:** The System can also be used as a reverse safety system to prevent the dumpers from toppling down from the OB dump while unloading.
- iii) **Vehicle Tracking Interface:** With the help of GPRS module incorporated in the Control Unit, the location co-ordinates of a dumper can be readily known by simply sending an SMS to that particular dumper. The location co-ordinate is automatically sent back by the system. These co-ordinates can be superimposed on Google Map with a tailor-made software, to track the exact location of the dumpers within the mine.

12.2.13 IP SURVEILLANCE SYSTEM

To monitor the total mine working area from a centralised control room a surveillance system is proposed. All the important locations viz entry & exit points of mine., loading points, silos and working faces are to be visually monitored at a centralised location using day and night CCTV Cameras(IP enabled) and wireless network.

12.2.14 Biometric Attendance System

This system shall be for attendance monitoring and evaluation. The whole attendance system consists of Finger/Iris scanner and support software with inbuilt clock and timer and network connectivity through GSM and Wi-Fi.

12.2.15 UPS

Uninterrupted Power Supply (UPS) shall be used in case of main power failure for LAN and others.

SPECIFICATION OF UPS

- (1) Capacity: 10KVA, Single phase/3 Phase
- (2) AC Input voltage: 220/230V, $\pm 15-20\%$ variation
- (3) Frequency: 50 Hz $\pm 5\%$ (Auto sensing)
- (4) AC output voltage: 230 VAC, Single phase/3 Phase
- (5) Efficiency at Full Load 94%
- (6) Regulation: both line and load $\pm 1\%$
- (7) Wave form: Sinusoidal, $< 5\%$ THD
- (8) Equipped with Maintenance By pass
- (9) Charger: Constant voltage limited current type, charging time for 90% discharged battery maximum 10 hrs.
- (10) Battery Back-up: 4hrs at full load.
- (11) Certifications: EU/EN/UL/ISO 9001
- (12) Rack mount Design: 19" mountable with sliding guides.
- (13) Communication: RS232 interface port & Ethernet port with Web management supports.

Features:

- (1) The 10 KVA UPS with 4 hrs battery back-up & accessories shall have the facility of Input voltage cut off device to protect the 10 KVA UPS with 4 hrs battery back-up & accessories against excessive over/under voltage conditions at the input side.
- (2) The system shall have surge suppression to prevent hardware damage.
- (3) The system shall have facility for continuous display of load and battery charging conditions and automatic cut off device to avoid over loading and over charging.
- (4) The 10 KVA UPS with 4 hrs battery back-up & accessories system shall be true on-line state of the art based system capable of providing precise sine wave output to the load.


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CHAPTER – XIII

CIVIL CONSTRUCTION

13.1 INTRODUCTION

The life of the Chandragupta Opencast project has been estimated as 41 years. For service and residential buildings, permanent type of construction has been proposed.

13.2 BUILDINGS

13.2.1 Residential

It is proposed to provide a township for Chandragupt OCP.

13.2.2 Service Buildings

It is proposed to provide facilities for medical, educational, recreational & shopping facilities for Chandragupt Opencast Project. Provision has been made in this report for construction of Project Office, Site office; Excavation Workshop, E&M workshop, Store, substation, etc.

13.3 ROADS & CULVERTS

13.3.1 Colony Road

The length of roads inside the township has been estimated as 4.60 km.

13.3.2 Haul Road

The length of haul road has been estimated as 5.4 km..

13.3.3 Approach Road to the Project

It is proposed to construct a 4.0 km. long approach road to the project.

13.3.4 Approach Road to the Magazine

It is proposed to construct a 3.0 km. long approach road to magazine.

13.3.5 Approach Road to the Colony

It is proposed to construct a 4.0 km. long approach road to the colony.


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13.4 WATER SUPPLY AND SEWERAGE

13.4.1 Water Demand

The potable & industrial water requirement for the project has been assessed as follows:

- (i) Potable Water Demand : 0.139 MGD
- (ii) Industrial Water Demand : 0.596 MGD

13.4.2 Source of Water

Source of water for potable and industrial use will be existing nallas or mine water.


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CHAPTER-XIV

SAFETY & CONSERVATION

14.1 INTRODUCTION

Safety of men and machine deployed in the mining area should be properly taken care of irrespective of whether the mining activities are performed by departmental or by outsourcing option.

All the regulations & schedules of Coal Mines Regulations 2017 relating to mining in general and opencast mining in particular have to be adhered to and implemented in order to maintain day to day safety as per stature.

14.2 SAFETY ASPECTS FOR OF HEMM / EQUIPMENT

Special precaution should be taken while deploying workers in the mine. Before employing any person to the mine proper vocation training should be imparted and recommendations of various Safety Conferences should be strictly followed. Some of the major aspects are as follows:-

A) For persons:

- i) No persons shall be deployed unless he is trained at VTC and holds VTC Certificates. A record of the same shall be maintained.
- ii) Records in Form-B and Form-D shall be maintained.
- iii) Records of driving license of operators shall be kept by competent authority and shall be made readily available for inspection by management.
- iv) Adequate supervision shall be maintained by competent persons, including officials and technicians.

B) **For Machineries:** Provisions of Regulation 109, 110, 216 & 217 of CMR 2017 and DGMS Cir. (Tech.) 1 of 1999 should be strictly adhered to along with the following:

- i) All machinery and plant used in connection with working of a mine shall be of good design, sound construction, and suitable material, adequate strength, free from patent defect and properly maintained.
- ii) The owner, agent and manager shall provide adequate training facilities and ensure proper training of persons employed for operation and maintenance of machinery and plant.
- iii) No person except an engineer or other competent person under his supervision shall undertake any work on machinery and plant in which technical knowledge or experience is required.

- iv) All the machineries to be deployed in mines shall be so designed as to afford the operator clear and uninterrupted vision all around.
- v) Every heavy earth moving machineries, including trucks and tippers, used in mine shall be fitted with adequate safety features or devices as specified by DGMS. All equipment shall be provided with audiovisual alarms, proper light for use at night and fitted with suitable type of the fire extinguishers.
- vi) Truck mounted drill machines designed for tube well drilling for sources of water shall not be used and only proper type of blast hole drill machine, especially designed for mining purpose, shall be used in the mine.
- vii) Every heavy earth moving machinery shall be under the charge of a competent person (Operator or Driver), authorized in writing by the Manager.
- viii) All persons employed or to be employed to operate heavy earth moving machinery shall be trained and their competency shall be evaluated by a Board constituted by the management, who shall be persons who are not connected with imparting of training.
- ix) A proper record of repair and maintenance along with inspection done by competent authority and defect pointed out shall be maintained and signed by authorized person.
- x) Only such fitters or mechanics possessing driver's or operator's license, shall be allowed to carry out test-run of heavy earth moving machineries.
- xi) No person other than the operator or the driver or any person so authorised in writing by the manager shall be allowed to ride on a heavy earth moving machinery

C) General:

- i) Every person shall strictly adhere to the provisions of the Act and of the rules and regulations and to any order or direction issued by the manager or an official with a view to the safety or convenience of persons not being inconsistent with the Act, rules and these regulations; nor shall he neglect or refuse to obey such orders or directions.
- ii) Every person shall, immediately before proceeding to work and immediately after terminating work at the end of his shift have his name recorded in the appropriate register.
- iii) Risk Management Plan of tipper/pay loader shall be made and implemented.
- iv) All operators/drivers so authorised by the Manager shall observe the Regulation 62 and 63 of CMR 2017 and obey the systematic traffics rules prepared by management
- v) Before deploying workers they must be trained and briefed about safety aspects in opencast mine. However during course of execution of the work, if any accident occurs whether major or minor, the matter shall have to be immediately informed to mine management i.e. Colliery Manager/Agent/GM of Area so that Notices of accidents in a

accordance of (Reg. 8 of CMR 2017) and Section 23 of The Mines Act 1952 may be given and other necessary steps may be taken in accordance with the Mines Act 1952.

- vi) Mine authority shall operate transport system in such a way so as to minimize pollution in the mine.

14.3 STABILITY OF BENCHES, QUARRY HIGHWALLS AND SPOIL DUMPS

During quarry operations, it is necessary to adopt required mining parameters for the stability of benches, highwalls and spoil dumps. It is also mandatory to examine systematically the fencing of mine workings, land slides and cracks between benches. It is required to maintain well-graded and wide roads on benches keeping the width of working areas sufficient for spreading of blasted rock and movement of the mining and transport equipment.

During actual mining operation, systematic observations of the condition of benches, high wall slopes and spoil dumps should be carried out and the dimensions be modified if necessary to suit the local conditions. To ascertain the optimum slope angles for stability of quarry benches, highwalls and spoil dumps, scientific study of slope stability along with hydro-geological study of the area needs to under taken.

During actual mining operation, systematic observations of the condition of benches, high wall slopes and spoil dumps should be carried out and the dimensions be modified if necessary to suit the local conditions.

Provisions laid down in Reg. 106 and 108 of the Coal Mines regulation 2017 shall be strictly adhered to for the safety of quarry and OB/ spoil dumps. In addition to this, the following precaution should be considered:

- i) The spoil dump height should not exceed 90m from immediate surface level with an overall slope of 28° or less. In the event of encountering steep floor gradient, floor blasting should be done and the area properly levelled by dozer before spoil dumping.
- ii) No working or construction should be allowed within the 60m toe of the OB dump.
- iii) Before dumping the OB on the floor of seam, at least 10m length all along the strike length should be made horizontal at every 50 meter by floor dinting/blasting.
- iv) Dump should be created in such a way that there is no chance of accumulation of water in and around the base of dump as it will adversely affect the shear strength of the base material of dump. It must be ensured that there is no stagnant water at the toe of dump and the top of the dump.
- v) The toe and face of the dump should not be eroded or cut at any point of time to avoid slope failure. A suitable toe wall should be created along the dump periphery.
- vi) Formation of dumping should be done in square or circular or any regular shape as far as possible.

- vii) Proper drainage system should be provided to bring down rain water by construction of inclined drain on dump face and catch drain on all benches.
- viii) During active period of dump, all rain water should be diverted away from mining site as far as possible.
- ix) Sump and pumping capacity should be sufficient to accommodate peak surface run-off and seepage of water.
- x) Gabion wall and garland drain should be constructed and maintained to trap the surface run-off and sludge coming from dump.
- xi) Plantation and grassing should be done on top and slope of the dump respectively.
- xii) Regular monitoring is required for development of tension crack, gullies, movement of soil mass, stagnation of water and any other unusual occurrence. In case of dump movement, rate of movement of dump should be monitored. Special attention should be given at curve area/turning area of the dump.

14.4 PRECAUTIONS AGAINST DANGER OF INUNDATION FROM SURFACE WATER

- 1) Adequate protection against any danger of inrush of surface water into the mine or part shall be provided and maintained to the satisfaction of DGMS, whose decision shall be final.
- 2) The entrance into the mine shall be so designed, constructed and maintained that its lowest point (which means the point at which a body of rising water on surface can enter the mine) shall be not less than 3.0 meters above the highest flood level at that point.
- 3) Every year, during the rains constant watch shall be kept on the flood levels on the surface of the mine and if at any time the levels cross the highest levels earlier recorded, such levels shall be marked by permanent posts along the edges of water and the new highest levels thus observed shall be recorded with the date as the highest flood level on the plans by an actual survey.
- 4) If water dams or reservoirs are built across rivers and water courses on the upstream side of the mine, arrangements shall be made for communication between appropriate authorities for the purpose of ascertaining the quantity and timing of water released from the dams which is likely to endanger safety of the mine and arrangement for similar communication shall be made when water level rises on the upstream side which is likely to endanger the mine.
- 5) The highest flood levels and danger levels at least 1.2 meters below the highest flood level, shall be permanently marked at appropriate places on the surface and whenever water rises towards the danger level at any place, all persons shall be withdrawn from the mine sufficiently in advance and for this purpose adequate arrangements of quick

communication to all parts of the mine by effective systems shall be provided and maintained.

- 6) No working shall be made in the mine at any spot lying within a horizontal distance of 15 meters from either bank of a river or nala.
- 7) A competent person shall, once at least in every fourteen days during the rainy season and once at least in every thirty days during other periods of the year, examine every protective measure provided under regulations 149, whether in use or not, for their stability, and a report of every such examination shall be recorded. The protective measures and workings shall also be inspected, once at least in every quarter by the Manager personally.
- 8) A careful assessment is to be made against the danger from surface water before the onset of rainy season. The necessary precautions should be clearly laid down and implemented. A garland drain needs to be provided to drain away the surface rainwater from coming into the mine.
- 9) An embankment, 3.0m above the HFL, along the river/nala should be made. Inspections for any accumulation of rainwater, obstruction in normal drainage and weakening in the embankment should be made.
- 10) Standing order for withdrawal of working persons in case of apprehended danger. During heavy rain inspection of vulnerable points is essential. In case of any danger persons are to be withdrawn to safer places.

14.5 PROTECTION OF EQUIPMENT DEPLOYED AT BOTTOM HORIZONS FROM FLOODING:

During the heavy monsoon period, the mining operation in the lower-most bench may have to be stopped. Therefore, it is proposed to drown the lower-most bench, which would work as a sump. The water will be pumped out and discharged into the nearby River or nalla after proper sedimentation.

For ensuring safety of the equipment while working out bottom horizons-with no access to surface profile, the following measures should be taken:

- 1) Drivage of initial trenches if any and coal cutting on bottom benches should be done during the dry period of the year.
- 2) Ramps should be made for quick shifting of equipment from bottom horizons, liable to be flooded during monsoon period, to the top horizons.

14.6 PREVENTION OF ELECTRIC SHOCKS:

During mining operations, all the statutory provisions of the Indian Electricity Rules 1956, and Indian Standards for installation and maintenance of electrical equipment etc. should be observed.

- 1) For protection from electric shocks to persons, all electrical equipment with voltage up to 1000V should be provided with Earth Leakage Relay, which will automatically disconnect electrical circuits.
- 2) Closed mobile substations and switchgears should be mechanically interlocked which exclude the possibility of opening the door when oil switch and air circuit breakers are in operation.
- 3) All metal parts of electrical equipment should be properly earthed to avoid failure of insulation.
- 4) All H.T lines and cables located within the blasting zones should be disconnected during charging & blasting operations.

14.7 DUST SUPPRESSION & DILUTION OF EXHAUST FUMES :

For precaution against dust, Regulation 143, 144 and 145 of CMR 2017 should be observed. Beside this the following measures should be adopted for dust suppression at all quarry working places, dumps, haul roads, CHP and near other auxiliary mining operations.

- 1) Spraying with water on all working faces & haul roads, by special spraying machines or water-sprinkler.
- 2) While drilling holes, it is necessary to use dust extraction devices.
- 3) Installation of local dust suppression and air conditioning devices in cabins of excavators and drilling rigs may be considered.
- 4) Leveling of spoil dump surface.
- 5) Separate dust suppression arrangement should be provided for CHP.

To prevent collection of harmful mixtures in the atmosphere, from the different sections of quarry workings, it is recommended:-

To spread out the sources of dust formation and omission of harmful gases throughout the working area of the quarry, the following precautions should be taken:

- 1) Drilling & blasting operations should be timed for periods of maximum wind activity during the day.
- 2) Dumpers may be provided with purifiers for exhaust gases.

14.8 MEASURES TO BE TAKEN FOR FIRE FIGHTING AND FIRE PREVENTION:

In addition to statutory provisions as laid down in Reg 135, 139 and 140 of CMR 2017, the measures for fire fighting and prevention of fires are as follows:

- 1) Organisation of special cell for systematic observations to examine and prevent fire.

- 2) Removal of spillage of coal on benches and cleaning of coal horizons to prevent cases of coal heating.
- 3) Storage of lubricants and cotton waste in enclosed fireproof containers in working places.
- 4) Provision of fire extinguishers.

14.9 MEASURES TO BE TAKEN WHILE DRILLING BLASTING:

Following measures should be taken while drilling and blasting operations in the quarry beside the statutory requirements:

- 1) Drilling and Blasting in quarry should be done in accordance with the provisions of Mines Act, rules and regulations and based on the Standing Orders for the safe use of explosives.
- 2) Adequate safety measures have to be taken during blasting operation in the quarry so that men/machine is not affected.

14.10 CONSERVATION

Suitable measures should be taken to minimize coal loss during mining operations. Selective mining of in-seam dirt bands has been proposed. It is proposed not to dump any spoil material over coal bearing area, amenable for mining, at present or even at a future date.

14.11 SCIENTIFIC STUDIES

The slopes of the quarry and dumps have been proposed on the basis of experience in the adjoining areas. However, to ascertain optimum slope angles for stability of quarry batter and dumps a scientific study need be carried out. Similarly hydro-geological study of the area is to under taken as none is available at present. Studies should also be carried out to ascertain the pattern of surface drainage, the manner of diversion of water courses to other water courses away from the mining area and the dimension of diversion dams, garland drains and other protective structures to be constructed.


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CHAPTER – XV

ENVIRONMENTAL MANAGEMENT

15.1 INTRODUCTION

The Environment Management Plan is one of the most important subjects to deal with after the preparation of the Project Report. The EMP deals with present land status, land use during mining, post mining use of the land and its impact on the present environment scenario. During mining operation, degradation of land, air, water, soil, noise, flora and fauna etc. occurs. Socio economic, hydro-geological strata are also affected and these are taken into consideration at the time of preparation of EMP.

15.2 EXISTING ENVIRONMENT QUALITY

Pre-mining observation is to be done in the above mentioned field. A base line data in environmental study is to be done and accordingly Environmental Impact is assessed. These basic data are taken from Pre-feasibility report, PR, Terms of Reference (TOR) etc. It covers the core zone of project as well as Buffer zone, which is 10 km away from periphery of the core zone. This is a running project. So, all the parameters related with environment will be studied for preparation of Environment Management Plan.

15.3 ENVIRONMENTAL IMPACT ASSESSMENT

The mining operation in Chandragupt OCP will generate a series of activities, which will produce air pollutions, waste water and effluent. It generates high noise level, degrade land and also will have impact on flora fauna. The project activities would also have impact on socio-economic profile of the area. It is proposed to assess the likely impact of the mining in and around the surrounding of the project.

15.4 ENVIRONMENTAL CONTROL MEASURES

Mitigation measures are broadly divided into preventive measure and suppression measure. Stress is given on mitigation measure, which is well effective and economical and are discussed in detail in EMP report.

15.5 ENVIRONMENT MANAGEMENT PLAN

For effective implementation, mid-term corrective measures, monitoring and control measure of environmental management plan depends on time bound action programme. The success of environmental management plan depends on the well set-up organization with dedicated persons. The objectives for preparation of Environmental Management Plan are:

- To implement environmental control and protection measures;
- Subsequent environmental monitoring of the efficacy of various control measures;

- Plantation / Green Belt Development;
- Land restoration;

Keeping in view of the above, details of the organizational structure responsible for the implementation of environmental control and mitigation measures as well as monitoring of such implementation will be discussed in the EMP.

15.7 CORPORATE SOCIAL RESPONSIBILITY

Company also performs some social works such as opening of primary schools and higher secondary schools for providing the education to local people, establishment of dispensaries and hospitals, medical camps for providing better health facilities, vocational training to unemployed youth for better employment digging of wells and bore wells for drinking water facilities etc. for welfare of the local people. These works are done with the fund generated as per the policy of CCL /Coal India Limited under the head of corporate social responsibility scheme.

15.8 REHABILITATION AND RESETTLEMENT

Based on the available data from CCL, about 500 families would be affected by mining operation in Chandragupt OCP. Thus, provision has been made for rehabilitation of 500 families. This figure is tentative & may change after detailed survey of mining lease hold area. Resettlement and rehabilitation will be done according to R&R Policy of Coal India Limited.


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CHAPTER-XVI

LAND REQUIREMENT

The total land requirement for Chandragupt Opencast Project has been estimated as 1495 Ha. It is divided into three Sections (Section-1, Section-2 & Section-3) consisting of 217.53, 471.40 & 644.22 Ha of land respectively.

The Forest land is 663.90 Ha.

LAND IN THE CORE ZONE OF CHANDRAGUPT OCP				
SN	Particulars	*Forest in Ha.	*Non - Forest in Ha.	Total land in Ha.
1	Quarry (Section-1)	67.72	149.81	217.53
2	Quarry (Section-2)	293.75	177.65	471.4
3	Quarry (Section-3)	226.03	418.19	644.22
4	Infrastructure (Field- Workshop)	17.14	20	37.14
5	CHP	4.46	11.74	16.2
6	Green Belt	52.3	-	52.3
7	Safety zone	2.50	53.71	56.21
Sub- Total		663.90	831.10	1495.00
LAND IN THE AMARPALI OPENCAST PROJECT				
1	CHP			Land already taken in Amrapali OCP
2	Unit Workshop			
3	Colony			

*The land details are tentative and likely to change after actual land survey.


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CHAPTER-XVII

MINE CLOSURE PLANNING

17.1 INTRODUCTION

Mine closure encompasses rehabilitation process as an ongoing programme designed to restore physical, chemical and biological quality disturbed by the mining to a level acceptable to all concerned. It aims at leaving the area in such a way that rehabilitation does not become a burden to the society after mining operation is over. It must also aim to create as self-sustained ecosystem.

Mine closure operation is a continuous series of activities starting from day one of the initiation of mining project. As progressive mine closure is a continuous series of activities, it is obvious that the proposals of scientific mining have included most of the activities in the progressive mine closure plan. Final mine closure plan as per statute, shall be considered to have its approval at least nine months before the date of proposed closure of mine. This period of nine months is reckoned as preparatory period for final mine closure operations.

Chandragupta OCP shall have mine closure plan, which shall be of two types:

- a) Progressive Mine Closure Plan and
- b) Final mine closure plan.

17.2 PROGRESSIVE MINE CLOSURE PLAN

17.2.1 Reclamation

A total of 1495.00 Ha. of Land is required for Chandragupt opencast project. This mining plan has been prepared based on the Geological Reports of Pachra and Pachra South geological blocks. The mining plan has been prepared to exploit 15.0 million te of coal per annum from opencast method by deploying shovel dumper combination and surface miner.

The plan envisages OB dumping in external dump in the initial years (first 5 years), thereafter internal dumping has been proposed in the voids of Chandragupt OCP. It is proposed to reclaim physically and biologically the excavated pit of Chandragupt mine after dumping by OB material. Reclamation of external OB dump shall be taken up concurrently with the Chandragupt opencast mine operation.

a) Phase-I: Physical / Technical Reclamation

In 1st phase OB dump shall be dozed and leveled to a bench slope angle of 37° . A layer of top soil is laid over this graded and leveled surface of OB dump.

The internal dump shall be dozed and leveled to a bench slope of 27° to safe guard any slope failure during mining operation.

b) Phase-II: Biological Reclamation

Biological reclamation is the Phase-II of reclamation process. Revegetation covers in terms of grass, trees of appropriate species are raised over physically reclaimed OB dump. The reclamation of OB dump shall be done concurrently with mine operation.

17.2.2 Air Quality Management Plan

Following mitigation measures are required to be done to control the air quality during mining operation:

- a) All blast hole drills are to be fitted with dust collection arrangements
- b) Water sprinklers are to be provided for dust suppression on haul roads and industrial area.
- c) Creation of green belt along roads and plantation in vacant land.
- d) Air Quality of mine shall be taken and analyzed on a regular interval.

17.2.3 Water Quality Management Plan

Following water Quality protection measures are suggested:

- a) Industrial effluent treatment plant
- b) Sedimentation pond for treatment of mine water
- c) Garland drains to arrest surface run-off flowing in to mine pit.
- d) Intercepting drains to collect water from external dumps
- e) Biological reclamation of disturbed land to arrest siltation.

17.2.4 Waste Management

Solid wastes that will be generated in course of coal mining are overburden material consisting of fragments of sandstone/shale of assorted size. They have not been found to generate acid mine drainage or leach high quantity of heavy metals.

A total of 995.34 MCum of OB will be removed and only 48.38 MCum of the OB is proposed to be dumped externally.

Several mitigation measures are proposed to for stabilization of external dump and prevent siltation and erosion.

- a) A Toe wall is proposed at the foot of the external dump.
- b) A series of open drains to be provided on dump body to arrest surface run-off and prevent siltation.
- c) Grasses are to be grown on dump slopes to minimize soil erosion.

17.2.5 Top Soil Management

It is proposed to dump and preserve top soil separately for use while reclaiming the land as well as external and internal dumps. No separate places have been proposed for keeping top soil.

However, the top of the area marked for external dump will be used for top soil preservation in rotational basis. Finished levels of the external dump may also be used if needed.

17.2.6 Safety & Security

While carrying out all kinds of mining and allied activities in the project, the safety rules in force as per Rules and Regulations made under Mines Act-1952 will be observed and required safety measures taken. Circulars issued time to time regarding safety to the personnel and equipment of the mine and to improve the working conditions of the mine, the mining plan envisages:

- Measures to prevent industrial accidents
- Measures to ensure stability of benches and OB dumps.
- Measures to ensure safety of equipment
- Measures to control fire
- Measures to control dust and emission of noxious gases
- Measures for pollution control.

17.3 FINAL MINE CLOSURE PLAN (CONCEPTUAL)

Mine closure operations is proposed to be undertaken after examination and detailed study that there is no further expansion possibility of the mine and the void is to be suitably filled up so that the land is utilized gainfully by the society. Intermediate stoppages of operations due to any reasons for a period of time do not come under the proposed scheme of mine closure. This chapter proposes following aspects:

- A. Technical Aspects
- B. Environmental Aspects
- C. Social Aspects
- D. Financial Aspects

17.3.1 Technical Aspects

- Safety aspects.
- Pit slopes and waste dumps.
- Hydrology and hydrogeology.
- Details of decommissioning of the infrastructures.
- Closure of entries like pits and entry to the mine.

17.3.2 Safety

After attaining the final stage dump the remaining portion between dump toe and final stage Quarry floor should be fenced properly so that no human being or stray animals should be trapped within. Internal dumps are proposed to be suitably re-graded to avoid deep trenches.

17.3.3 Pit Slopes and Waste Dumps

The final pit slopes are designed to avoid any slope failure. Technical study is proposed to be conducted before deciding upon the final slope. Both the external and internal Dumps are designed in such a way that there are minimal chances of slope failure. The external Dump is sloped ultimately in the overall range of 25 degree to 28 degrees. The internal dump slopes are designed at milder gradient so that even with the percolation of water in the dip side of the quarry, the dumps remain stable. It is proposed that the internal and external dump must be provided with toe walls/ silt arrestors and garland drains. Vegetation cover on surface of these dumps is proposed to be ensured as a final closing operation.

17.3.4 Hydrology and Hydrogeology

In the mine closure plan, the surface flow pattern of precipitation and mine water drainage is envisaged to be examined and the water channel suitably laid down, so that this is acceptable to the local community and it do not disturb the general hydrology of the area. Efforts are proposed to be made to regenerate the ground water resources.

17.3.5 Decommissioning of the Infrastructures

The coal project develops lot of infrastructure for sustaining their operations. These include Workshop, Coal Handling Plant, Railway Siding, Office Complex, Residential Complex, Roads, Pipe Lines and Transmission Line. Decommissioning of the infrastructure should be planned in such a way that the Land occupied by these infrastructures is released. However these infrastructures are proposed to be reused for the neighboring projects /mine.

17.3.6 Closure of Entry to the Mine

All entries to the mine must be effectively sealed. This will prevent illegal mining, entry of fire and water etc.

17.4 ENVIRONMENTAL ASPECTS

- Air, water, dust.
- Reclamation of forest/vegetation.
- Management of recharge areas.
- Acceptable surface and ground water flows.
- Alternative use of land.

17.4.1 Air, Water and Dust

It is proposed that air quality; water quality and dust level is to be monitored. Necessary actions to check the pollution from the closed mine, if any, in respect of air, water and dust is to be taken after examining the local site conditions then prevailing.


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17.4.2 Reclamation of Forest / Vegetation

It is proposed that major portion of the project area is covered with vegetation. This will involve both forest land as well as non-forest land. Certain areas, mostly industrial areas, where service building are proposed to be located and to be used are not proposed for plantation.

17.4.3 Management of Recharge Area

It is proposed that the recharge areas are fully utilized with sufficient availability of water, if feasible, is ensured to enhance ground water availability.

17.4.4 Surface and Ground Water flows

In the final stage, wherever the mine water is likely to flow out to surface and meet the natural drainage system, the quality of water is proposed to be assessed and flow pattern for mine water be properly modified / redesigned. Alternately, the water treatment arrangements may be considered depending upon the local site conditions.

17.4.5 Alternative Use of Land

During the mining operation, the land usage changes from its pre-mining scenario. The final stage land use plan shows the use of land in a post-mining scenario when coal-mining operations have completed. Alternative use of land, specially released from infrastructure areas and vacant areas, as proposed to be planned and properly designated for post-mining land uses depending on the existing conditions prevailing at that point of time. While for OB dumps and acquired forest areas, vegetation and afforestation has been proposed as a final land use. While agriculture may be the best land use, if feasible, and if it is supported by some irrigation facilities.

17.5 SOCIAL ASPECTS

- Re-deployment of work force.
- Management of community facilities
- Canalization of available water

17.5.1 Re-deployment of Work Force

The peak work force required for mine operations is in the first few years of the mine when construction activities as well as operational activities achieved their peak.

This work force slowly goes down with completion of development and when only the operational work remains. Again near the end of the mine life, say 4-5 years before closure, the activity of the mine starts getting reduced and therefore management gets opportunity to taper the operational manpower. After closure, skeleton service people are proposed to be left for continuing with the actual closure operations. The reduction of manpower could be done as per the following options:

1. Natural retirement.
2. Implementation of VRS schemes for age group of +50.


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3. Retraining and redeployment of younger groups – 40.
4. Transfer of experienced middle-aged groups between 40-50 years to other projects.

Retrenchment of people with suitable compensation after exhausting all the above option may be introduced.

17.5.2 Management of Community Facilities

The community facilities are proposed to be developed by coal projects for betterment of the neighboring community. The project management provides or assists in developing educational facilities, health facilities, community halls and also some communication facilities. After the mine closure, these facilities are to be continued for the neighboring communities to the possible extent. The closure plan will envisage interaction of mining company with the state or local bodies who will take over these facilities and run the same for the community. The coal companies towards running these facilities, which is proposed to be taken care of by the local/state bodies, may make a onetime payment.

17.5.3 Canalization of Available Water

If it is found that the mine is having sufficient water and on closure, the mine water flows into the surface watercourses, canalizing this water for surrounding community for their irrigational/domestic uses may be taken up.

17.6 FINANCIAL ASPECTS

- Creation of a corpus fund for the final mine closure
- Cost of progressive closure activities.
- Cost towards organization for executing the closure activities.
- Cost of the post project monitoring
- Bond/insurance for the closure cost

17.6.1 Financial Assurance

As proposed above, many activities are to be undertaken for progressive mine closure plan concurrently with the mine operation and final closure plan after the closure of the mine, which naturally will involve expenditure. Some of the closure activities will, in fact, form part of normal mining operations. However, some activities are proposed to be addressed only after completion of the coal mining operations.

17.7 DISASTER MANAGEMENT PLAN & RISK MANAGEMENT:

There are various elements of risks in operation of the mine. They include following:-

- **Slope Failure of External OB Dump** – OB proposed is planned to be stacked in internal and external dumps having a total maximum height of 90m in three tiers of 30m each. The OB


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material consists of assorted size of sandstone fragments, other geological strata and sub-soil. It has to be ensured that slope of OB Dumps do not fail as it would cause damage to life & property.

- **Slope failure of Internal Dump** – The slope of the backfilled mass is dynamic i.e. it moves every day. It has to be ensured that slope of backfilled mass is safe otherwise it may pose risk to life & property and interrupt the mining operations.
- **Stability of High walls** – In course of opencast mining slopes if created on high wall sides in coal and OB / interburden formations unless properly planned, they may fail. It is proposed to undertake slope stability analysis to avoid slope failure.
- **Fire** – There may be fire in working, store, industrial installations and other service building provided for the mine.
- **Inundation** – The open pit will collect water from direct precipitation and surface run-off from surrounding areas. This may lead to inundation of the mine pit.
- **Seismic activities** – The project is located in low risk seismic zone area.

Ameliorative Measures

Following ameliorative measures have been envisaged to be taken to prevent the risks/accidents:

- Slope stability analysis is required to be conducted for high wall slopes, External Dumps and Internal Dump slopes.
- Adequate fire fighting arrangements to be made.
- For preventing mine inundation, sufficient pumping arrangements have been made to pump out the pit water continuously.
- Garland drains have been proposed around mine pit to intercept surface run-off.
- Medical facilities – A hospital with necessary infrastructure, doctors and paramedical staff and ambulance has been proposed to take care of emergency situation.


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CHAPTER – XVIII

MANPOWER & PRODUCTIVITY

18.0 INTRODUCTION

Manpower requirements are assessed on the basis of 7 days week and 330 days of annual working. The peak manpower of the project has been estimated as 1247.

18.1 MANPOWER REQUIREMENT for Chandragupl OCP -15.0 MTY has been given below.

DEPARTMENTAL

SI No	Manpower Particulars	Category	Maximum	
			No.	%age
1	Unskilled	I	0	0.00
2	Semi-skilled	II, E	5	3.36
3	Total Workers		5	3.36
4	Monthly Paid		121	81.21
5	Officers		23	15.44
6	Total manpower		149	100

MDO

SI No	Manpower Particulars	Category	Maximum	
			No.	%age
1	Unskilled	I	55	5.01
2	Semi-skilled	II, E	93	8.47
3	Skilled	C, D, III, IV, V, VI	275	25.05
4	Highly skilled	A, B	539	49.09
4	Total Workers		962	87.61
5	Monthly Paid		110	10.02
6	Officers		26	2.37
7	Total manpower		1098	100

Additionally 70 (45 unskilled and 25 semi-skilled) persons for MDO is proposed to be outsourced as Security Manpower.

18.2 TRAINING

Newly recruited persons are to be trained as per the standing guidelines stipulated in the V.T Rules of DGMS and the existing Training Schedules of CIL prior to actual placement in the job/ mine. For periodical training and development need, a Group VTC for Area may be formed. If required, facilities at these training centres should be augmented periodically.


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ECONOMIC EVALUATION


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CHAPTER-XIX

BREAK-UP OF COST HEADS BETWEEN MDO & COMPANY

Company - Scope	MDO Operator - Scope
<u>Capital Heads</u> <ul style="list-style-type: none"> • Land • Railway siding • Vehicles for Departmental Manpower • Prospection & Boring (GR) • R&R expenditure • PR & EMP preparation • Scientific research 	<u>Capital Heads</u> <ul style="list-style-type: none"> • Residential & service building for MDO Manpower • Residential & service building for Departmental Manpower • HEMM • Other than HEMM • Furniture & Fittings for MDO Manpower • Furniture & Fittings for Departmental Manpower • Vehicles for MDO Manpower • Prospection & Boring (Production support) • Capital Outlay in Mines other than R&R part • Roads & culverts • Water supply & Sewerage
<u>Operating cost heads</u> <ul style="list-style-type: none"> • Salaries & wages for Departmental Manpower • Stores cost <ul style="list-style-type: none"> ◦ Diesel for Vehicles ◦ Misc. Items • Misc. expenditure for Departmental manpower <ul style="list-style-type: none"> ◦ Provision for TA/DA ◦ R&M of Civil items ◦ Misc. Items • Mine closure cost • Administrative cost • Interest on Working capital on the above cost heads • Depreciation/amortization of Company side capital investment 	<u>Operating cost heads</u> <ul style="list-style-type: none"> • Salaries & wages for MDO Manpower • Stores cost <ul style="list-style-type: none"> ◦ Diesel & Lubricant cost ◦ R&M cost of P&M ◦ Explosives cost ◦ Diesel for vehicles ◦ Misc. items • Power cost • Misc. expenditure for MDO manpower & Other cost components <ul style="list-style-type: none"> ◦ Provision for TA/DA ◦ Workshop Debit for P&M ◦ R&M of Civil items ◦ R&M of vehicles ◦ Haul road Maintenance ◦ Contingency ◦ Environment related costs ◦ Watch & ward ◦ Hiring charges of vehicles ◦ Misc. Items • Interest on Working capital on the above cost heads • Depreciation/amortization of MDO side capital investment


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CHAPTER-XX

ECONOMICS

20.1 INTRODUCTION

The modified & updated cost estimates of Project Report of Chandragupt OCP has been prepared at the nominal rated capacity of 15.0 Mty of coal considering MDO operation. The estimated economics have been discussed in the subsequent paragraphs.

20.2 TOTAL CAPITAL INVESTMENT

The capital investment, both initial as well as beyond target year, has been proposed from the internal resources of the Company. The capital requirements is given below:

Table-20.1: Capital Requirement (Project Life)

(Rs in Lakhs)				
SI No	Particulars	CCL	MDO	TOTAL
1	Land:			
	a) Freehold Land			
	b) Leasehold Land	67293.26		67293.26
2	Buildings:			
	a) Service		13601.03	13601.03
	b) Residential		14244.46	14244.46
3	Plant & Machinery			
	a) H. E. M. M.		131303.37	131303.37
	b) Others than HEMM		60186.01	60186.01
4	Furniture & Fittings		60.60	60.60
5	Railway Siding	22790.00		22790.00
6	Vehicles			
7	Prospecting & Boring		152.00	152.00
8	Development			
8.1	Capital Outlay in Mines	5639.00	3023.38	8662.39
8.2	Roads & Culverts		18083.60	18083.60
8.3	Water Supply & Sewerage		3056.05	3056.05
8.4	Scientific Research			
8.5	PR Prep Cost	1627.91		1627.91
9	Land Reclamation		2653.64	2653.64
	Total Capital	97350.17	246364.15	343714.33

However, the capital requirement to be sanctioned is Rs 97350.17 lakhs

20.3 CAPITAL INVESTMENTS FOR P&M

Capital investment on P&M is given in Appendix-A.3. The detailed break-up for HEMM, Electrical, Pump & Pipes, Workshop and Other P&M etc. are given in Appendix-A.3.1 to A.3.5.

Plant & Machinery

For the plant and machinery, as far as possible, the prices have been taken from the Standard Price List of Mining Equipment published by CMPDI and whenever information regarding price was not available, a broad estimate has been made.

20.4 ESTIMATED COST OF CIVIL CONSTRUCTION

The basis for the estimation of the cost of civil construction viz. residential buildings, service buildings, roads etc. has been given in Appendices - A.2.1, A.2.2 & A.8.2.

20.5 CAPITAL INVESTMENT ON VEHICLES

All vehicles are proposed to be outsourced (7 Nos for CCL and 36 nos. for the MDO) and the cost is included in Other Outsourcing Cost.

20.6 DEVELOPMENT

Under this head, estimated investment is given for (a) capital outlay in mines (Appendix A.8.1), (b) Roads and culverts, including haul roads (A.8.2), (c) Water Supply & Sewerage (A.8.3). The details of each item are given in the respective Appendix.

20.7 ESTIMATES OF OPERATING COST

Appendix-C gives the details of average cost and profitability. The method adopted in estimating the costs are briefly explained as follows:

a) Wages

The requirement of manpower for the targeted production of 15.0 MTY is estimated category wise/ scale wise. Prevalent pay scales for executives and non-executives (NCWA-X) are adopted. With conformity to resolution of 317th CIL Board Meeting regarding Cost Provisioning in Project Report of CIL Projects, Initial basic + 7.97% of the relevant pay scales of executives & non-executives have been considered in estimating the salary and wages cost. For manpower of MDO, HPC wages has been considered. In addition to the above 70 manpower has been considered as to be outsourced by the MDO and included in the other outsourcing cost.

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Over and above this, 70 persons for MDO has been outsourced as Security manpower. The cost is included in Other Outsourcing Cost.

b) Stores

Stores cost consists (1) diesel and lubricants, (2) explosives and detonator, (3) spares for routine repairs etc. Prevalent norms have been followed in estimating stores cost.

c) Power

The average Power cost per Tonne has been calculated based on the annual KWH consumed.

d) Miscellaneous Expenditure

This covers the expenditure on printing & stationery, postages, telephone, repairs and maintenance of assets other than P&M, workshop debits for annual servicing and overhauling of HEMM, insurance and taxes for vehicles, normative contractual cost of major maintenance of HEMM. The average Miscellaneous cost /Tonne has been shown in Table C below.

e) Final Mine closure Cost

A fund equal to Rs. 8.89 Lakhs/hectare of land (updated till Dec 2019 WPI) is proposed to be created towards a fund for final mine closure. The corpus required for mine closure, which has been distributed over the life of mine with a yearly escalation of 5%.

f) Administrative Charges

This includes area overhead, apex overhead etc. and the cost has been taken as per the actual administrative cost of CCL which is Rs. 191.03 per tonne. *With conformity to resolution of 317th CIL Board Meeting regarding Cost Provisioning in Project Report of CIL Projects, 10% of Administrative Overhead has been adopted as administrative cost for the calculation of IRR and for calculation of per tonne cost, actual administrative cost of CCL has been considered. The above mentioned administrative cost per tonne has been duly adjusted for incremental production. Rate of the interest on working capital is taken as 14.50% per annum.*

g) Interest on Working Capital:

The interest on working capital for calculating MDO cost has been considered with 1 month fund requirement.

h) Depreciation

Depreciation on assets is computed as per the prevalent norms. The straight-line method of charging depreciation has been adopted.

i) Cost & Profitability

The details of the average cost and profitability estimates, at 100% capacity is given in **Appendix-C**. The CPT & profitability has been shown for the whole life of the project. These have been summarised in the table below:-

Table-20.2: Cost & Profitability

(Cost in Rs/Te)			
S.N.	PARTICULARS	COST/TE	% OF TOTAL COST
1	SALARY & WAGES	37.48	6.22%
2	STORES	221.33	36.71%
3	POWER	15.34	2.55%
4	MISC EXP	42.66	7.07%
5	ADMINISTRATIVE COST (CASH)	15.81	2.62%
6	MINE CLOSURE COST	4.56	0.76%
7	OTHER OUTSOURCING COST	4.34	0.72%
8	INTEREST ON WORKING CAPITAL	5.71	0.95%
9	TOTAL CASH COST	347.22	57.59%
10	DEPRECIATION	113.43	18.81%
11	ADMINISTRATIVE COST (NOTIONAL)	142.26	23.59%
	TOTAL COST	602.91	100.00%

j) Selling Price

The declared Selling Price per tonne of ROM coal has been adopted for the grade G-11 (GCV 4000-4300) Coal for power sector, i.e. Rs. 955/- per tonne with additional charge of Rs 87/- per tonne for sizing of coal up to -100mm and RLS charges Rs. 29/- per tonne. The average selling price of ROM coal works out to Rs. 1023.25/- per tonne.

20.8 FINANCIAL ANALYSIS

The year-wise cash flows at 100% capacity utilisation has been estimated and is detailed in Appendix-D. The cash-flow excludes depreciation and interest on loan capital. The financial IRR on total capital of the project at 100% level of the rated output have been worked out based on the estimates of the aforesaid cash flow and is given below.

Table-20.3: Financial Analysis

Particulars	IRR
At 100% Capacity	39.70%
At 85% Capacity	30.08%

Sanjeev Kumar
SANJEEV KUMAR
 MANAGER
 CHANDRAGUPTA OPENCAST PROJECT
 CCL ANAPALLI-CHANDRAGUPTA AREA

20.9 INCLUSION OF GST IN PR

The prices of capital assets i.e., HEMMs, P&M, Civil constructions etc. have been considered inclusive of GST. A standard rate of GST @ 18% on HEMMs and P&M other than HEMMs has been considered. Input tax credit on GST paid on such capital assets will be available which can be utilized against output tax liability and hence due adjustment has been made on account of GST Credit on such capital assets for computation of cash flow analysis.

Calculations of operating expenditure have been made without considering impact of GST.


SANJEEV KUMAR
MANAGER
CHANDRAGUPTA OPENCAST PROJECT
CCL, AMARPALI-CHANDRAGUPTA AREA

APPENDICES

CCL-Part


SANJEEV KUMAR
MANAGER
CHANDRAGUPTA OPENCAST PROJECT
CCL AMRAPALI-CHANDRAGUPTA AREA

CHANDRAGUPT OCP (15.00 MTY)
STATEMENT OF ESTIMATED CAPITAL INVESTMENT AND YEARWISE PHASING
CCL

(Amount in Rs.lakhs)

SL NO	PARTICULARS	TOTAL CAPITAL UP TO PROJECT LIFE	TOTAL CAPITAL UP TO TARGET YEAR	PHASING OF CAPITAL								
				1	2	3	4	5	6	7	8	9
1	Land:											
	a) Freehold Land											
	b) Leasehold Land	67293.26	67293.26	23088.34	23088.34	2116.59						
2	Buildings:											
	a) Service											
	b) Residential											
3	Plant & Machinery											
	a) H. E. M. M.											
	b) Others than HEMM											
4	Furniture & Fittings											
5	Railway Siding	22790.00	22790.00	4870.00	13530.00	4390.00						
6	Vehicles											
7	Prospecting & Boring											
8	Development.											
8.1	Capital Outlay in Mines	5639.00	5639.00	1135.00	1000.00	1000.00	1000.00	1504.00				
8.2	Roads & Culverts											
8.3	Water Supply & Sewerage											
8.4	Scientific Research											
8.5	P.R Prep.Cost	1627.91	1627.91	1627.91								
	Upfront payment											
9	Revenue Exp.capitalised during Devel. Period											
10	Land Reclamation											
	INITIAL CAPITAL	97350.17	97350.17	30721.25	37618.34	26506.59	1000.00	1504.00				

PR OF CHANDRAGUPTA OCP (15.0 MTY)
STATEMENT SHOWING THE ESTIMATED INVESTMENT ON LAND ACQUISITION

CCL
(Amount in Rs. Lakhs)

Sl. No.	Particulars	Land Required (Ha)	Cost (Rs Lakh per Ha)	Cost & Phasing Rs. in lakhs				
				Total cost	Upto Target Year			Beyond Target year
					1st yr.	2nd yr.	3rd Yr.	
1	Forest Land	663.90	21.84	14501.79	7250.90	7250.90	0.00	0.00
2	Tenancy Land	498.66	89.20	44480.47	13344.14	13344.14	17792.19	0.00
3	GMK Land	332.44	25.00	8311.00	2493.30	2493.30	3324.40	0.00
	TOTAL	1495.00		67293.26	23088.34	23088.34	21116.59	0.00

Sanjeev Kumar
SANJEEV KUMAR
MANAGER
CHANDRAGUPTA OCP PROJECT
CCL AMRAPALI

**UCE FOR CHANDRAGUPTA OCP (15.0 MTY)
DETAILS OF RESIDENTIAL BUILDINGS**

SL.No.	CATEGORY/SCALE	TYPE OF QTRS.	NO.OF PERS-ONS	%age SATISFACTION	TOTAL QTRS. REQD.
1	CAT.I to VI, EX GR-B,C,D&E, MR-D to MR-H	A	34	26.47	9
2	MR-C to MR-A1 & EX GR- A & SPECIAL GRADE	HOSTEL/BARRACK B	64	35.00	22
3	E1 to E5	C	15	100.00	15
4	E6 AND ABOVE	D	7	100.00	7
5	SECURITY Sr. OFFICER(SECURITY) WATCH & WARD INSP.,HEAD WATCHMAN, ARMED GUARD & SECURITY GUARD	C A	1 28	100.00 100.00	1 28
	TOTAL		149	55.00	82

SANJEEV KUMAR
MANAGER
CHANDRAGUPTA DE-RICAST PROJECT
CCL AMBAPALI-CHANDRAGUPTA AREA

APPENDIX-A.2.2

UCE FOR CHANDRAGUPTA OCP (15.0 MTY)
DETAILS OF SERVICE BUILDINGS.

CCL

SL.No.	PARTICULARS	NO.	PLINTH AREA (sq.mt)	PLINTH AREA RATE(Rs)	COST AT 100 C.I.(Rs)
A.	OFFICE				
1	P.O. OFFICE	1	500	446	223000


SANJEEV KUMAR
MANAGER
CHANDRAGUPTA DE-ENCAST PROJECT
CCL AMRAPALI-CHANDRAGUPTA AREA

CHANDRAGUPTA OCP (15.00 MTY)

STATEMENT SHOWING THE ESTIMATED CAPITAL EXPENDITURE ON RAILWAY SIDING

(Amount in Rs. Lakhs)

SL. No.	PARTICULARS	TOTAL COST	PHASING		
			1	2	3
1	Preliminary Work	50.00	40.00	10.00	0.00
2	Civil Engineering Cost including link & Yard Portion and bridges (17.5 KM.approx.) etc.	17900.00	4480.00	10740.00	2680.00
3	Signalling and Telecommunication	900.00	90.00	540.00	270.00
4	Electrical Engineering & Control	2690.00	130.00	1610.00	950.00
5	EMP Measures	450.00	50.00	230.00	170.00
6	Contingency (Including Lighting, approach road, drain, rail-weigh bridge etc.)	800.00	80.00	400.00	320.00
TOTAL		22790.00	4870.00	13530.00	4390.00


SANJEEV KUMAR
 MANAGER
 CHANDRAGUPTA OCP/CAST PROJECT
 CCL, RAIPUR/CHANDRAGUPTA, JHAR

Appendix A.6

Provision of Hired Vehicles (CCL)

MDO	Particulars	Total No
1	Jeep	4
2	Car	3
	Total	7


SANJEEV KUMAR
MANAGER
CHANDRAGUPTA SPENCAST PROJECT
CCL AMRAPALI-CHANDRAGUPTA-135A

PR OF CHANDRAGUPTA OCP (15.0 MTY)
Estimated Capital for Capital Outlay in Mines

CCL

(AMOUNT IN RS. LAKH)

Sl.No	Particulars	Total Provision	Phasing					
			Up to Target Year					
			1st yr.	2nd yr.	3rd Yr.	4th. Yr.	5th. Yr.	6th. Yr.
1	Village rehabilitation for 500 families including cost of houses.	5504.00	1000.00	1000.00	1000.00	1000.00	1504.00	
2	Cost of EMP preparation & Baseline environmental data generation	114.41	114.41					
3	Total	5618.41	1114.41	1000.00	1000.00	1000.00	1504.00	0.00
4	GST except item no. 1 (18% OF Above)	20.59	20.59	0.00	0.00	0.00	0.00	0.00
5	GRAND TOTAL (IN Rs. LAKHS.)	5639.00	1135.00	1000.00	1000.00	1000.00	1504.00	0.00


SANJEEV KUMAR
 MANAGER
 CHANDRAGUPTA OPENCAST PROJECT
 CCL AMRAPALI-CHANDRAGUPTA AREA

CHANDRAGUPT OCP (15.0 MTP)
MANPOWER (CCL)

Particulars	Category	Max	Y1	Y2	Y3	Y4	Y5	Y6	Y7	Y8	Y9	Y10
LOADING/DESPATCH												
Loading Supervisor	6724-10360	4	4	4	4	4	4	4	4	4	4	4
Loading Munshi	5952-8644	8	8	8	8	8	8	8	8	8	8	8
Sub-Total of Loading & Despatch		12	12	12	12	12	12	12	12	12	12	12
TOTAL OF COAL												
PROJECT / G.M.'S OFFICE												
Project Officer (Mining) GM	53500-72000	1	1	1	1	1	1	1	1	1	1	1
Sr. Manager (Sales)	56800-62000	1	1	1	1	1	1	1	1	1	1	1
Private Secretary	20600-46500	1	1	1	1	1	1	1	1	1	1	1
O.S.	7824-12054	1	1	1	1	1	1	1	1	1	1	1
Sr. Clerk	7260-11184	1	1	1	1	1	1	1	1	1	1	1
LDC/Typist	6219-9009	1	1	1	1	1	1	1	1	1	1	1
Peon	5951-8247	1	1	1	1	1	1	1	1	1	1	1
Revenue Officer	20500-46500	1	1	1	1	1	1	1	1	1	1	1
Sub-Total of Project Office	7824-12054	1	1	1	1	1	1	1	1	1	1	1
TRAINING CENTRE												
Training Officer/C.M	32000-58000	1	1	1	1	1	1	1	1	1	1	1
Instructor	7260-11184	1	1	1	1	1	1	1	1	1	1	1
LDC/Typist	6219-9009	1	1	1	1	1	1	1	1	1	1	1
Peon	5951-8247	1	1	1	1	1	1	1	1	1	1	1
Sub-Total of Training Centre	5951-8247	1	1	1	1	1	1	1	1	1	1	1
MINING/SAFETY, DESPATCH & QUALITY CONTROL												
Chief Manager (Mining)	43200-66000	1	1	1	1	1	1	1	1	1	1	1
Sr. Manager (Mining)	36800-62000	1	1	1	1	1	1	1	1	1	1	1
Manager (Mining)/Safety Officer	32900-58000	1	1	1	1	1	1	1	1	1	1	1
Dy. Manager /ACM	29100-54500	4	4	4	4	4	4	4	4	4	4	4
Asst. Manager / UM	24900-50500	4	4	4	4	4	4	4	4	4	4	4
Sr. Overman	7824-12054	4	4	4	4	4	4	4	4	4	4	4
Overman	7260-11184	8	8	8	8	8	8	8	8	8	8	8
Fire Fighting Supervisor	7260-11184	1	1	1	1	1	1	1	1	1	1	1
Blasting Overman	7260-11184	2	2	2	2	2	2	2	2	2	2	2
O.S.	7824-12054	1	1	1	1	1	1	1	1	1	1	1
P.A.	7260-11184	1	1	1	1	1	1	1	1	1	1	1
LDC/Typist	6219-9009	1	1	1	1	1	1	1	1	1	1	1
Mining Sinder	6724-10360	29	29	29	29	29	29	29	29	29	29	29
MTK	6219-9009	4	4	4	4	4	4	4	4	4	4	4
Peon	5950-8248	2	2	2	2	2	2	2	2	2	2	2
Fire Fighting Headover	5950-8248	4	4	4	4	4	4	4	4	4	4	4
Sub-Total of MINING/SAF, DESP. & QUA. CONTROL	55	55	55	55	55	55	55	55	55	55	55	55
WATCH & WARD												
Security Officer	20500-46500	1	1	1	1	1	1	1	1	1	1	1
Watch & Ward Inspector	6219-9009	1	1	1	1	1	1	1	1	1	1	1
Head Watchman	6219-9009	2	2	2	2	2	2	2	2	2	2	2
Armed Guard	6219-9009	10	10	10	10	10	10	10	10	10	10	10
Security Guard	5952-8644	15	15	15	15	15	15	15	15	15	15	15
Sub-Total of Watch and Ward	17	17	17	17	17	17	17	17	17	17	17	17
ACCOUNTS												
Sr. Manager (Finance)	30600-62000	1	1	1	1	1	1	1	1	1	1	1
Manager (Finance)	32900-58000	1	1	1	1	1	1	1	1	1	1	1
Accountant	7824-12054	2	2	2	2	2	2	2	2	2	2	2
Sr. Cashier	7260-11184	1	1	1	1	1	1	1	1	1	1	1
Cashier	6724-10360	1	1	1	1	1	1	1	1	1	1	1
LDC/Typist	6219-9009	2	2	2	2	2	2	2	2	2	2	2
Sub-Total of Accounts	6	6	6	6	6	6	6	6	6	6	6	6
PERSONNEL WELFARE												
Sr. Manager (Admin)	36600-62000	1	1	1	1	1	1	1	1	1	1	1
Manager (Personnel)	32000-58000	1	1	1	1	1	1	1	1	1	1	1
LDC/Typist	6219-9009	1	1	1	1	1	1	1	1	1	1	1
Recreation Club Attendant	6219-9009	1	1	1	1	1	1	1	1	1	1	1
Sub-Total of Personnel Welfare	3	3	3	3	3	3	3	3	3	3	3	3

CHANDRAGUPT OCP (15.0 MTN)
MANPOWER (CCL)

Particulars	Category	Max	Y1	Y2	Y3	Y4	Y5	Y6	Y7	Y8	Y9	Y10	SURVEY														
Manager (Survey)		1		1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	
Sr. Officer (Survey)		1		1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	
Head Surveyor		1		1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	
Surveyor (Ind. Revenue)		3		3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	
Dakon	7260 - 11184	2	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	
Chairman	5885 - 6542	7	2	3	4	6	7	7	7	7	7	7	7	7	7	7	7	7	7	7	7	7	7	7	7	7	
Sub-Total of Survey			4	9	10	14	16	15	15	15	15	15	15	15	15	15	15	15	15	15	15	15	15	15	15	15	
TOTAL FOR COMMON			97	113	126	136	137	137	137	137	137	137	137	137	137	137	137	137	137	137	137	137	137	137	137	137	
GRAND TOTAL			153	107	123	136	148	148	148	148	148	148	148	148	148	148	148	148	148	148	148	148	148	148	148	148	

SANJEEV KUMAR
MANAGER
CHANDRAGUPT OCP (15.0 MTN) AREA
CCL AMBAPALI-CHANDRAGUPTA AREA

CHANDRAPUR OCP (15.0 MTP)
STATEMENT SHOWING ESTIMATED YEAR WISE OPERATING COST AT 100% CAPACITY UTILISATION
CCL

Sl	Particulars	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25
1	Salary & Wages	1134.83	1331.43	1498.26	1581.23	1589.17	1589.17	1589.17	1589.17	1589.17	1589.17	1589.17	1570.21	1570.21	1584.99	1589.28	1589.28	1589.28	1589.28	1589.28	1589.28	1589.28	1589.28	1589.28	1589.28	1589.28
2	Stamps	14.00	22.50	40.00	55.00	65.00	75.00	75.00	75.00	75.00	75.00	75.00	75.00	75.00	75.00	75.00	75.00	75.00	75.00	75.00	75.00	75.00	75.00	75.00	75.00	75.00
3	Power																									
4	Misc. Expenses	358.47	781.49	1155.91	1403.63	1583.31	1733.31	1733.31	1733.31	1733.31	1733.31	1733.31	1733.31	1733.31	1733.31	1733.31	1733.31	1733.31	1733.31	1733.31	1733.31	1733.31	1733.31	1733.31	1733.31	1733.31
5	Administrative Cost (CML)	613.94	808.80	1308.86	1811.39	2088.34	2352.06	2352.06	2352.06	2352.06	2352.06	2352.06	2352.06	2352.06	2352.06	2352.06	2352.06	2352.06	2352.06	2352.06	2352.06	2352.06	2352.06	2352.06	2352.06	2352.06
6	Wire closure Cost	324.12	340.33	357.36	375.21	393.98	413.57	434.36	456.08	478.88	502.82	527.96	554.36	582.06	611.18	641.74	673.83	707.52	742.90	780.04	819.05	860.00	903.00	948.15	995.56	1045.33
7	OB Outsourcing																									
8	COAL Outsourcing																									
9	Other Outsourcing cost	5.97	17.92	29.86	41.80	41.80	41.80	41.80	41.80	41.80	41.80	41.80	41.80	41.80	41.80	41.80	41.80	41.80	41.80	41.80	41.80	41.80	41.80	41.80	41.80	41.80
10	Reserve Price																									
11	Bank Guarantee Charges (LS)	1571.79	159.52	215.00	254.60	278.48	299.37	300.31	301.96	303.06	304.22	305.43	306.77	308.14	309.57	309.97	308.53	310.15	311.86	313.66	315.54	317.52	319.68	321.78	324.06	325.48
12	Interest on Working capital																									
13	Total cost Cost	3923.23	3459.95	4653.26	5523.27	6340.98	6904.30	7326.61	7549.38	7673.23	7693.38	7693.38	7693.38	7693.38	7693.38	7693.38	7693.38	7693.38	7693.38	7693.38	7693.38	7693.38	7693.38	7693.38	7693.38	7693.38
14	Interest on loan																									
15	Administrative Cost (Internal)	4625.50	7261.24	12319.88	16302.51	18795.08	21168.57	21168.57	21168.57	21168.57	21168.57	21168.57	21168.57	21168.57	21168.57	21168.57	21168.57	21168.57	21168.57	21168.57	21168.57	21168.57	21168.57	21168.57	21168.57	21168.57
16	Depreciation	941.50	12955.60	20002.18	24800.72	27979.31	30817.65	30839.33	30862.16	30886.03	30911.10	30937.48	30964.76	30992.63	31020.83	31049.53	31078.85	311078.94	31135.80	31164.14	31192.50	31220.86	31249.14	31277.30	31305.30	31333.15
	Total	941.50	12955.60	20002.18	24800.72	27979.31	30817.65	30839.33	30862.16	30886.03	30911.10	30937.48	30964.76	30992.63	31020.83	31049.53	31078.85	311078.94	31135.80	31164.14	31192.50	31220.86	31249.14	31277.30	31305.30	31333.15
	Cost/lt. (Rs.)	250.00	88.54	70.81	63.16	58.88	57.02	57.17	57.30	57.39	57.46	57.52	57.57	57.62	57.67	57.72	57.77	57.82	57.87	57.92	57.97	58.02	58.07	58.12	58.17	58.22
	Fixed Cost (Rs/lt.)	250.00	88.54	70.81	63.16	58.88	57.02	57.17	57.30	57.39	57.46	57.52	57.57	57.62	57.67	57.72	57.77	57.82	57.87	57.92	57.97	58.02	58.07	58.12	58.17	58.22
	Variable Cost (Rs/lt.)																									

Amount in Rs.Lakhs

SANJEEV KUMAR
MANAGER
CHANDRAPUR OCP/CAST PROJECT
CCL AMPAPATI-CHANDRAPUR AREA

CCL - 10X

B13, CML

CHANDRAGUPH OCP (15.00 MTP)

STATEMENT SHOWING ESTIMATED YEAR WISE OPERATING COST AT 85% CAPACITY UTILISATION

CCL

(Amount in Rs. Lakhs)

Sl. No.	Particulars	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25
1	Salary & Wages	1134.00	1301.00	1468.26	1591.23	1598.17	1598.17	1598.17	1598.17	1598.17	1598.17	1598.17	1598.17	1598.17	1598.17	1598.28	1598.28	1598.28	1598.28	1598.28	1598.28	1598.28	1598.28	1598.28	1598.28	1598.28
2	Power	14.00	22.50	40.00	65.00	65.00	75.00	75.00	75.00	75.00	75.00	75.00	75.00	75.00	75.00	75.00	75.00	75.00	75.00	75.00	75.00	75.00	75.00	75.00	75.00	75.00
3	Water	1573.81	1573.81	1573.81	1573.81	1573.81	1573.81	1573.81	1573.81	1573.81	1573.81	1573.81	1573.81	1573.81	1573.81	1573.81	1573.81	1573.81	1573.81	1573.81	1573.81	1573.81	1573.81	1573.81	1573.81	1573.81
4	Adminstrative Cost (C&M)	513.94	606.40	1368.89	1811.39	2088.34	2352.06	2352.06	2352.06	2352.06	2352.06	2352.06	2352.06	2352.06	2352.06	2352.06	2352.06	2352.06	2352.06	2352.06	2352.06	2352.06	2352.06	2352.06	2352.06	2352.06
5	Material Expenses	329.07	781.49	1071.91	1287.33	1446.81	1575.81	1575.81	1575.81	1575.81	1575.81	1575.81	1575.81	1575.81	1575.81	1575.81	1575.81	1575.81	1575.81	1575.81	1575.81	1575.81	1575.81	1575.81	1575.81	1575.81
6	Material Cost	324.12	340.33	357.36	375.21	393.96	413.87	434.36	456.08	478.88	502.82	527.06	554.36	582.68	611.18	641.74	673.83	707.52	742.90	780.04	819.05	859.00	900.00	943.15	988.56	1045.33
7	OB Costing																									
8	Cost Accounting																									
9	Other Outourcing cost	5.82	16.87	28.12	39.37	39.37	39.37	39.37	39.37	39.37	39.37	39.37	39.37	39.37	39.37	39.37	39.37	39.37	39.37	39.37	39.37	39.37	39.37	39.37	39.37	39.37
10	Positive Price																									
11	Bank Guarantee Charges (B.G.)	112.22	199.47	210.86	248.90	271.76	282.16	283.16	284.23	286.33	286.48	287.70	288.04	288.74	289.77	289.24	289.80	292.42	304.13	308.83	307.81	308.79	311.87	314.05	316.35	318.75
12	Interest on Working Capital																									
13	Total cost	2433.91	3458.96	4573.37	5398.64	5994.43	6307.26	6398.86	6481.71	6495.82	6493.72	6487.08	6484.38	6480.25	6458.47	6457.51	6524.15	6599.47	6876.38	6935.49	6876.38	6719.31	6764.39	6811.72	6867.42	6913.61
14	Interest on Loan																									
15	Administrative Cost (National)	4525.50	7261.24	12310.88	16302.51	18795.08	21188.57	21188.57	21188.57	21188.57	21188.57	21188.57	21188.57	21188.57	21188.57	21188.57	21188.57	21188.57	21188.57	21188.57	21188.57	21188.57	21188.57	21188.57	21188.57	21188.57
16	Depreciation	944.78	2234.41	3018.94	3068.94	3144.14	3144.14	3144.14	3144.14	3144.14	3144.14	3144.14	3144.14	3144.14	3144.14	3144.14	3144.14	3144.14	3144.14	3144.14	3144.14	3144.14	3144.14	3144.14	3144.14	3144.14
	Total	8004.18	12954.51	19812.30	24770.06	27833.65	30642.86	30671.86	30694.43	30718.33	30743.44	30777.89	30798.73	30808.86	30808.86	30808.86	30808.86	30808.86	30808.86	30808.86	30808.86	30808.86	30808.86	30808.86	30808.86	30808.86
	Costs (Rs.)	339.31	338.68	282.83	254.52	251.89	249.36	249.36	249.36	249.36	249.36	249.36	249.36	249.36	249.36	249.36	249.36	249.36	249.36	249.36	249.36	249.36	249.36	249.36	249.36	249.36
	Fixed Cost (Rs./hr)	111.61	177.16	131.34	109.22	99.84	95.82	91.99	92.16	92.16	92.16	92.16	92.16	92.16	92.16	92.16	92.16	92.16	92.16	92.16	92.16	92.16	92.16	92.16	92.16	92.16
	Variable Cost (Rs./hr)	224.70	161.52	161.49	155.70	152.05	148.56	148.56	148.56	148.56	148.56	148.56	148.56	148.56	148.56	148.56	148.56	148.56	148.56	148.56	148.56	148.56	148.56	148.56	148.56	148.56

SANJEEV K. JHAH
MANAGER
CHANDRAGUPH OPENCAST PROJECT
CCL AMRAPALI-CHANDRAGUPH AREA

CCL - 11X

RI-3, CMPDI

(Amount in Rs. Lakhs)

S.N	Particulars	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25
1	Initial Capital (Equity)	30721.25	27618.34	26504.59	1000.00	1504.00																				
2	Debt Service																									
3	Replacement Capital																									
4	Less: GST credit on Capital Goods																									
5	Cash Operating Expenses	3923.20	3459.56	4663.26	6522.27	6040.08	6564.93	6526.61	6549.38	6573.29	6588.39	6624.75	6632.96	6603.92	6626.14	6656.18	6681.62	6727.14	6764.22	6803.16	6844.05	6886.98	6932.66	6976.39	7026.69	7081.28
6	Total Cash Outflow	34644.48	41076.29	31768.95	6522.27	7544.08	6564.93	6526.61	6549.38	6573.29	6588.39	6624.75	6632.96	6603.92	6626.14	6656.18	6681.62	6727.14	6764.22	6803.16	6844.05	6886.98	6932.66	6976.39	7026.69	7081.28
7	Inflow from Sales	28651.00	46346.26	61968.00																						
8	Net Cash Flow	-5993.48	4967.96																							
9	Desired Selling Price to Yield 12% IRR (Rs/M)				50860.15	-6522.27	-7544.08	-6564.93	-6526.61	-6549.38	-6573.29	-6588.39	-6624.75	-6632.96	-6603.92	-6626.14	-6656.18	-6681.62	-6727.14	-6764.22	-6803.16	-6844.05	-6886.98	-6932.66	-6976.39	-7026.69
10				134.62																						

(Amount in Rs. Lakhs)

CHANDRAGUPT OCP (15.00 MTY)
STATEMENT SHOWING ESTIMATED CASH FLOW ANALYSIS AT 85% CAPACITY UTILISATION
CCL

S.N	Particulars	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25
1	Initial Capital	30721.25	37618.34	26508.58	1000.00	1504.00																				
2	Debt Service																									
3	Replacement Capital																									
4	Less: GST credit on Capital Goods																									
5	Cash Operating Expenses	2433.91	3458.86	4573.37	5308.64	5884.43	6337.26	6358.05	6381.71	6405.62	6430.72	6457.08	6484.38	6438.25	6458.47	6480.51	6524.15	6558.47	6598.55	6635.49	6676.38	6719.31	6764.39	6811.72	6861.42	6913.61
6	Total Cash Outflow	33156.16	41077.20	31079.98	6358.64	7398.43	6337.26	6358.95	6381.71	6405.62	6430.72	6457.08	6484.38	6438.25	6458.47	6480.51	6524.15	6558.47	6598.55	6635.49	6676.38	6719.31	6764.39	6811.72	6861.42	6913.61
7	Inflow from Sales	24353.35	38139.31	68581.00																						
8	Net Cash Flow	-8801.81	-1837.89	38501.04	-6388.64	-7398.43	-4337.26	-4358.95	-4381.71	-4405.62	-4430.72	-4457.08	-4484.38	-4438.25	-4458.47	-4480.51	-4524.15	-4558.47	-4598.55	-4635.49	-4676.38	-4719.31	-4764.39	-4811.72	-4861.42	-4913.61
9	Desired Selling Price to Yield 12% IRR (Rs/Kt)			157.56																						

(Amount in Rs. Lakh)

(Amount in Rs. Lakh)

CHANDRAGUPTA OCEANCAST PROJECT
CCL, KIMBAPALI CHANDRAGUPTA AREA
SANJEEV KUMAR
MANAGER

APPENDICES

MDO-Part


SANJEEV KUMAR
MANAGER
CHANDRASUPTA OPENCAST PROJECT
CCL AMRAPALI-CHANDRASUPTA AREA

PROJECT REPORT OF CHANDRAGUPT OCP (15.00 MTY)
STATEMENT OF ESTIMATED CAPITAL INVESTMENT AND YEARWISE PHASING
MDO

APPENDIX-A

SL NO	PARTICULARS	TOTAL CAPITAL UP TO PROJECT LIFE	TOTAL CAPITAL UP TO TARGET YEAR	PHASING OF CAPITAL														
				1	2	3	4	5	6	7	8	9	10	11	13	14	15	16
1	Land:																	
	a) Freehold Land																	
	b) Leasehold Land																	
2	Buildings:																	
	a) Service	13601.03	13601.03	20.00	60.00	3680.00	3810.00	6031.03										
	b) Residential	14244.46	13280.00	7848.00	1487.00	1838.00	847.00	1033.00	227.00	964.46								
3	Plant & Machinery																	
	a) H. E. M. M.	131303.37	71876.36	29448.09	8868.94	16954.40	5364.30	8799.11	2441.52	296.19	296.19		296.19	3490.93	25431.05	296.19	25003.71	2835.64
	b) Others than HEMM	60186.01	58913.81	5674.44	13736.61	20831.14	18080.50	120.54	470.58	61.48	564.74				385.20			
4	Furniture & Fittings	60.60	60.60				30.30	30.30										
5	Railway Siding																	
6	Vehicles																	
7	Prospecting & Boring	152.00	152.00			76.00	76.00											
8	Development.																	
8.1	Capital Outlay in Mines	3023.38	1824.89	760.55	267.69	389.68	164.34	182.17	60.46	58.29	59.00	114.87	966.33					
8.2	Roads & Culverts	18083.60	18020.55	6635.65	6718.40	1647.77	2961.63	46.80	10.30	63.06								
8.3	Water Supply & Sewerage	3056.05	2978.73	506.80	336.55	456.99	499.29	1165.88	13.22	77.32								
8.4	Scientific Research																	
8.5	P.R. Prep.Cost																	
	Upfront payment																	
9	Revenue Exp.capitalised during Devel. Period																	
10	Land Reclamation	2653.64	2653.64		2357.46	296.19												
11	Washery																	
	INITIAL CAPITAL	246364.15	183361.62	50893.53	33832.66	46170.16	31833.36	17408.83	3223.07	1520.80	919.93	114.87	1262.51	3490.93	25816.25	296.19	25003.71	2835.64

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SANJEEV KUMAR
 MANAGER
 CHANDRAGUPTA OPENCAST PROJECT
 CCL, AMRAPALI-CHANDRAGUPTA

MDO, 1X

RI-3, CMPDI

**CHANDRAGUPT OCP (15.0 MTY)
SUMMARY OF THE CAPITAL INVESTMENT ON BUILDINGS.**

APPENDIX-A.2

MDO

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Sl.No.	PARTICULARS	TOTAL PROV.	P H A S I N G							REFERENCE
			UP TO TARGET YEAR						BEYOND TGT. YR.	
			Y.1	Y.2	Y.3	Y.4	Y.5	Y.6		
1.	RESIDENTIAL BUILDINGS	14244.46	7848.00	1487.00	1838.00	847.00	1033.00	227.00	965.20	APP.A.2.1.
2.	SERVICE BUILDINGS	13601.03	20.00	60.00	3680.00	3810.00	6031.03			APP.A.2.2.
	T O T A L	27845.50	7868.00	1547.00	5518.00	4657.00	7064.03	227.00	965.20	


SANJEEV KUMAR
 MANAGER
 CHANDRAGUPTA OCP PROJECT
 CCL, AMBAPUR CHANDRAGUPTA AREA

APPENDIX A.2.1

CHANDRAGUPT OCP (15.0 MTY)
STATEMENT SHOWING THE CAPITAL INVEST ON
RESIDENTIAL BUILDINGS.


MDO
UPTO TARGET YEAR
(AMOUNT IN Rs.'000')

SL.No.	CATEGORY/SCALE	TYPE OF QTRS.	NO.OF PERSONS	%age SATISFACTION	TOTAL QTRS. REQD.	UNIT COST AT 100 CI IN RS.	UNIT COST AT 4025 CI(IN RS.)	TOTAL COST
1	CAT.I to VI, EX GR-B,C,D&E, MR-D to MR-H	A	990	50.00	495	36301	1461115	723252
2	MR-C to MR-A1 & EX GR- A & SPECIAL GRADE	STEL/BARRACK B	102	70.00	71	46420	1868389	132656
3	E1 to E5	C	34	100.00	34	69287	2788806	94819
4	E6 AND ABOVE	D	14	100.00	14	97357	3918635	54861
5	SECURITY Sr. OFFICER(SECURITY) WATCH & WARD INSP.,HEAD WATCHMAN, ARMED GUARD & SECURITY GUARD	C A	1 28	100.00 100.00	1 28	69287 36301	2788806 1461115	2789 40911
	SUB-TOTAL		1169	55.00	643			1049288
	CONTINGENCIES 3% OF ABOVE							31479
	Design Engrg. @ 3.75%							39348
	Survey @ 0.5%							5246
	TOTAL (IN Rs. LAKHS.)							11253.61
	Add GST @ 18%							2026
	GRAND TOTAL (IN Rs. LAKHS.)							13279.26

**CHANDRAGUPTA OCP(15.8 MTY)
STATEMENT SHOWING THE CAPITAL INVEST ON
RESIDENTIAL BUILDINGS.**

**MDO
BEYOND TARGET YEAR
(AMOUNT IN Rs.'000')**

SL.No.	CATEGORY/SCALE	TYPE OF QTRS.	NO.OF PERSONS	%age SATISFACT ION	TOTAL QTRS. REQD.	UNIT COST AT 100 CI IN RS.	UNIT COST AT 4825 CI(IN RS.)	TOTAL COST
1	CAT.I to VI, EX GR-B,C,D&E, MR-D to MR-H	A	1021	49.46	505	36301	1461115	737863
2	MR-C to MR-A1 & EX GR- A & SPECIAL GRADE	HOSTEL/BARRACK B	149	70.00	104	46420	1868389	194312
3	E1 to E5	C	34	100.00	34	69287	2788906	94819
4	E6 AND ABOVE	D	14	100.00	14	97357	3918635	54861
5	SECURITY Sr. OFFICER(SECURITY) WATCH & WARD INSP.HEAD WATCHMAN, ARMED GUARD & SECURITY GUARD	C A	1 28	100.00 100.00	1 28	69287 36301	2788906 1461115	2789 40811
	SUB-TOTAL		1247	55.00	685			1125556
	CONTINGENCIES 3% OF ABOVE							33767
	Design Engg. @ 3.75%							42208
	Survey @ 0.5%							5628
	TOTAL (IN Rs. LAKHS.)							12071.58
	Add GST @ 18%							2173
	GRAND TOTAL (IN Rs. LAKHS.)							14244.46


SANJEEV KUMAR
MANAGER
CHANDRAGUPTA OPENCAST PROJECT
CCL, AMRAPALI-CHANDRAGUPTA AREA

APPENDIX-A.2.2

CHANDRAGUPTA OCP(150 MTY)
ESTIMATED CAPITAL EXPENDITURE ON SERVICE BUILDINGS.

MDO

(AMOUNT IN Rs. '000')

SL.No.	PARTICULARS	NO.	PLINTH AREA (sq.mt)	PLINTH AREA RATE(Rs)	COST AT 100 C.I.(Rs)	COST AT 4025 C.I
A.	OFFICE					
1	P.O. OFFICE	1	1450	446	646700	260.30
2	SITE OFFICE	1	100	446	44600	17.95
3	TOWN ADMINISTRATION OFFICE	1	50	446	22300	8.98
4	BOUNDARY WALL(IN METRE)		310	150	46500	18.72
SUB TOTAL(1 TO 4)						
B	WORKSHOPS					305.94
B.1	EXCAVATION WORKSHOP					
1	WORKSHOP OFFICE	1	432	446	192672	77.55
2	SECURITY POST	2	9	446	8028	3.23
3	DOZER REPAIR SHOP	1	1560	740	1154400	464.65
4	FACE EQUIPMENT REPAIR SHOP	1	864	740	639360	257.34
5	BUCKET REPAIR SHOP	1	1152	740	852480	343.12
6	SETTLING TANK	2	1830	260	951600	383.02
7	DOZER WASHING STN.	1	180	650	117000	47.09
8	DOZER PARKING	1	360	115	41400	16.66
9	PUMP HOUSE	1	175	280	49500	18.31
10	DUMPER WASHING STN.	1	864	740	639360	257.34
11	OPEN SERVICE GROUND	1	960	45	43200	17.39
12	DUMPER REPAIR SHOP	1	10080	1100	11088000	4462.92
13	FUELING STATION	1	LS			42.88
14	FUELING STATION BUILDING	1	50	446	22300	8.98
15	CRANE PARKING BAYS	1	550	45	24750	9.96
16	WATER RESERVOIR	1	650	650	422500	170.06
17	CONC. ROAD FOR DOZER	1	2600	115	299000	120.35
18	CONC. ROAD FOR DUMPERS	1	25360	115	2916400	1173.85
19	SCRAP YARD	1	1800	45	81000	32.60
20	BOUNDARY WALL(IN METRE)	1	1028	150	154200	62.07
SUB TOTAL(1 TO 20)						
B.2	E & M WORKSHOP					7969.37
1	LAV PARKING SPACE	1	600	45	27000	10.87
2	MVC. STR. SHOP & STORE	1	828	650	538200	216.63
3	ELECTRICAL & LMV SHOP	1	648	650	421200	169.53
4	L MV WASHING STATION	1	100	100	10000	4.03
5	PUMP HOUSE	1	50	260	13000	5.23
6	CONC. ROAD FOR L.M.Vs.	1	1850	45	83250	33.51
7	BOUNDARY WALL (IN METER)	1	215	150	32250	12.98
SUB TOTAL(1-7)						
B.3	COMMON FACILITIES					452.77
1	SECURITY POST	1	9	446	4014	1.62
2	TIME OFFICE	1	100	446	44600	17.95
3	FIRE FIGHTING STATION	1	300	550	165000	66.41
4	CAR PARKING	1	150	235	35250	14.19
5	CYCLE STAND	1	300	200	60000	24.15
6	CANTEEN	1	240	380	91200	36.71
7	REST SHELTER	1	25	380	9500	3.82
8	W.C.	1	25	685	17125	6.89
9	TOILET	1	15	685	10275	4.14
10	SUB STATION	1	540	550	297000	119.54
11	BITUMINOUS PAVEMENT	1	1775	33	58575	23.58
12	CONC. PAVEMENT	1	1366	45	61470	24.74
13	BOUNDARY WALL (IN METER)	1	110	150	16500	6.64
SUB TOTAL(1-13)						
350.38						

MDO
NT IN R\$ 1.000

SL.No.	PARTICULARS	NO.	PLINTH AREA (sqm)	PLINTH RATE(Rs)	100 CL(Rs)	COST AT 4025 CL
B.4	STORE COMPLEX					
1	SECURITY POST	2	446	8028		3.23
2	LIGHTING TOWER	5	14229	71145		28.64
3	STORE OFFICE	1	100	446		17.95
4	STORE SHED	1	1800	550		396.46
5	SCRAP YARD	1	2400	45		43.47
6	POL STORE	1	600	413		99.74
7	STORE YARD	1	2500	45		45.28
9	CONC. PAVEMENT	1	1670	84150		33.87
10	BOUNDARY WALL (IN METER)	1	550	82500		33.21
SUB TOTAL(1 TO 9)						
E	MAGAZINE					703.86
1	MAGAZINE BUILDING	1	152	550		33.65
2	BOUNDARY WALL (IN METER)		100	150.00		6.04
SUB TOTAL(1-2)						
F	SUB STATIONS					39.69
1	SUB STATION BUILDINGS	2	240	550		105.25
2	OUTER SWITCHYARD	2			264000	265.00
3	BOUNDARY WALL	2	300	150		36.23
SUB TOTAL(1-3)						
G	STATORY BUILDINGS					407.49
1	FIRST AID CENTRE	1	17	467		3.20
2	REST SHELTER	1	39	380		5.97
3	TOILET	1	52	685		14.34
4	CANTEEN	1	245	380		37.47
5	FIRE FIGHTING STATION	1	200	550		44.28
6	BOUNDARY WALL (IN METER)		470	150		28.36
SUB TOTAL(1-6)						
H	COMMUNITY BUILDINGS					133.82
1	COMMUNITY HALL	1	450	380		68.83
2	OFFICERS CLUB	1	380	380		58.12
3	SHOPPING CENTRE	1	1110	380		169.77
4	GARAGE	1	536	235		50.65
5	CYCLE STAND	1	704	200		56.67
6	DISPENSARY	1	280	467		52.63
7	BUS SHEDS	1	92	235		8.70
8	WORKERS INSTITUTE	1	341	380		52.16
9	POST OFFICE	1	56	446		10.05
10	BANK	1	202	446		36.26
11	SCHOOL	1	484	380		74.03
12	OFFICERS REST HOUSE	1	276	380		42.21
13	STAFF REST HOUSE	1	264	380		43.44
14	TRAINING CENTER	1	246	446		44.16
15	BOUNDARY WALL (IN METER)		990	150		59.77
SUB TOTAL(1-15)						
	TOTAL					827.46
	CONTINGENCIES @ 3%					11190.58
	TOTAL					11526.30
	Add GST @ 18%					2074.73
	GRAND TOTAL					13601.03

CHANDRAGUPTA OCP(15.0 MTY)
STATEMENT SHOWING THE BUILDING COST INDEX.
AT CCL'S PROJECTS IN MARCH 2019
 (With Ref. to 100 base in Delhi as on 1.10.76)

SL. NO.	DESCRIPTION	UNIT	RATES AS ON 1.10.76 AT DELHI	RATES AT SITE	RATIO BET. Col.5 & Col.4	WEIGH-TAGE	COST INDEX
1	2	3	4	5	6	7	8
1.	BRICKS	1000.00	106.15	4600.00	43.33	16.00	693.36
2.	SAND: 67% Coarse Sand 33% Fine Sand	Cu.m.	21.92	413.45	18.86	5.00	94.31
3.	CEMENT	Quintal	35.28	560.00	15.87	21.00	333.33
4.	STONE AGGREGATE 50% 20 mm Size 50% 50 mm Size	Cu.m.	27.10	1485.00	54.80	6.50	356.18
5.	TIMBER(Second class teak & local timber)	Cu.m.	2021.00	75000.00	37.11	18.00	667.99
6.	STEEL Mild/Tor/sructural steel	Quintal	183.20	4950.00	27.02	10.00	270.20
7.	LABOUR: (a) Mason 50% 1st. Class 50% 2nd. Class	Each	9.89	504.00	50.96	8.50	433.16
	(b) Carpenter 50% 1st. Class 50% 2nd. Class	Each	9.89	504.00	50.96	4.00	203.84
	(c) Coolie/Beldar	Each	4.41	390.00	88.44	11.00	972.79
	TOTAL						4025.16
	i.e. COST INDEX					SAY	4025.00

CCM

Amount in Rs Lakh

[illegible]

[illegible]

SANJEEV KUMAR
MANAGER
CHANDRAGUPTA SPENCAST PROJECT
CCL AMRAPALI CHANDRAGUPTA AREA

MDO, 8X

RI-3, CMPDI

CHANDRAGUPTA DE-CAST PROJECT
 SANJEEV KUMAR
 MANAGER
 CHANDRAGUPTA DE-CAST PROJECT
 CHANDRAGUPTA AREA

CHANDRAGUPT OC (15.00 MTY)

SUMMARY OF ESTIMATED CAPITAL EXPENDITURE ON ELECTRICAL P&M MDO

APPENDIX A-I-3.2(I)

			Base Date-March'20								(In Rs.'Lakhs)
Sl. No.	DESCRIPTION	TOTAL CAPITAL	YEARWISE PHASING OF CAPITAL								
			1	2	3	4	5	6	7	Beyond Target Year	
A	Substation- I	587.02	324.64	262.38							
B	Substation- II	545.97	299.78	246.19							
C	Incoming Power Supply Arrangement	280.00	280.00								
D	Quarry Power Distribution	725.95	217.03	18.78	18.78	51.35	32.57	65.26	18.78	303.40	
E	Cables	119.99	64.07			8.90			5.00	42.03	
F	Illumination	448.70	196.38		20.70	31.98	20.70	5.21	30.48	143.25	
G	Colony Electrification	250.05	101.93	61.02	26.96	23.73	31.06			5.36	
H	Miscellaneous	263.44	77.06	43.61	28.84	15.42	11.22	9.37	7.22	70.71	
	Total	3221.12	1560.89	631.99	95.27	131.38	95.54	79.84	61.48	564.74	

CHANDRAGUPTA OC (15 MTY)
MDO

APPENDIX A.3.20

ESTIMATED CAPITAL EXPENDITURE ON ELECTRICAL P&M

Base Date-March/25

In Rs'000

SLNo.	PARTICULARS	TOTAL PROVISION				EXISTING	ADDITIONAL		
		Unit	Qty.	Rate	Amount		Qty.	Rate	Amount
1	2	3	4	5	6	7	8	9	10
A	SUBSTATION - I								
	P&M for Main Substation								
1.1	Circuit Breaker, VCB, 33 kV, 750 MVA, 1250 Amps with remote control panel	Nos.	5	609	3045		5	609	3045
1.2	Isolator Off Load type, 33 kV, OD type, 1600 A	Nos.	8	80	640		8	80	640
1.3	Isolator Off Load type, 33 kV, OD type, 1600 A with earthing switch	Nos.	2	85	170		2	85	170
1.4	Isolator Off Load type, 33 kV, OD type, 800A with drop out fuse	Nos.	4	80	320		4	80	320
1.5	Lightning Arrestor, 33 kV Grade, 10 kA	Nos.	6	17	102		6	17	102
1.6	C.T. 33 kV with CT ratio, 200-100 /1 A/ 1 A/ 1 A for metering & protection.	Nos.	5	100	500		5	100	500
1.7	Potential Transformer, 33 kV/110 V for metering & Protection	Nos.	2	74	148		2	74	148
1.8	Power Transformer, 10 MVA, 33/6.6 kV, out door type, 50 Hz., 3 ph, DY-11 (Cu)	Nos.	2	4386	8772		2	4386	8772
1.9	Station Transformer, 160 kVA, 33 kV/415 V, out door type, 50 Hz., 3 ph, DY-11 (Cu)	No.	1	228	228		1	228	228
1.10	Lighting Transformer, 100 kVA, 33 kV/230 V (L-L), out door type, 50 Hz (Cu)	No.	1	150	150		1	150	150
1.11	Lightning Arrestor suitable for 6.6 kV, 10 kA	Nos.	18	11	198		18	11	198
1.12	Circuit Breaker, VCB, 6.6 kV, 150 MVA, 1600 Amps, with remote control panel	Nos.	3	500	1500		3	500	1500
1.13	Circuit Breaker, VCB, 6.6 kV, 150 MVA, 1250 Amps, with remote control panel	Nos.	18	450	8100		18	450	8100
1.14	Isolator, 6.6 kV, outdoor type, 1600 A	Nos.	6	45	270		6	45	270
1.15	Isolator, 6.6 kV, outdoor type, 1250 A	Nos.	34	30	1020		34	30	1020
1.16	Isolator with earthing switch, 6.6 kV, 1250 Amps.	Nos.	2	50	100		2	50	100
1.17	Neutral grounding Resistor, 6.6 kV, 76 Ohm 50 A Capacitor Bank outdoor type complete with remote control panel and automatic power factor correction relay, 6.6 kV, 2175 kVar	Nos.	2	160	320		2	160	320
1.18	415 V indoor Switch board for Station Transformer	Set	2	2664	5327		2	2664	5327
1.19	230V(L-L), indoor distribution switch board for Lighting	Set	1	180	180		1	180	180
1.20	DC Distribution Board	Set	1	110	110		1	110	110
1.21	Battery and battery Charging Set	Set	1	100	100		1	100	100
1.22	Substation lighting, indoor & outdoor, Lamps with fittings and accessories, Ceiling Fan, Exhaust fan, including cables, Poles, switch boards etc.	Set	1	350	350		1	350	350
1.23	Earthing System including earth pits, Connection of GI Strips for S/S including lightning Masts.	LS			500				500
1.24	Fire fighting arrangement including automatic fire-fighting System for transformer	LS			500				500
1.25	Conductors, Cables (Power & Control) for S/S including cable trays, insulators etc.	LS			5000				5000
1.26	Bus bar arrangement	LS			1000				1000
1.27	Miscellaneous Items including Measuring & Testing Equipments for substation, Furniture & Fittings, Tools And Tackles etc.	LS			1200				1200
1.28		LS			800				800
A.1	Sub-total P&M				40650				40650

SANJEEV KUMAR
MANAGER
CHANDRAGUPTA OPENCAST PROJECT
CCL AMRAPALI-CHANDRAGUPTA AREA

CHANDRAGUPTA OC (15 MTY)
MDO

ESTIMATED CAPITAL EXPENDITURE ON ELECTRICAL P&M

Base Date-March'20

In Rs'000

Sl.No.	PARTICULARS	TOTAL PROVISION				EXISTING	ADDITIONAL		
		Unit	Qty.	Rate	Amount		Qty.	Rate	Amount
1	2	3	4	5	6	7	8	9	10
A.2	Erection & commissioning				4065	2643			4065
A.3	Design and Engineering				2236				2236
A.4	Overhead construction cost				7043				7043
A.5	Insurance				335				335
A.6	Contingency				1620				1620
A.7	GST @ 18 % of [A2, A3, A4, A5, A6]				2754				2754
	Sub-total [A] (Substation-I)				58702				58702
B	SUBSTATION - II								
	P&M for Main Substation								
2.1	Circuit Breaker, VCB, 33 kV, 750 MVA, 1250 Amps with remote control panel	Nos.	5	609	3045		5	609	3045
2.2	Isolator Off Load type, 33 kV, OD type, 1600 A	Nos.	8	80	640		8	80	640
2.3	Isolator Off Load type, 33 kV, OD type, 1600 A with earthing switch	Nos.	2	85	170		2	85	170
2.4	Isolator Off Load type, 33 kV, OD type, 800A with drop out fuse	Nos.	4	80	320		4	80	320
2.5	Lightning Arrestor, 30 kV Grade, 10 kA	Nos.	6	17	102		6	17	102
2.6	C.T. 33 kV with CT ratio, 200-100 / 1 A / 1 A / 1 A for metering & protection.	Nos.	5	100	500		5	100	500
2.7	Potential Transformer, 33 kV/110 V for metering & Protection	Nos.	2	74	148		2	74	148
2.8	Power Transformer, 10 MVA, 33/6.6 kV, out door type, 50 Hz., 3 ph, DY-11 (Cu)	Nos.	2	4386	8772		2	4386	8772
2.9	Station Transformer, 160 kVA, 33 kV/15 V, out door type, 50 Hz., 3 ph, DY-11 (Cu)	No.	1	228	228		1	228	228
2.10	Lighting Transformer, 100 kVA, 33 kV/230 V (L-L), out door type, 50 Hz (Cu)	No.	1	150	150		1	150	150
2.11	Lightning Arrestor, suitable for 6.6 kV, 10 kA	Nos.	14	11	154		14	11	154
2.12	Circuit Breaker, VCB, 6.6 kV, 150 MVA, 1600 Amps with remote control panel	Nos.	3	500	1500		3	500	1500
2.13	Circuit Breaker, VCB, 6.6 kV, 150 MVA, 1250 Amps with remote control panel	Nos.	14	450	6300		14	450	6300
2.14	Isolator, 6.6 kV, outdoor type, 1600 A	Nos.	6	45	270		6	45	270
2.15	Isolator, 6.6 kV, outdoor type, 1600 A	Nos.	26	30	780		26	30	780
2.16	Isolator with earthing switch, 6.6 kV, 1600 Amps.	Nos.	2	50	100		2	50	100
2.17	Neutral grounding Resistor, 6.6 kV, 76 Ohm 50 A	Nos.	2	160	320		2	160	320
2.18	Capacitor Bank outdoor type complete with remote control panel and automatic power factor correction relay, 6.6 kV, 1894 kVAR	Set	2	2384	4768		2	2384	4768
2.19	415 V indoor Switch board for Station Transformer	Set	1	180	180		1	180	180
2.20	230V(L-L), Indoor distribution switch board for Lighting	Set	1	110	110		1	110	110
2.21	DC Distribution Board	Set	1	100	100		1	100	100
2.22	Battery and battery Charging Set	Set	1	350	350		1	350	350
2.23	Substation lighting, indoor & outdoor, Lamps with fittings and accessories, Ceiling Fan, Exhaust fan, including cables, Poles, switch boards etc.	LS			500				500
2.24	Earthing System including earth pits, Connection of GI Strips For S/S including lightning Masts.	LS			500				500
2.25	Fire fighting arrangement including automatic fire-fighting System for transformer	LS			5000				5000
2.26	Conductors, Cables (Power & Control) for S/S including cable trays, insulators etc.	LS			1000				1000
2.27	Bus bar arrangement	LS			1000				1000
2.28	Equipments for substation, Furniture & Fittings, Tools	LS			800				800
B.1	Sub-total P&M				37807				37807


SANJEEV KUMAR
MANAGER
CHANDRAGUPTA OPENCAST PROJECT
OCL, AMRAPALI-CHANDRAGUPTA
RI-3, CMPDI

**CHANDRAGUPTA OC (15 MTY)
MDO**

ESTIMATED CAPITAL EXPENDITURE ON ELECTRICAL P&M

Base Date-March'20

In Rs'000

Sl.No.	PARTICULARS	TOTAL PROVISION				EXISTING	ADDITIONAL		
		Unit	Qty.	Rate	Amount		Qty.	Rate	Amount
1	2	3	4	5	6	7	8	9	10
B. 2	Erection & commissioning				3781				3781
B. 3	Design and Engineering				2079				2079
B. 4	Overhead construction cost				6550				6550
B. 5	Insurance				312				312
B. 6	Contingency				1507				1507
B. 7	GST @ 18 % of (B2, B3, B4, B5, B6)				2561				2561
	Sub-total (B) (Substation-II)				54597				54597
C	Incoming Power Supply Arrangement								
1	33 kV Double Circuit overhead transmission line in double pole structure with 'WOLF' conductor including erection for Sub-station-I	km.	10	2600	26000		10	2600	26000
2	33 kV Double Circuit overhead transmission line in double pole structure with 'WOLF' conductor including erection for Sub-station-II	km.	6	2600	15600		6	2600	15600
3	Power receiving arrangement at Proposed DVC Switching station	LS			2000		LS	2000	2000
	Sub-total (Incoming Power supply)				28000				28000
D	Quarry Power Distribution								
1	Field switch, 6.6 kV, 800 Amps, 150 MVA, skid mounted, outdoor type	Nos.	34	321	10914		34	321	10914
2	6.6 kV OHTL with ACSR 'WOLF' conductor	km.	50	900	45000		50	900	45000
3	Isolator, 6.6 kV, outdoor type, 800 A	Nos.	52	20	1040		52	20	1040
4	Lightning Arrestor, suitable for 6.6 kV, 10 kA	Set	34	9	306		34	9	306
5	400 kVA, 6.6/0.433 kV, 50 Hz, DY-11, outdoor type unitised substation	Set	4	1379	5516		4	1379	5516
6	8- Panel 6.6 kV, outdoor type Switchboard, Comprising 2 no. 800A VCB for incoming, 1 no. coupler and six nos. 400 A VCB for 6 nos outgoing feeder control (for pumping).	Set	2	2615	5229		2	2615	5229
6	7- Panel 6.6 kV, outdoor type Switchboard, Comprising 2 no. 800A VCB for incoming, 1 no. coupler and four nos. 400 A VCB for 4 nos outgoing feeder control (for pumping).	Set	1	2034	2034		1	2034	2034
7	11- Panel 415 V, outdoor type Switchboard, Comprising 1 no. 800A ACB for incoming and ten nos. 250 A MCCB for outgoing - feeder control (for pumping)	Set	3	852	2556		3	852	2556
	Sub-total (Quarry Power Distribution)				72595				72595
E	Cables								
1	6.6 kV grade, PVC/DWA mining type, Copper conductor cable of following sizes:								
a	3 X 150sq. mm	km	0.3	4450	1335		0.3	4450	1335
b	3 X 120sq. mm	km	0.3	3523	1057		0.3	3523	1057
c	3 X 50 sq. mm	km	2.1	2078	4260		2.1	2078	4260
d	3 x 35 sq. mm	km	1.8	1582	2848		1.8	1582	2848
2	1.1 kV grade, PVC/DWA mining type, Copper conductor cable of different sizes.	LS			2500		LS		2500
	Sub-total (Cable)				11999				11999

SANJEEV KUMAR
MANAGER
CHANDRAGUPTA OPENCAST PROJECT
CCL, AMRAPALI-CHANDRAGUPTA AREA

**CHANDRAGUPTA OC (15 MTY)
MDO**

ESTIMATED CAPITAL EXPENDITURE ON ELECTRICAL P&M

Base Date-March'20

In Rs'000

Sl.No.	PARTICULARS	TOTAL PROVISION				EXISTING	ADDITIONAL		
		Unit	Qty.	Rate	Amount		Qty.	Rate	Amount
1	2	3	4	5	6	7	8	9	10
F	Illumination								
1	Lighting transformer, 25 KVA, pole mounted 6.6 / 0.23 KV (L-L)	Nos.	12	75	900		12	75	900
2	Lighting transformer, 10 KVA, pole mounted 6.6 / 0.23 KV (L-L)	Nos.	28	35	980		28	35	980
3	Skid mounted Flood lighting towers 15m high	Set	26	150	3900		26	150	3900
4	Flood light fixtures with 250 watts LED lamps, switch fuse units, switches, cable etc.	LS			2875				2875
5	Mobile Lighting Tower with light fittings and fixtures, power generators, cables, switches etc.	Set	16	1000	16000		16	1000	16000
6	230 (L-L) Volts OHTL with ACSR 'Mink' Conductor	km	16	700	11200		16	700	11200
7	Street lighting fixture with 80 / 150 W LED lamps, isolation fuses, switches, Cables, bracket, clamp etc.	LS			9015				9015
	Sub-total (Illumination)				44870				44870
G	Colony Electrification and Street Lighting								
1	6.6 KV overhead transmission line DC with 'WOLF' conductor	km	4.0	1500	6000		4.0	1500	6000
2	6.6 KV overhead transmission line with 'DOG' conductor	km	3.0	1000	3000		3.0	1000	3000
3	415 KV overhead transmission line with RABIT conductor	km	6.0	750	4500		6.0	750	4500
4	250 KVA, 6.6kv/415V Distribution Transformer, Switchgear, Cable, Conductor, Insulator and earthing arrangement etc for Transformers	Nos.	15	210	3150		15	210	3150
5	Service connection to quarters and service buildings with cable etc.	LS			3000		LS		3000
6	Street lighting with 80W LED lamp fittings	LS			955		LS		955
7		LS			4400		LS		4400
	Sub Total (Colony Electrification and Street Lighting)				25805				25005
H	Miscellaneous								
1	Power supply OH Line to CHP Substation	LS			2000		LS		2000
2	Power supply OH Line to workshop Substation	LS			800		LS		800
3	Power supply arrangement to office etc.	LS			1000		LS		1000
4	Measuring & Testing equipment	LS			1000		LS		1000
5	Energy Conservation Measures	LS			1000		LS		1000
6	Erection & Commissioning	LS			15447		LS		15447
7	Contingencies	LS			5097		LS		5097
	Sub-total (Miscellaneous)				26344				26344
	GRAND TOTAL				322112	0			322112


SANJEEV KUMAR
 MANAGER
 CHANDRAGUPTA OPENCAST PROJECT
 DCL, AMRAPALI-CHANDRAGUPTA AREA

**CHANDRAGUPT OCP [15.0 MTY]
ESTIMATED PHASED CAPITAL EXPENDITURE ON P&M - WORKSHOP
MDO
SUMMARY SHEET**

(AMT. IN RS. LAKH)

SL.NO.	DESCRIPTION	TOTAL COST	PHASING		
			1	3	6
A	EXCAVATION WORKSHOP	1335.27	914.35	309.82	111.10
B	E&M WORKSHOP	117.44	67.08	50.36	0
C	PROJECT STORE	59.61	49.30	10.31	0
D	GRAND TOTAL	1512.32	1030.73	370.49	111.10


SANJEEV KUMAR
MANAGER
CHANDRAGUPTA OPENCAST PROJECT
CCL AMRAPALI-CHANDRAGUPTA AREA

SL. NO.	ITEM CODE	DESCRIPTION	UNIT	QTY	TOTAL COST	QTY	TOTAL COST	QTY	TOTAL COST	QTY	TOTAL COST
MACHINE SHOP											
1	104	HEAVY DUTY CENTRE LATHE C.H. - 250 mm, D.I.C. - 2000 mm, POWER 15 kW			1636.30	1	1636.30				
2	105	MEDIUM DUTY CENTRE LATHE C.H. - 220 mm, D.I.C. - 1500 mm, POWER 10 kW			1464.00	1	1464.00				
3	106	LIGHT DUTY CENTRE LATHE C.H. - 200 mm, D.I.C. - 1000 mm, POWER 7.5 kW			1200.00	1	1200.00				
4	204	POWER JACKS FOR CUTTING AND GRINDING UP TO 300 mm DIA. POWER 1.5 kW			192.00	1	192.00				
5	301	WELDING CHILL, DRILLING CAPACITY IN STEEL 50 mm, POWER 1.5 kW			1172.00	1	1172.00				
6	302	FILTER DRILL, DRILLING CAPACITY IN STEEL 25 mm, POWER 0.5 kW			187.00	1	187.00				
7	403	DOUBLE ENDED PEDISTAL GRINDER, WHEEL DIA. 30 mm, POWER 0.5 kW			45.00	1	45.00				
8	406	WELD GRINDER F. POWER 0.5 kW			24.00	1	24.00				
9	408	PORTABLE HAND GRINDER 100 mm, POWER 0.5 kW			17.00	1	17.00				
10	412	NON STANDARD STEEL GRACE PLATE, TOOL, JACKETS			17.00	1	17.00				
ELECTRICAL REPAIR SHOP											
1	505	AUTOMATIC BATTERY CHARGING SET WITH CONTROL DEVICE 14 VOLT			84.00	1	84.00				
2	506	AUTOMATIC BATTERY CHARGING SET WITH CONTROL DEVICE 7.5 VOLT			47.00	2	94.00				
3	507	DRILLED WIRE (50 mm) PLANT CAPACITY 15 LBS/HR			72.00	2	144.00				
4	510	SET OF ELECTRICAL MEASURING AND TESTING INSTRUMENTS			15.00	1	15.00				
5	502	TABLE FOR TAPPING OF CONDUIT			4.00	1	4.00				
6	504	CABLE VULCANISER			108.00	1	108.00				
7	510	SET OF ELECTRICAL MEASURING AND TESTING INSTRUMENTS			50.00	1	50.00				
8	511	HOTWIRE CUTTING TOOL FOR TAPPING CABLE			82.00	1	82.00				
9	514	PORTABLE BATTERY AND MOTOR TESTING EQUIPMENT			74.00	1	74.00				
10	516	WIND FOR TESTING AC ELECTRIC MOTOR VOLTAGE V			120.00	1	120.00				
11	518	APPARATUS FOR TESTING ELECTRIC INSULATION CIRCUIT			50.00	1	50.00				
12	519	VOLTAG FIRST TESTING VOLTAGES 100V			50.00	1	50.00				
13	520	CONDUCTIVITY DETECTOR			20.00	1	20.00				
14	528	WIRE TAPPING KIT			30.00	1	30.00				
ENGINE REPAIR SHOP											
1	601	WALVE SEAL GRINDER			20.00	2	40.00				
2	602	WALVE SEAL GRINDER			20.00	2	40.00				
3	604	PERFORM GRINDER C. GRINDER WITH ADJUSTABLE BLADE			4.00	1	4.00				
4	610	HYDRAULIC BEARING PULLER KIT, 80 L			122.00	1	122.00				
5	614	PORTABLE HAND DRILL - 25 mm, POWER 0.5 kW			17.00	1	17.00				
6	616	PORTABLE HAND GRINDER 100 mm, POWER 0.5 kW			17.00	1	17.00				
7	618	PORTABLE STEEL GRINDER ELECTRICALLY HEATED WITH HEATER			220.00	1	220.00				
8	1004	WELDER TOOL KIT (WELDER)			70.00	2	140.00				
9	1011	WELDER TOOL AND TACKLES FOR CUT, SHAPE			40.00	1	40.00				
10	1012	WELDER TOOL AND TACKLES FOR CUT, SHAPE			40.00	1	40.00				
11	1013	WELDER TOOL AND TACKLES FOR CUT, SHAPE			40.00	1	40.00				
12	1014	WELDER TOOL AND TACKLES FOR CUT, SHAPE			40.00	1	40.00				
13	1015	WELDER TOOL AND TACKLES FOR CUT, SHAPE			40.00	1	40.00				
14	1016	WELDER TOOL AND TACKLES FOR CUT, SHAPE			40.00	1	40.00				
15	1017	WELDER TOOL AND TACKLES FOR CUT, SHAPE			40.00	1	40.00				
16	1018	WELDER TOOL AND TACKLES FOR CUT, SHAPE			40.00	1	40.00				
17	1019	WELDER TOOL AND TACKLES FOR CUT, SHAPE			40.00	1	40.00				
18	1020	WELDER TOOL AND TACKLES FOR CUT, SHAPE			40.00	1	40.00				
19	1021	WELDER TOOL AND TACKLES FOR CUT, SHAPE			40.00	1	40.00				
20	1022	WELDER TOOL AND TACKLES FOR CUT, SHAPE			40.00	1	40.00				
21	1023	WELDER TOOL AND TACKLES FOR CUT, SHAPE			40.00	1	40.00				
22	1024	WELDER TOOL AND TACKLES FOR CUT, SHAPE			40.00	1	40.00				
23	1025	WELDER TOOL AND TACKLES FOR CUT, SHAPE			40.00	1	40.00				
24	1026	WELDER TOOL AND TACKLES FOR CUT, SHAPE			40.00	1	40.00				
25	1027	WELDER TOOL AND TACKLES FOR CUT, SHAPE			40.00	1	40.00				
26	1028	WELDER TOOL AND TACKLES FOR CUT, SHAPE			40.00	1	40.00				
27	1029	WELDER TOOL AND TACKLES FOR CUT, SHAPE			40.00	1	40.00				
28	1030	WELDER TOOL AND TACKLES FOR CUT, SHAPE			40.00	1	40.00				
29	1031	WELDER TOOL AND TACKLES FOR CUT, SHAPE			40.00	1	40.00				
30	1032	WELDER TOOL AND TACKLES FOR CUT, SHAPE			40.00	1	40.00				
31	1033	WELDER TOOL AND TACKLES FOR CUT, SHAPE			40.00	1	40.00				
32	1034	WELDER TOOL AND TACKLES FOR CUT, SHAPE			40.00	1	40.00				
33	1035	WELDER TOOL AND TACKLES FOR CUT, SHAPE			40.00	1	40.00				
34	1036	WELDER TOOL AND TACKLES FOR CUT, SHAPE			40.00	1	40.00				
35	1037	WELDER TOOL AND TACKLES FOR CUT, SHAPE			40.00	1	40.00				
36	1038	WELDER TOOL AND TACKLES FOR CUT, SHAPE			40.00	1	40.00				
37	1039	WELDER TOOL AND TACKLES FOR CUT, SHAPE			40.00	1	40.00				
38	1040	WELDER TOOL AND TACKLES FOR CUT, SHAPE			40.00	1	40.00				
39	1041	WELDER TOOL AND TACKLES FOR CUT, SHAPE			40.00	1	40.00				
40	1042	WELDER TOOL AND TACKLES FOR CUT, SHAPE			40.00	1	40.00				
41	1043	WELDER TOOL AND TACKLES FOR CUT, SHAPE			40.00	1	40.00				
42	1044	WELDER TOOL AND TACKLES FOR CUT, SHAPE			40.00	1	40.00				
43	1045	WELDER TOOL AND TACKLES FOR CUT, SHAPE			40.00	1	40.00				
44	1046	WELDER TOOL AND TACKLES FOR CUT, SHAPE			40.00	1	40.00				
45	1047	WELDER TOOL AND TACKLES FOR CUT, SHAPE			40.00	1	40.00				
46	1048	WELDER TOOL AND TACKLES FOR CUT, SHAPE			40.00	1	40.00				
47	1049	WELDER TOOL AND TACKLES FOR CUT, SHAPE			40.00	1	40.00				
48	1050	WELDER TOOL AND TACKLES FOR CUT, SHAPE			40.00	1	40.00				
49	1051	WELDER TOOL AND TACKLES FOR CUT, SHAPE			40.00	1	40.00				
50	1052	WELDER TOOL AND TACKLES FOR CUT, SHAPE			40.00	1	40.00				
51	1053	WELDER TOOL AND TACKLES FOR CUT, SHAPE			40.00	1	40.00				
52	1054	WELDER TOOL AND TACKLES FOR CUT, SHAPE			40.00	1	40.00				
53	1055	WELDER TOOL AND TACKLES FOR CUT, SHAPE			40.00	1	40.00				
54	1056	WELDER TOOL AND TACKLES FOR CUT, SHAPE			40.00	1	40.00				
55	1057	WELDER TOOL AND TACKLES FOR CUT, SHAPE			40.00	1	40.00				
56	1058	WELDER TOOL AND TACKLES FOR CUT, SHAPE			40.00	1	40.00				
57	1059	WELDER TOOL AND TACKLES FOR CUT, SHAPE			40.00	1	40.00				
58	1060	WELDER TOOL AND TACKLES FOR CUT, SHAPE			40.00	1	40.00				
59	1061	WELDER TOOL AND TACKLES FOR CUT, SHAPE			40.00	1	40.00				
60	1062	WELDER TOOL AND TACKLES FOR CUT, SHAPE			40.00	1	40.00				
61	1063	WELDER TOOL AND TACKLES FOR CUT, SHAPE			40.00	1	40.00				
62	1064	WELDER TOOL AND TACKLES FOR CUT, SHAPE			40.00	1	40.00				
63	1065	WELDER TOOL AND TACKLES FOR CUT, SHAPE			40.00	1	40.00				
64	1066	WELDER TOOL AND TACKLES FOR CUT, SHAPE			40.00	1	40.00				
65	1067	WELDER TOOL AND TACKLES FOR CUT, SHAPE			40.00	1	40.00				
66	1068	WELDER TOOL AND TACKLES FOR CUT, SHAPE			40.00	1	40.00				
67	1069	WELDER TOOL AND TACKLES FOR CUT, SHAPE			40.00	1	40.00				
68	1070	WELDER TOOL AND TACKLES FOR CUT, SHAPE			40.00	1	40.00				
69	1071	WELDER TOOL AND TACKLES FOR CUT, SHAPE			40.00	1	40.00				
70	1072	WELDER TOOL AND TACKLES FOR CUT, SHAPE			40.00	1	40.00				
71	1073	WELDER TOOL AND TACKLES FOR CUT, SHAPE			40.00	1	40.00				
72	1074	WELDER TOOL AND TACKLES FOR CUT, SHAPE			40.00	1	40.00				
73	1075	WELDER TOOL AND TACKLES FOR CUT, SHAPE			40.00	1	40.00				
74	1076	WELDER TOOL AND TACKLES FOR CUT, SHAPE			40.00	1	40.00				
75	1077	WELDER TOOL AND TACKLES FOR CUT, SHAPE			40.00	1	40.00				
76	1078	WELDER TOOL AND TACKLES FOR CUT, SHAPE			40.00	1	40.00				
77	1079	WELDER TOOL AND TACKLES FOR CUT, SHAPE			40.00	1	40.00				
78	1080	WELDER TOOL AND TACKLES FOR CUT, SHAPE			40.00	1	40.00				
79	1081	WELDER TOOL AND TACKLES FOR CUT, SHAPE			40.00	1	40.00				
80	1082	WELDER TOOL AND TACKLES FOR CUT, SHAPE			40.00	1	40.00				
81	1083	WELDER TOOL AND TACKLES FOR CUT, SHAPE			40.00	1	40.00				
82	1084	WELDER TOOL AND TACKLES FOR CUT, SHAPE			40.00	1	40.00				
83	1085	WELDER TOOL AND TACKLES FOR CUT, SHAPE			40.00	1	40.00				
84	1086	WELDER TOOL AND TACKLES FOR CUT, SHAPE			40.00	1	40.00				
85	1087	WELDER TOOL AND TACKLES FOR CUT, SHAPE			40.00	1	40.00				
86	1088	WELDER TOOL AND TACKLES FOR CUT, SHAPE			40.00	1	40.00				
87	1089	WELDER TOOL AND TACKLES FOR CUT, SHAPE			40.00	1	40.00				
88	1090	WELDER TOOL AND TACKLES FOR CUT, SHAPE			40.00	1	40.00				
89	1091	WELDER TOOL AND TACKLES FOR CUT, SHAPE			40.00	1	40.00				
90	1092	WELDER TOOL AND TACKLES FOR CUT, SHAPE			40.00	1	40.00				
91	1093	WELDER TOOL AND TACKLES FOR CUT, SHAPE			40.00	1	40.00				
92	1094	WELDER TOOL AND TACKLES FOR CUT, SHAPE			40.00	1	40.00				
93	1095	WELDER TOOL AND TACKLES FOR CUT, SHAPE			40.00	1	40.00				
94	1096	WELDER TOOL AND TACKLES FOR CUT, SHAPE			40.00	1	40.00				
95	1097	WELDER TOOL AND TACKLES FOR CUT, SHAPE			40.00	1	40.00				
96	1098	WELDER TOOL AND TACKLES FOR CUT, SHAPE			40.00	1	40.00				
97	1099	WELDER TOOL AND TACKLES FOR CUT, SHAPE			40.00	1	40.00				
98	1100	WELDER TOOL AND TACKLES FOR CUT, SHAPE									

**CHANDRAGUPTA DCP (15.8 MTY)
MDG
ESTIMATED PHASED CAPITAL EXPENDITURE ON P&M - EXCAVATION WORKSHOP**

(AMOUNT IN Rs. '000)

SL. NO.	ITEM CODE	DESCRIPTION	UNIT COST	TOTAL QTY	TOTAL COST	P&M (RHS)					
						1		2		3	
						QTY.	COST	QTY.	COST	QTY.	COST
11	305	PORTABLE HAND DRILL - 13mm, POWER-0.55 kw	26.00	2	52.00	1	26.00	1	26.00		
12	304	PORTABLE HAND DRILL 25 mm, POWER-0.55 kw	51.00	2	102.00	1	51.00	1	51.00		
13	434	FLEXIBLE SHAFT GRINDER, 100mm, POWER-0.55kW	36.00	1	36.00	1	36.00				
14	435	PORTABLE HAND GRINDER 100 mm, POWER - 0.55 kW	17.00	1	17.00			1	17.00		
15	406	ANGLE GRINDER 6" POWER 0.55 KW	24.00	1	24.00			1	24.00		
16	210	PORTABLE AIR BLOWER	26.00	1	26.00	1	26.00				
17	1811	MISC. TOOLS AND TACKLES FOR DIFF. SHOPS		LS	35.00		15.00		25.00		
SUB-TOTAL							1254.90		1713.00		181.00
DUMPER REPAIR SHOP											
1	1001	AIR-COMPRESSOR 3.38 Cu.M/Min. WORKING PRESSURE - 7kg/5kg, Cn. POWER - 30 hp	255.00	2	410.00	1	255.00	1	255.00		
2		TYRE PRESS FOR UPTO 150 T DUMPER	3000.00	1	3000.00	1	3000.00				
3		SPECIAL TOOLS & TACKLES FOR DUMPER		LS	200.00		200.00				
4	1004	MASTER TOOL KIT (IN SETS)	78.00	3	234.00	1	78.00	2	156.00		
5	1005	HEAVY DUTY IMPACT SOCKETS (IN SETS)	134.00	2	268.00	1	134.00	1	134.00		
6	1006	TORQUE WRENCHES & MULTIPLIERS (IN SETS)	31.00	2	62.00	1	31.00	1	31.00		
7	1507	UNIVERSAL TEST RIG FOR TESTING BRAKE COMPONENTS	275.00	1	275.00	1	275.00				
8	1510	HYDRAULIC HOSE CRIMPING MACHINE	37.00	1	37.00			1	37.00		
9	1402	POWER OPERATED HYDRAULIC PRESS FOR DISMANTLING AND ASSEMBLY WORK, CAP-100	532.00	1	532.00			1	532.00		
10	1501	HYDRAULIC JACK WITH PULLER ATTACHMENT, CAPACITY-100 L	477.00	2	954.00	1	477.00	1	477.00		
11	304	PORTABLE HAND DRILL - 25mm, POWER-0.55 kw	51.00	2	102.00	1	51.00	1	51.00		
12	433	DOUBLE ENDED PEDESTAL GRINDER, WHEEL DIA-300mm, POWER-0.66 kw	45.00	1	45.00			1	45.00		
13	304	TRANSFORMER WELDING SET 400A	130.00	1	130.00	1	130.00				
14	305	CRY-ACETYLENE GAS CUTTING AND BRAZING SET	31.00	2	62.00	1	31.00	1	31.00		
15	1812	WORKING TABLE, BENCHES, CABINETS, PART STORING RACKS, HAND TROLLEYS ETC. FOR SHOP FLOORS		LS	75.00		50.00		25.00		
SUB-TOTAL							21671.00		1734.00		
DUMPER DAILY & SHEDULE MAINT.											
1		BAY LUBRICATION SYSTEM	4700.00	1	4700.00	1	4700.00				
2		USED OIL TRANSFER SYSTEM FOR COLLECTION OF WASTE OIL		LS	400.00		400.00				
3	1001	AIR-COMPRESSOR 3.38 Cu.M/Min. WORKING PRESSURE - 7kg/5kg, Cn. POWER - 30 hp	255.00	2	410.00	1	255.00	1	255.00		
4	1004	MASTER TOOL KIT (IN SETS)	78.00	3	234.00	2	156.00	1	78.00		
5	1103	DIAGNOSTIC TOOLS AND INSTRUMENTS		LS	50.00		25.00		25.00		
SUB-TOTAL							5794.00		5485.00		368.00
HEAVY REPAIR SHOP											
1	305	PORTABLE HAND DRILL 13 mm, POWER-0.55 kw	26.00	2	52.00	1	26.00	1	26.00		
2	404	FLEXIBLE SHAFT GRINDER 100mm, POWER-0.55 kw	36.00	2	72.00	1	36.00	1	36.00		
3	904	TRANSFORMER WELDING SET 400A	130.00	2	260.00	1	130.00	1	130.00		
4	905	CRY-ACETYLENE GAS CUTTING AND BRAZING SET	31.00	2	62.00	1	31.00	1	31.00		
5	1004	MASTER TOOL KIT (IN SETS)	78.00	2	156.00	1	78.00	1	78.00		
6	1006	TORQUE WRENCHES & MULTIPLIERS (IN SETS)	31.00	1	31.00			1	31.00		
7	1504	HYDRAULIC JACK, CAPACITY - 100 L	77.00	1	77.00			1	77.00		
8	1505	HEAVY DUTY IMPACT SOCKETS (IN SETS)	134.00	1	134.00			1	134.00		
9	1515	HYDRAULIC BEARING PULLER KIT	40.00	1	40.00	1	40.00				
10	1811	MISC. TOOLS AND TACKLES FOR DIFF. SHOPS		LS	75.00		50.00		25.00		
11	1812	WORKING TABLE, BENCHES, CABINETS, PART STORING RACKS, HAND TROLLEYS ETC. FOR SHOP FLOORS		LS	50.00		25.00		25.00		
SUB-TOTAL							701.00		418.00		585.00
FIELD SERVICE EQUIPMENT											
1	1701	MOBILE WORKSHOP VAN, COMPLETE WITH ACCESSORIES (FOR SMALL & MEDIUM REPAIRS)	5036.00	2	10072.00			1	5036.00	1	5036.00
2	1702	TOOLS & ELECTRICAL MEASURING INSTRUMENT		LS	40.00		25.00		15.00		
3	1703	MOBILE SERVICE VAN (FOR FIELD LUBRICATION WORK)	1425.00	1	1425.00	1	1425.00				
4	1704	PORTABLE AIR COMPRESSOR COUPLED WITH DIESEL ENGINE 4.55 CU/MMIN. WORKING PRESSURE 7KG/5KG, POWER-54 HP	831.00	1	831.00	1	831.00				
SUB-TOTAL							12372.00		5851.00		5836.00
DOZER REPAIR SHOP											
1	305	PORTABLE HAND DRILL 13mm, POWER-0.55 kW	26.00	2	52.00	1	26.00	1	26.00		
2	435	PORTABLE HAND GRINDER 100mm, POWER-0.55 kW	17.00	1	17.00			1	17.00		
3	406	ANGLE GRINDER 6" POWER 0.55kW	24.00	1	24.00	1	24.00				
4	1104	PRESSURIZED LUBRICATION SYSTEM WITH AIR COMPRESSOR	954.00	1	954.00	1	954.00				
5	1004	MASTER TOOL KIT (IN SETS)	78.00	2	156.00	1	78.00	1	78.00		
6	1005	HEAVY DUTY IMPACT SOCKETS (IN SETS)	134.00	1	134.00			1	134.00		
7	1006	TORQUE WRENCHES & MULTIPLIERS (IN SETS)	31.00	1	31.00			1	31.00		
8	302	M.G. WELDING SET 400A	120.00	1	120.00			1	120.00		
9	304	TRANSFORMER WELDING SET 400A	130.00	2	260.00	1	130.00	1	130.00		
10	305	CRY-ACETYLENE GAS CUTTING AND BRAZING SET	31.00	2	62.00	1	31.00	1	31.00		
11	1202	OIL LEAK TESTER	40.00	1	40.00			1	40.00		
12	1204	EXLER BEARING REMOVER	40.00	1	40.00			1	40.00		
13	1205	BRUSH ASSEMBLY TOOLS		LS	30.00		30.00				
14	1811	MISC. TOOLS AND TACKLES FOR DIFF. SHOPS		LS	40.00		25.00		15.00		
15	1812	WORKING TABLE, BENCHES, CABINETS, PART STORING RACKS, HAND TROLLEYS ETC. FOR SHOP FLOORS		LS	40.00		25.00		15.00		
SUB-TOTAL							2014.00		643.00		

SANJEEV KUMAR
MANAGER
CHANDRAPUR, CHHATTISGARH

SL. NO.	ITEM CODE	DESCRIPTION	UNIT	QTY	TOTAL COST	QTY	TOTAL COST	QTY	TOTAL COST
WASHING STATION									
1	1004	HIGH PRESSURE MULTIPLE WASHING UNIT (H.M.U.) FOR	4	470.00	1880.00	1	470.00	1	470.00
2	1002	HIGH PRESSURE WATER AND STEAM SET WASHING UNIT FOR	1	450.00	450.00	1	450.00	1	450.00
3	1005	TRUCK MOUNTED SLURRY PUMP	1	410.00	410.00	1	410.00	1	410.00
MATERIAL HANDLING EQUIPMENT									
1	1001	TRUCK MOUNTED FORK LIFT TRUCK	1	200.00	200.00	1	200.00	1	200.00
2	1003	FOR CRANE 450 W. SPAN - 9 M. FOR CRANE REPAIR SHOP	2	6015.00	12030.00	1	6015.00	1	6015.00
3	1004	FOR CRANE 450 W. SPAN - 9 M. FOR CRANE REPAIR SHOP	1	2104.00	2104.00	1	2104.00	1	2104.00
4	1005	FOR CRANE 150 W. SPAN - 2 M. FOR CRANE REPAIR SHOP	1	2604.00	2604.00	1	2604.00	1	2604.00
5	1006	FOR CRANE 100 W. SPAN - 2 M. FOR CRANE REPAIR SHOP	1	2104.00	2104.00	1	2104.00	1	2104.00
6	1007	CHAIN PULLEY BLOCK CAP. 5 T	1	27.00	27.00	1	27.00	1	27.00
STORES AND COMMON EQUIPMENT									
1	1008	FIRE FIGHTING EQUIPMENT & FIRE DETECTION SYSTEM	1	1700.00	1700.00	1	1700.00	1	1700.00
2	1009	FIRE FIGHTING WITH HYDRANT SYSTEM	1	2000.00	2000.00	1	2000.00	1	2000.00
3	1010	EXHAUST / VENTILATION FAN	1	601.00	601.00	1	601.00	1	601.00
4	1011	TIME CLOCK AND CARD PUNCHING M/C	1	300.00	300.00	1	300.00	1	300.00
5	1012	ELECTRIC BROWN RANGE 5 KW	2	25.00	50.00	1	25.00	1	25.00
6	1013	PLUMBING AND FITTING	1	70.00	70.00	1	70.00	1	70.00
7	1014	CLEANING EQUIPMENT FOR WASH. SPEED FLOOR	1	100.00	100.00	1	100.00	1	100.00
MISCELLANEOUS									
1	1015	ELECTRICAL (WIRING)	1	1500.00	1500.00	1	1500.00	1	1500.00
2	1016	WATER (MATERIAL)	1	1007.30	1007.30	1	1007.30	1	1007.30
3	1017	CONSTRUCTION	1	3100.00	3100.00	1	3100.00	1	3100.00
SUB-TOTAL									
1	1018	SUB-TOTAL			6777.30		6777.30		6777.30
2	1019	SUB-TOTAL			100.00		100.00		100.00
3	1020	SUB-TOTAL			20.00		20.00		20.00
4	1021	SUB-TOTAL			60.00		60.00		60.00
5	1022	SUB-TOTAL			200.00		200.00		200.00
6	1023	SUB-TOTAL			300.00		300.00		300.00
7	1024	SUB-TOTAL			2104.00		2104.00		2104.00
8	1025	SUB-TOTAL			2604.00		2604.00		2604.00
9	1026	SUB-TOTAL			2104.00		2104.00		2104.00
10	1027	SUB-TOTAL			27.00		27.00		27.00
11	1028	SUB-TOTAL			1700.00		1700.00		1700.00
12	1029	SUB-TOTAL			2000.00		2000.00		2000.00
13	1030	SUB-TOTAL			601.00		601.00		601.00
14	1031	SUB-TOTAL			12030.00		12030.00		12030.00
15	1032	SUB-TOTAL			2104.00		2104.00		2104.00
16	1033	SUB-TOTAL			2604.00		2604.00		2604.00
17	1034	SUB-TOTAL			2104.00		2104.00		2104.00
18	1035	SUB-TOTAL			27.00		27.00		27.00
19	1036	SUB-TOTAL			1700.00		1700.00		1700.00
20	1037	SUB-TOTAL			2000.00		2000.00		2000.00
21	1038	SUB-TOTAL			601.00		601.00		601.00
22	1039	SUB-TOTAL			12030.00		12030.00		12030.00
23	1040	SUB-TOTAL			2104.00		2104.00		2104.00
24	1041	SUB-TOTAL			2604.00		2604.00		2604.00
25	1042	SUB-TOTAL			2104.00		2104.00		2104.00
26	1043	SUB-TOTAL			27.00		27.00		27.00
27	1044	SUB-TOTAL			1700.00		1700.00		1700.00
28	1045	SUB-TOTAL			2000.00		2000.00		2000.00
29	1046	SUB-TOTAL			601.00		601.00		601.00
30	1047	SUB-TOTAL			12030.00		12030.00		12030.00
31	1048	SUB-TOTAL			2104.00		2104.00		2104.00
32	1049	SUB-TOTAL			2604.00		2604.00		2604.00
33	1050	SUB-TOTAL			2104.00		2104.00		2104.00
34	1051	SUB-TOTAL			27.00		27.00		27.00
35	1052	SUB-TOTAL			1700.00		1700.00		1700.00
36	1053	SUB-TOTAL			2000.00		2000.00		2000.00
37	1054	SUB-TOTAL			601.00		601.00		601.00
38	1055	SUB-TOTAL			12030.00		12030.00		12030.00
39	1056	SUB-TOTAL			2104.00		2104.00		2104.00
40	1057	SUB-TOTAL			2604.00		2604.00		2604.00
41	1058	SUB-TOTAL			2104.00		2104.00		2104.00
42	1059	SUB-TOTAL			27.00		27.00		27.00
43	1060	SUB-TOTAL			1700.00		1700.00		1700.00
44	1061	SUB-TOTAL			2000.00		2000.00		2000.00
45	1062	SUB-TOTAL			601.00		601.00		601.00
46	1063	SUB-TOTAL			12030.00		12030.00		12030.00
47	1064	SUB-TOTAL			2104.00		2104.00		2104.00
48	1065	SUB-TOTAL			2604.00		2604.00		2604.00
49	1066	SUB-TOTAL			2104.00		2104.00		2104.00
50	1067	SUB-TOTAL			27.00		27.00		27.00
51	1068	SUB-TOTAL			1700.00		1700.00		1700.00
52	1069	SUB-TOTAL			2000.00		2000.00		2000.00
53	1070	SUB-TOTAL			601.00		601.00		601.00
54	1071	SUB-TOTAL			12030.00		12030.00		12030.00
55	1072	SUB-TOTAL			2104.00		2104.00		2104.00
56	1073	SUB-TOTAL			2604.00		2604.00		2604.00
57	1074	SUB-TOTAL			2104.00		2104.00		2104.00
58	1075	SUB-TOTAL			27.00		27.00		27.00
59	1076	SUB-TOTAL			1700.00		1700.00		1700.00
60	1077	SUB-TOTAL			2000.00		2000.00		2000.00
61	1078	SUB-TOTAL			601.00		601.00		601.00
62	1079	SUB-TOTAL			12030.00		12030.00		12030.00
63	1080	SUB-TOTAL			2104.00		2104.00		2104.00
64	1081	SUB-TOTAL			2604.00		2604.00		2604.00
65	1082	SUB-TOTAL			2104.00		2104.00		2104.00
66	1083	SUB-TOTAL			27.00		27.00		27.00
67	1084	SUB-TOTAL			1700.00		1700.00		1700.00
68	1085	SUB-TOTAL			2000.00		2000.00		2000.00
69	1086	SUB-TOTAL			601.00		601.00		601.00
70	1087	SUB-TOTAL			12030.00		12030.00		12030.00
71	1088	SUB-TOTAL			2104.00		2104.00		2104.00
72	1089	SUB-TOTAL			2604.00		2604.00		2604.00
73	1090	SUB-TOTAL			2104.00		2104.00		2104.00
74	1091	SUB-TOTAL			27.00		27.00		27.00
75	1092	SUB-TOTAL			1700.00		1700.00		1700.00
76	1093	SUB-TOTAL			2000.00		2000.00		2000.00
77	1094	SUB-TOTAL			601.00		601.00		601.00
78	1095	SUB-TOTAL			12030.00		12030.00		12030.00
79	1096	SUB-TOTAL			2104.00		2104.00		2104.00
80	1097	SUB-TOTAL			2604.00		2604.00		2604.00
81	1098	SUB-TOTAL			2104.00		2104.00		2104.00
82	1099	SUB-TOTAL			27.00		27.00		27.00
83	1100	SUB-TOTAL			1700.00		1700.00		1700.00
84	1101	SUB-TOTAL			2000.00		2000.00		2000.00
85	1102	SUB-TOTAL			601.00		601.00		601.00
86	1103	SUB-TOTAL			12030.00		12030.00		12030.00
87	1104	SUB-TOTAL			2104.00		2104.00		2104.00
88	1105	SUB-TOTAL			2604.00		2604.00		2604.00
89	1106	SUB-TOTAL			2104.00		2104.00		2104.00
90	1107	SUB-TOTAL			27.00		27.00		27.00
91	1108	SUB-TOTAL			1700.00		1700.00		1700.00
92	1109	SUB-TOTAL			2000.00		2000.00		2000.00
93	1110	SUB-TOTAL			601.00		601.00		601.00
94	1111	SUB-TOTAL			12030.00		12030.00		12030.00
95	1112	SUB-TOTAL			2104.00		2104.00		2104.00
96	1113	SUB-TOTAL			2604.00		2604.00		2604.00
97	1114	SUB-TOTAL			2104.00		2104.00		2104.00
98	1115	SUB-TOTAL			27.00		27.00		27.00
99	1116	SUB-TOTAL			1700.00		1700.00		1700.00
100	1117	SUB-TOTAL			2000.00		2000.00		2000.00
101	1118	SUB-TOTAL			601.00		601.00		601.00
102	1119	SUB-TOTAL			12030.00		12030.00		12030.00
103	1120	SUB-TOTAL			2104.00		2104.00		2104.00
104	1121	SUB-TOTAL			2604.00		2604.00		2604.00
105	1122	SUB-TOTAL			2104.00		2104.00		2104.00
106	1123	SUB-TOTAL			27.00		27.00		27.00
107	1124	SUB-TOTAL			1700.00		1700.00		1700.00
108	1125	SUB-TOTAL			2000.00		2000.00		2000.00
109	1126	SUB-TOTAL			601.00		601.00		601.00
110	1127	SUB-TOTAL			12030.00		12030.00		12030.00
111	1128	SUB-TOTAL			2104.00		2104.00		2104.00
112	1129	SUB-TOTAL			2604.00		2604.00		2604.00
113	1130	SUB-TOTAL			2104.00		2104.00		2104.00
114	1131	SUB-TOTAL			27.00		27.00		27.00
115	1132	SUB-TOTAL			1700.00		1700.00		1700.00
116	1133	SUB-TOTAL			2000.00		2000.00		2000.00
117	1134	SUB-TOTAL			601.00		601.00		601.00
118	1135	SUB-TOTAL			12030.00		12030.00		12030.00
119	1136	SUB-TOTAL			2104.00		2104.00		2104.00
120	1137	SUB-TOTAL			2604.00		2604.00		2604.00
121	1138	SUB-TOTAL			2104.00		2104.00		2104.00
122	1139	SUB-TOTAL			27.00		27.00		27.00
123	1140	SUB-TOTAL			1700.00				

CHANDRAGUPT OCP (15.0 MTY)

MDO

ESTIMATED PHASED CAPITAL EXPENDITURE ON P&M-E&M WORKSHOP

(AMOUNT IN Rs.'000)

SL. NO.	ITEM CODE	DESCRIPTION	UNIT COST	TOTAL QTY.	TOTAL COST	PHASING			
						1		3	
						QTY.	COST	QTY.	COST
MACHINE SHOP									
1	102	HEAVY DUTY CENTRE LATHE, CH-260 mm, D.B.C. - 2000 mm, POWER - 11 KW.	1836.00	1	1836.00			1	1836.00
2	104	LIGHT DUTY CENTRE LATHE, C.H.-200mm, D.B.C.-1000mm, POWER-3KW	1200.00	1	1200.00	1	1200.00		
3	201	SHAPING MACHINE STROKE-630mm, POWER-2.25kw.	261.00	1	261.00			1	261.00
4	204	POWER HACKSAW TO CUT ROUND UP TO 300mm DIA, POWER-1.5kw	192.00	1	192.00	1	192.00		
5	402	DOUBLE ENDED PEDESTAL GRINDER, WHEEL DIA-300mm, POWER-0.66KW	45.00	1	45.00	1	45.00		
6	302	FILLER DRILLING MACHINE, CAP. IN STEEL-25 mm., POWER - 2.5 KW.	187.00	1	187.00	1	187.00		
7	304	PORTABLE HAND DRILL, CAP. IN STEEL - 25 mm.	61.00	1	61.00	1	61.00		
8	404	PORTABLE HAND GRINDER, WHEEL DIA-100mm, POWER-0.55KW	17.00	1	17.00	1	17.00		
9	1208	STEEL RACKS, BENCHES, TABLES AND CABINETS ETC.		LS	50.00		25.00		25.00
10	1209	STANDARD TOOLS, GAUGES AND INSTRUMENTS		LS	30.00		20.00		10.00
SUB-TOTAL					3879.00		1747.00		2132.00
STRUCTURAL REPAIR SHOP									
1	303	BENCH DRILL, CAP. IN STEEL-13mm, POWER-0.55KW	41.00	1	41.00			1	41.00
2	305	PORTABLE HAND DRILL, CAP. IN STEEL-13mm	26.00	1	26.00	1	26.00		
3	402	DOUBLE ENDED PEDESTAL GRINDER WHEEL DIA-300mm,POWER-0.66 KW	45.00	1	45.00			1	45.00
4	404	PORTABLE HAND GRINDER, WHEEL DIA.-100mm, POWER-0.55 KW	17.00	1	17.00	1	17.00		


SANJEEV KUMAR
 MANAGER

CHANDRAGUPTA OCP [15.0 MTY]
MDO

ESTIMATED PHASED CAPITAL EXPENDITURE ON P&M - E&M WORKSHOP

(AMOUNT IN Rs.'000)

SL. NO.	ITEM CODE	DESCRIPTION	UNIT COST	TOTAL QTY.	TOTAL COST	PHASING			
						1		3	
						QTY.	COST	QTY.	COST
5	501	POWER OPERATED HYDRAULIC PRESS FOR DISMANTLING AND ASSEMBLY WORK, CAP-50t.	238.00	1	238.00			1	238.00
6	503	SURFACE PLATE	39.00	1	39.00			1	39.00
7	504	TEST STAND FOR PUMPS(HYD.)	203.00	1	203.00			1	203.00
8	510	TEST BENCH, FITTER STAND WITH VICE ETC.		LS	70.00		35.00		35.00
9	1104	HYDRAULIC JACK, CAP.-10t	28.00	1	28.00			1	28.00
10	1109	HYDRAULIC BEARING PULLER KIT	40.00	1	40.00	1	40.00		
11	1211	WORKING TABLES, BENCHES, CABINETS, PARTS, STORING RACKS, HAND TROLLEYS ETC.		LS	45.00		25.00		20.00
SUB-TOTAL					792.00		143.00		649.00
ELECTRICAL REPAIR SHOP									
1	404	PORTABLE HAND GRINDER, WHEEL DIA.-100mm, POWER-0.55 KW	17.00	1	17.00	1	17.00		
2	603	TRANSFORMER OIL DIELECTRIC STRENGTH KIT WITH GLASS TEST CELL	61.00	1	61.00			1	61.00
3	604	TRANSFORMER OIL FILTRATION MC., CAP.-500 GPH.	186.00	1	186.00			1	186.00
4	605	PORTABLE AIR BLOWER WITH SUCTION ATTACHMENT	26.00	1	26.00	1	26.00		
5	606	CABLE VULCANISER	108.00	1	108.00			1	108.00
6	607	PORTABLE MOTOR AND RELAY TESTING EQUIPMENT		LS	40.00				40.00
7	608	APPARATUS FOR TESTING ELECTRIC INSULATOR CIRCUIT VOLTAGE - 220 V (IN SETS)	64.00	1	64.00			1	64.00
8	609	SET OF ELECTRICAL MEASURING & TESTING EQUIPMENT.		LS	35.00		25.00		10.00
9	1104	HYDRAULIC JACK, CAP.-10t	28.00	2	56.00	1	28.00	1	28.00
10	1109	HYDRAULIC BEARING PULLER KIT	40.00	1	40.00			1	40.00
11	1211	WORKING TABLES, BENCHES, CABINETS, PARTS, STORING RACKS, HAND TROLLEYS ETC.		LS	50.00		25.00		25.00
SUB-TOTAL					663.00		121.00		562.00

APPENDIX - A.3.3

CHANDRAGUPT OCP (15.0 MTY)

MDO

ESTIMATED PHASED CAPITAL EXPENDITURE ON P&M - E&M WORKSHOP

(AMOUNT IN Rs.'000)

SL. NO.	ITEM CODE	DESCRIPTION	UNIT COST	TOTAL QTY.	TOTAL COST	PHASING			
						1		3	
						QTY.	COST	QTY.	COST
L.M.V. REPAIR SHOP									
1	303	BENCH DRILL, CAP. IN STEEL-13mm, POWER-0.55KW	41.00	1	41.00			1	41.00
2	305	PORTABLE HAND DRILL, CAP. IN STEEL-13mm	26.00	1	26.00	1	26.00		
3	404	PORTABLE HAND GRINDER, WHEEL DIA.-100mm, POWER-0.55 KW	17.00	1	17.00	1	17.00		
4	702	TRANSFORMER WELDING SET,400A	130.00	1	130.00			1	130.00
5	704	OXY-ACETYLENE GAS CUTTING AND BRAZING SET	31.00	1	31.00			1	31.00
6	902	HYDRO-MECHANICAL WASHING PLATFORM TO LIFT CAR, TRUCK, BUS ETC. CAP-10 TE WITH WASHING UNIT	408.00	1	408.00	1	408.00		
7	903	AIR COMPRESSOR, 2.9 CUM/MIN., WORKING PRESSURE 7 KG/SQ.CM	195.00	1	195.00	1	195.00		
8	904	BATTERY CHARGING SET - 24 VOLT	46.00	1	46.00	1	46.00		
9	905	BATTERY CHARGING SET - 12 VOLT	36.00	1	36.00	1	36.00		
10	906	SPRAY GUN FOR PAINTING	36.00	1	36.00			1	36.00
11	907	VALVE GRINDING AND LAPPING MC	97.00	1	97.00			1	97.00
12	908	MOBILE GREASING UNIT CAP. 10 LITS.		LS	50.00		50.00		
13	909	ELECTRIC VULCANISER UNIT	41.00	1	41.00			1	41.00
14	910	WATER DISTILLATION PLANT, 5 LTRS./HR.	18.00	1	18.00	1	18.00		
15	1103	HYDRAULIC JACK, CAP-20 t	40.00	1	40.00	1	40.00		
16	1109	HYDRAULIC BEARING PULLER KIT	40.00	1	40.00	1	40.00		
17	1210	MISC.TOOLS & TACKLES		LS	20.00		10.00		10.00
18	1211	WORKING TABLES, BENCHES, CABINETS, PARTS, STORING RACKS, HAND TROLLEYS ETC.		LS	45.00		25.00		20.00
SUB-TOTAL					-1317.00		911.00		406.00

AREA

CHANDRAGUPTA OCP (15.0 MTY)

MDO

ESTIMATED PHASED CAPITAL EXPENDITURE ON P&M - E&M WORKSHOP

(AMOUNT IN Rs.'000)

(AMOUNT IN Rs. '000)

SL. NO.	ITEM CODE	DESCRIPTION	UNIT COST	TOTAL QTY.	TOTAL COST	PHASING				
						1		3		
						QTY.	COST	QTY.	COST	
STORES AND COMMON EQUIPMENT										
1	1202	WEIGHING MIC CAP-10 T	98.00	1	98.00			1	98.00	
2	1205	ELECTRIC SIREN RANGE-5KM	26.00	1	26.00	1	26.00			
3	1206	TIME CLOCK AND CARD PUNCHING MIC	25.00	1	25.00	1	25.00			
4	1207	EXHAUST FANS/ VENTILATION REQUIRED FOR ALL SHOPS		LS	60.00		30.00		30.00	
5	1208			LS	90.00		50.00		40.00	
6		EOT CRANE CAP-10/2 te, SPAN-18m	1964.00	1	1964.00	1	1964.00			
7		FIRE FIGHTING EQUIPMENT		LS	100.00		50.00		50.00	
SUB-TOTAL					2363.00		2145.00		218.00	
SUM OF SUB TOTAL					9034.00		5067.00		3967.00	
MISCELLANEOUS										
1		ELECTRICAL(15%)		LS	1355.10		880.82		474.29	
2		INSTALLATION(10%)		LS	903.40		506.70		396.70	
3		CONTINGENCIES(5%)		LS	451.70		253.35		198.35	
SUB-TOTAL					2710.20		1640.87		1069.34	
TOTAL					11744.20		6707.87		5036.34	


SANJEEV KUMAR
 MANAGER
 CHANDRAGUPTA OPENCAST PROJECT
 CCL AMRAPALI-CHANDRAGUPTA AREA

CHANDRAGUPT OCP [15.0 MTY]**MDO****ESTIMATED PHASED CAPITAL EXPENDITURE ON P&M - PROJECT STORE**

(AMOUNT IN Rs.'000)

SL. NO.	DESCRIPTION	UNIT COST	TOTAL QTY.	TOTAL COST	PHASING			
					1		3	
					QTY.	COST	QTY.	COST
PROJECT STORE								
1	DIESEL OPERATED FORK LIFT TRUCK, CAP-3t	1234	1	1234	1	1234		
2	EOT CRANE 10/2 te SPAN-18m	1964	1	1964	1	1964		
3	STORAGE STEEL RACKS		LS	300		200		100
4	CARDEX CABINET		LS	65		40		25
5	CABINET, MOVABLE LADDERS, TROLLEYS ETC.,		LS	60		60		
6	FIRE FIGHTING EQUIP.		LS	200		100		100
7	WEIGHING M/C	150	1	150			1	150
8	PERSONAL COMPUTER	50	1	50			1	50
9	EXHAUST & VENTILATION FAN		LS	300		200		100
10	FURNITURE & FITTINGS		LS	200		100		100
11	CHAIN PULLEY BLOCK CAP-10 t	37	1	37			1	37
12	TIME CLOCK & CARD PUNCHING M/C	25	1	25			1	25
SUB-TOTAL				4585		3898		687
MISCELLANEOUS								
1	ELECTRICAL(15%)			687.75		447.04		240.71
2	INSTALLATION(10%)			458.50		389.80		68.70
3	CONTINGENCIES(5%)			229.25		194.90		34.35
	SUB-TOTAL			1375.50		1031.74		343.76
	TOTAL			5960.50		4929.74		1030.76


SANJEEV KUMAR
 MANAGER
 CHANDRAGUPTA OPENCAST PROJECT
 CCL, AMRAPALI-CHANDRAGUPTA AREA

PROJECT REPORT FOR CHANDRAGUPTA DCP (15.80 MTY)
ESTIMATED CAPITAL EXPENDITURE ON P&M - PUMPS, PIPES & FITTINGS
R00

APPENDIX - A.3.4

SL.NO.	PARTICULARS	PROVISION UP TO TARGET YEAR			PHASING OF PROVISION UP TO TARGET YEAR						BEYOND TARGET YEAR									
		QTY	UNIT COST	TOTAL AMOUNT	1		5		6		10		15		20		25		30	
					QTY	COST	QTY	COST	QTY	COST	QTY	COST	QTY	COST	QTY	COST	QTY	COST	QTY	COST
A1	PUMPS (Nos.)																			
	RT-1																			
1	120 LPS X 130 M HEAD/PLP 250 KW, TSFC - 415 V, WITH MOTOR & STARTER & ELECTRICAL	3	15.00	45.00	1	15.00	1	15.00	1	15.00										
2	38 LPS X 60 M HEAD/PLP 37 KW, TSFC - 415V, WITH MOTOR, STARTER & ELECTRICAL	2	4.30	8.60	1	4.30	1	4.30												
3	80 LPS X 130 M HEAD WITH ALL ACCESSORIES (DIESEL DRIVEN)	1	13.00	13.00					1	13.00										
4	22 LPS X 45 M HEAD/PLP 35 KW, TSFC - 415 V, WITH MOTOR, STARTER & ELECTRICAL (SLURRY PUMP)	2	5.00	10.00	2	10.00														
5	15 LPS X 60 M HEAD/PLP 22.5 KW, TSFC - 415 V WITH ELECTRICAL PUMP	2	2.50	5.00	2	5.00														
	Sub Total - A1			86.60		35.30		20.30		28.00		5.00		0.00		0.00		0.00		0.00
B1	PIPES (in KM) & FITTINGS																			
	RT-1																			
6	M.S.P.P.E OF NOMINAL DIAMETER 300MM (IN KM)	0.30	28.00	8.40	0.10	2.80	0.10	2.80	0.10	2.80										
7	M.S.P.P.E OF NOMINAL DIAMETER 250MM (IN KM)	4.00	22.10	88.40	1.00	22.10	1.00	22.10	2.00	44.20										
8	M.S.P.P.E OF NOMINAL DIAMETER 200MM (IN KM)	2.00	17.40	34.80					2.00	34.80										
9	M.S.P.P.E OF NOMINAL DIAMETER 150 MM (IN KM)	1.00	18.01	18.01	0.50	9.00	0.50	9.00												
10	CL.P.P.E OF NOMINAL DIAMETER 100MM (IN KM)	1.00	7.91	7.91	0.00	3.96	0.50	3.96												
11	MISCELLANEOUS ITEM VALVES, FITTINGS, BENDS, ARMOURD SUCTION AND DELIVERY HOSES, PONTOON ETC.	1.0		24.35		3.38		13.30		8.15		0.00		3.00		0.00		0.00		0.00
	Sub Total - B1			174.47		37.25		47.25		55.58		0.00		3.00		0.00		0.00		0.00
	Installation Charges	1.0		30.80		10.80		10.13		17.85		0.00		0.00		0.00		0.00		0.00
	TOTAL RT-1			205.33		51.43		77.68		126.83		0.00		0.00		0.00		0.00		0.00


SANJEEV KUMAR
MANAGER
CHANDRAGUPTA OPENCAST PROJECT
CCL 400-4000-March-2020

PROJECT REPORT FOR CHANDRAGUPTA OCP (15.00 MTY)
ESTIMATED CAPITAL EXPENDITURE ON P&M - PUMPS, PIPES & FITTINGS
MDU

MYEER - A.2.4

SL.NO.	PARTICULARS	PROVISION UP TO TARGET YEAR			PHASING OF PROVISION UP TO TARGET YEAR						BEYOND TARGET YEAR									
		QTY	UNIT COST	TOTAL AMOUNT	1		3		5		15		18		23		28		33	
					QTY	COST	QTY	COST	QTY	COST	QTY	COST	QTY	COST	QTY	COST	QTY	COST	QTY	COST
A2	PUMPS (Nos.)																			
PT-2																				
1	120 LPS X 220 M HEAD/HPLP, 450 KW, TEFC - 6.6 KV, WITH MOTOR & STARTER & ELECTRICAL	0	25.00	0.00							5	120.00								
2	120 LPS X 130 M HEAD/HPLP, 350 KW, TEFC - 6.6 KV, WITH MOTOR & STARTER & ELECTRICAL	3	16.00	48.00	1	16.00	2	32.00												
3	38 LPS X 60 M HEAD/HPLP, 37 KW, TEFC - 415V, WITH MOTOR, STARTER & ELECTRICAL	3	4.30	12.90	1	4.30	2	8.60												
4	80 LPS X 220 M HEAD WITH ALL ACCESSORIES (DIESEL DRIVEN)	0	25.00	0.00							1	25.00								
5	32 LPS X 45 M HEAD/HPLP, 35 KW, TEFC - 415 V, WITH MOTOR, STARTER & ELECTRICAL (SLURRY PUMP)	3	5.00	15.00	2	10.00	1	5.00			1	5.00								
6	15 LPS X 80 M HEAD/HPLP-22.5 KW, TEFC - 415 V WITH ELECTRICAL TAPE PLANT	3	2.50	7.50	2	5.00	1	2.50			1	2.50								
Sub Total - A2				82.40		39.30		48.10		5.80		158.50		0.00		0.00		0.00		0.00
B2	PIPES (in KM) & FITTINGS																			
PT-2																				
7	M.S PIPE OF NOMINAL DIAMETER 300MM (IN KM)	0.30	28.00	8.40	0.18	2.80	0.30	8.40			0.28	7.84								
8	M.S PIPE OF NOMINAL DIAMETER 250MM (IN KM)	4.80	22.19	106.40	1.08	22.10	2.00	44.20	1.00	22.10	3.00	66.30	1.00	22.10						
9	M.S PIPE OF NOMINAL DIAMETER 200MM (IN KM)	0.80	17.40	13.92							2.00	34.80								
10	M.S PIPE OF NOMINAL DIAMETER 150MM (IN KM)	1.80	10.01	18.02	0.59	5.91	0.50	5.01												
11	GI PIPE OF NOMINAL DIAMETER 100MM (IN CM)	3.80	7.91	30.06	1.00	7.91	1.80	14.24	1.00	7.91										
12	MISCELLANEOUS ITEMS VALVES, FITTINGS, BONDS, ARMORED SUCTION AND DELIVERY HOSES, PONTON ETC.	LS		23.85		3.76		6.27		13.08		10.67		2.21		0.00		0.00		0.00
Sub Total - B2				175.29		41.80		81.89		40.01		117.37		24.31		0.00		0.00		0.00
Installation Charges		LS		35.55		11.55		17.56		6.45		40.96		3.65		0.00		0.00		0.00
TOTAL PT-2				275.94		88.41		136.85		46.46		158.33		27.96		0.00		0.00		0.00

SANJEEV KUMAR
MANAGER
CHANDRAGUPTA OPENCAST PROJECT
OCL, AMRAPALI-CHANDRAGUPTA AREA

ESTIMATED CAPITAL EXPENDITURE ON PSM - PUMPS, PIPES & FITTINGS

MDO

(Amount in Rs. lakhs)

Amount in Rupees																					
SL.NO	PARTICULARS	PROVISION UP TO TARGET YEAR			PHASING OF PROVISION UP TO TARGET YEAR						BEYOND TARGET YEAR										
		QTY	UNIT	COST	TOTAL AMOUNT	1		3		5		15		18		23		25		32	
						QTY	COST	QTY	COST	QTY	COST	QTY	COST	QTY	COST	QTY	COST	QTY	COST	QTY	COST
A3	PUMPS (Nos.)																				
PT-3																					
1	120 LPS X 280 M HEAD/NLP,380 KW, TEPC - 65 KV, WITH MOTOR & STARTER & ELECTRICAL	3	27.00	8.00															8	135.00	
2	120 LPS X 180 M HEAD/NLP,350 KW, TEPC - 65 KV, WITH MOTOR & STARTER & ELECTRICAL	3	24.75	8.00									3	74.25	3	40.00					
3	120 LPS X 130 M HEAD/NLP,250 KW, TEPC - 65 KV, WITH MOTOR & STARTER & ELECTRICAL	4	19.00	84.00	1	15.00	1	15.00	2	30.00											
4	38 LPS X 85 M HEAD/NLP,37 KW, TEPC - 415V, WITH MOTOR, STARTER & ELECTRICAL	3	4.30	12.90	2	8.60	1	4.30													
5	80 LPS X 120 M HEAD WITH ALL ACCESSORIES (DIESEL DRIVEN)	3	13.00	8.00								1	0.00								
6	80 LPS X 260 M HEAD WITH ALL ACCESSORIES (DIESEL DRIVEN)	3	27.30	8.00											1	27.30					
7	32 LPS X 45 M HEAD/NLP,35 KW, TEPC - 415 V, WITH MOTOR, STARTER & ELECTRICAL (SLURRY PUMP)	2	5.00	10.00	2	10.00						1	0.00						2	0.00	
8	15 LPS X 85 M HEAD/NLP,22.5 KW, TEPC - 415 V WITH ELECTRICAL(FACE PUMP)	2	2.50	5.00	2	5.00						1	0.00						2	0.00	
Sub Total - A2				91.80		38.64		35.30		52.00		0.00		74.25		18.30		0.00		135.00	
B3	PIPES (in KM) & FITTINGS																				
PT-3																					
9	H.S.PIPE OF NOMINAL DIAMETER 300MM (IN KM)	2.40	28.80	11.20	0.10	2.80	0.10	2.80	0.20	5.60				0.10	2.80						
10	H.S.PIPE OF NOMINAL DIAMETER 250MM (IN KM)	3.00	22.50	96.30	1.00	32.15	1.00	32.15	1.30	32.15	1.00	32.15	1.00	32.15	1.20	32.15	1.80	32.15			
11	H.S.PIPE OF NOMINAL DIAMETER 200MM (IN KM)	1.00	17.40	9.00								2.00	34.80								
12	H.S.PIPE OF NOMINAL DIAMETER 150MM (IN KM)	1.00	18.01	10.01	0.50	5.81	0.50	5.81													
13	GI PIPE OF NOMINAL DIAMETER 100MM (IN KM)	2.00	7.31	15.82	0.50	3.96	0.50	3.96	1.20	7.31	1.00	0.00									
14	MISCELLANEOUS ITEMS:VALVES, FITTINGS, BENCH,ARMOUR, SUCTON AND DELIVERY HOSES, PONDON ETC.	LB		20.30		3.30		3.30		13.56		5.80		2.49		2.21					
Sub Total - B2				123.84		37.25		37.25		46.17		92.98		37.39		34.31		32.15		0.00	
Installation Charges		LB		32.33		11.53		8.53		12.18		8.58		35.20		15.12		3.32		20.25	
TOTAL PT-3				247.68		86.37		84.14		81.35		71.34		115.89		116.80		35.42		185.25	
GRAND TOTAL (PT-1, PT-2 & PT-3)				414.21		249.25		275.51		279.64		285.30		146.34		116.30		35.42		185.25	

PROJECT REPORT FOR CHANDRAGUPT OCP (15.0 MTY)
SUMMARY STATEMENT OF CAPITAL EXPENDITURE ESTIMATE

Chandragupta OCP (MDO Mode)
COAL HANDLING PLANT
[CRUSHING UP TO - 100 mm]

[Amount in Rs.Lakhs]

Sl. No.	PARTICULARS	Total Cost			
		1	2	3	4
P H A S I N G					

A	Mechanical System				
	i) P & M / Equipment	6199.50	62.50	272.50	3112.50
	ii) Conveyors	11417.00	335.70	3648.80	5708.50
	iii) Belting				
	a) Nylon Nylon Belting	1454.00	0.00	291.00	436.00
	b) Steel Cord Belting	1939.00	0.00	388.00	485.00
	Total of 'A'	21009.50	398.20	4600.30	9742.00
2	Electrical & Control System	2262.85	47.67	498.85	1141.27
3	Erection and Commissioning	2327.23	44.59	509.91	1088.33
4.1	Civil & Structural Works	14862.70	674.50	3923.50	3777.50
4.2	Survey and Soil Testing	44.00	35.20	8.80	0.00
5	Design & Engineering	1279.98	24.52	280.45	598.58
6	Over Head Construction Cost	4031.93	77.25	883.43	1885.53
7	Insurance	192.00	3.68	42.07	89.79
8	Contingencies	927.34	17.77	203.19	433.67
9	Training of O&M Staff	12.80	0.25	2.80	5.99
10	Spares	465.45			
11	GST 18% on (3+4+5+6+8+9)	4060.56	154.13	1009.60	1324.07
Grand Total		51476.34	1477.75	11962.91	20086.71
					17948.96

SANDEEP KUMAR
MANAGER

CHANDRAGUPTA OPENCAST PROJECT
 CCL AMRAPALI-CHANDRAGUPTA AREA

PROJECT REPORT FOR CHANDRAGUPT OCP [15.0 MTY]

[C] STATEMENT SHOWING THE PHASED CAPITAL EXPENDITURE ON P&M:CHP
[P & M]

[Amount in Rs.'000']

Sl. No.	PARTICULARS	TOTAL QTY.	UNIT COST	TOTAL COST	P H A S I N G			
					1	2	3	4
1	Twin Shaft Sizer (Primary) of 1500 tph nominal capacity, Feed size 1200mm, Product Size 200/300 mm	1	65000	65000			65000	0
2	Twin Shaft Sizer (Secondary) of 1500 tph nominal capacity, Feed size 300 mm, Product Size (-) 100mm	1	60000	60000			60000	0
3	Apron Feeder	1	17500	17500			17500	0
4	Electro Mech.Vibrating Feeder	10	700	7000			7000	0
5	Magnetic Separator	3	1600	4800			4800	0
6	Metal Detector	3	500	1500			1500	0
7	Rapid Loadout with 2 nos.P.W.Hopper & Auto.Sampler.	4	40000	160000			53600	106400
8	Plough Feeder (1500 tph)	8	23000	184000			61600	122400
9	Flap or Sector Gate	8	600	4800		1200	3600	0
10	Motorised Hoist, Chain pulley etc., 5 / 10 t	10	600	6000	0	1200	2400	2400
11	Wear Resistent liner, Chute etc.	LS		20000	0	2000	8000	10000
12	Plant Safety and Fire Fighting System	LS		20000	0	2000	8000	10000
13	Dust Suppresion & Dust Extraction	LS		28000	0	2800	8400	16800
14	E.O.T Crane,Cap 30/20 t With Structure	1	7400	7400	0	3700	3700	0
15	Road Weigh bridge with all accessories	5	1550	7750	3100	4650	0	0
16	Belt Weighing Scale	8	650	5200		1300	1950	1950
17	Misc.items, tools,tackles etc.	LS		21000	3150	8400	4200	5250
TOTAL				619950	6250	27250	311250	275200


SANJEEV KUMAR
 MANAGER
CHANDRAGUPTA OPENCAST PROJECT
CCL, AMRAPALI-CHANDRAGUPTA AREA

PROJECT REPORT FOR CHANDRAGUPT OCP [15.0 MTY]

[A].STATEMENT SHOWING THE PHASED CAPITAL EXPENDITURE ON P&M :CHP

[CONVEYOR]

[Amount in Rs.'000]

SL. NO.	PARTICULARS	TOTAL QTY.	UNIT COST	TOTAL COST	P H A S I N G			
					1	2	3	4
1	Conveyor Dgn. : 1 C1&2 Width in mm : 1600 Length in m : 90 Power in kW : 2X90	2	14500	29000	2900	11600	14500	0
2	Conveyor Dgn. : 1 C3 Width in mm : 1600 Length in m : 145 Power in kW : 2X90	1	15200	15200	1520	6080	7600	0
3	Conveyor Dgn. : 2 C1&2 Width in mm : 1600 Length in m : 620 Power in kW : 2X200	2	54000	108000	10800	43200	54000	0
4	Conveyor Dgn. : 2 C3 Width in mm : 1600 Length in m : 730 Power in kW : 2X150	1	62000	62000	6200	24800	31000	0
5	Conveyor Dgn. : CT Width in mm : 1600 Length in m : 50 Power in kW : 1X110	1	9500	9500	950	3800	4750	0
5	Conveyor Dgn. : 3C1,2,3&4 Width in mm : 1600 Length in m : 300 Power in kW : 2X150	4	28000	112000	11200	33600	56000	11200
6	Conveyor Dgn. : 4C1,2,3&4 Width in mm : 1600 Length in m : 500 Power in kW : 2X250	4	41500	166000	0	49800	83000	33200
7	Conveyor Dgn. : 5C1,2,3&4 Width in mm : 1600 Length in m : 2050 Power in kW : 2X500	4	160000	640000	0	192000	320000	128000
TOTAL				1141700	33570	364880	570850	172400

PROJECT REPORT FOR CHANDRAGUPT OCP [15.0 MTY]

[B].STATEMENT SHOWING THE PHASED CAPITAL EXPENDITURE ON P&M :CHP

[BELTING]

[Amount in Rs.'000]

SL. No.	PARTICULARS	TOTAL QTY. (m)	UNIT COST	TOTAL COST	P H A S I N G			
					1	2	3	4
	Width of Belt,mm : 1600							
1	Type of Belt : NN	20630	7.05	145400	0	29100	43600	72700
	Type of Carcass : 1400/4							
	Width of Belt,mm : 1600							
2	Type of Belt : SC	17630	11.00	193900	0	38800	48500	106600
	Type of Carcass : ST1400							
TOTAL				339300	0	67900	92100	179300


SANJEEV KUMAR
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 CHANDRAGUPTA OPENCAST PROJECT
 CCL, AMRAPALI-CHANDRAGUPTA AREA

PROJECT REPORT FOR CHANDRAGUPT OCP [15.0 MTY]
[D].STATEMENT SHOWING THE PHASED CAPITAL EXPENDITURE ON : CHP
[CIVIL & STRUCTURALS]

[Amount in Rs.'000]

SL. No.	PARTICULARS	TOTAL QTY	TOTAL COST	P H A S I N G			
				1	2	3	4
1	Conveyor Gentries Inclined Roof Type	LS	435120	43500	108800	130500	152320
2	Transfer Houses / Drive House	LS	48950	0	9790	14690	24470
3	Receiving Pits and hoppers	LS	80000	12000	16000	20000	32000
4	Ground Bunker, Cap.20,000 te	2	587400	0	176200	117480	293720
5	Silo with sampler house for Rapid Loading, Capacity 4000 Te	2	209000	0	41800	62700	104500
6	Civil structure for sizers & other equipments	LS	15000	100	500	7700	6700
7	General Development in CHP Area	LS	5400	1350	2160	1080	810
8	Survey, Soil Investigation & Hydrogeological Data	LS	4400	3520	880		0
9	CHP Office & service Building, Road, Drain, bridge, Tunnel, Water supply, Sanitation etc.	LS	55000	5500	22000	11000	16500
10	Contingencies & Misc.	LS	50400	5000	15100	12600	17700
TOTAL		LS	1490670	70970	393230	377750	648720


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 MANAGER
 CHANDRAGUPTA OPENCAST PROJECT
 CCL, AMRAPALI-CHANDRAGUPTA AREA

**PROJECT REPORT OF CHANDRAGUPTOCP (15.00 MTY)
ESTIMATED CAPITAL REQUIREMENT ON OTHER P&M
MDO**

APPENDIX-A.3.6

SI No	Description	No.	Unit Cost	Cost	Amount in Rs. Lakh.									
					1		2		3		4		5	
					No.	Amt.	No.	Amt.	No.	Amt.	No.	Amt.	No.	Amt.
1	Exploder with continuity tester for 200 Shots	3	0.16	0.48			1	0.16	1	0.16	1	0.16		
2	Road Roller (10T) & Tar Boiler		15.00											
3	Mechsnised explosive handler			10.00			LS	10.00						
4	F.E. Loader 0.5 Cum.	1	15.00	15.00									1	15.00
8	Miscellaneous Equipment			10.00									LS	10.00
12	Mobile Light Plants	1	15.00	15.00			1	15.00						
13	Total Station(short Range 2 km with Accessories)	1	21.00	21.00	1	21.00								
14	Smart Station	1	40.00	40.00	1	40.00								
15	Terrestrial Laser Scanner	1	150.00	150.00			1	150.00						
16	Digital Level	1	3.00	3.00			1	3.00						
17	DGPS	1	30.00	30.00			1	30.00						
18	Hand held GPS	1	0.50	0.50	1	0.50								
19	Miscellaneous office automation equipment for survey			20.00			LS	20.00						
20	Slope Stability monitoring device	1	635.00	635.00			1	635.00						
Total				949.98		61.50		863.16		0.16		0.16		25.00

Sanjeev Kumar
SANJEEV KUMAR
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CHANDRAGUPTA OPTICAST PROJECT
CCL, AMHAPALI-CHANDRAGUPTA AREA

CHANDRAGUPTA OPENCAST PROJECT (15MTY)

CMPDI

ESTIMATED PHASED CAPITAL EXPENDITURE ON P&M-ELECTRICALS (MDO)

APPENDIX -A-3.7

Amount in Rs.'000

SLNO.	Particulars	Qty.	Unit Cost	Total Cost	Year Wise Phasing			
					4th Year		5th Year	
					Qty.	Cost	Qty.	Cost
1	2	3	4	5	6	7	8	9
COMMUNICATION								
1	Surface Mine Communication							
	a. IP Exchange 500 lines with accessories	1	4000	4000	LS	3000	LS	1000
	b. BSNL fixed lines	20	4	80	15	60	5	20
	c. Mobile Connection with sets	30	5	150	20	100	10	50
2	Tetra Based OITDS including Transceiver Mobile fixed sets with base towers	LS		120000	LS	100000	LS	20000
3	Internet & LAN for 40 PCs, Hardware and Software	LS		2500	LS	1500	LS	1000
4	L3 Switch	2	300	600	1	300	1	300
5	L2 Switch	4	100	400	2	200	2	200
6	Point to point Radio	2	150	300	1	150	1	150
7	Point to Multi Point Radio (Base-1, Remote-5)	LS	600	600	LS	400	LS	200
8	2/4 Mbps leased lines	LS	250	250	LS	250		
9	Plant Comm. System, etc.	LS		500	LS	300	LS	200
10	GPS Based Truck Monitoring System	LS		1000	LS	1000		
11	IP Surveillance System	LS	1500	1500	LS	1000	LS	500
12	Biometric Attendance System	LS		200	LS	200		
13	UPS 20 KVA	1	800	800	1	800		
14	Cables & Accessories along with laying	LS		3000	LS	2500	LS	500
15	Furniture fitting with Air Conditioning etc.	LS		300	LS	200	LS	100
16	Testing & Measuring Equipment	LS		100			LS	100
17	Installation and commissioning	LS		13273		10916		2357
18	Spares	LS		6637		5458		1179
SubTotal				156190		128334		27856

SANJEEV KUMAR
MANAGER

CHANDRAGUPTA OPENCAST PROJECT
GCL, AMRAPALI-CHANDRAGUPTA AREA

MDO- 33X

Appendix A.6

Provision of Hired Vehicles

S N'	Particulars	Total No
	Jeep	5
2	Car	4
3	Fire Tender	2
4	Ambulance	2
5	School Bus	5
6	Shift Bus	4
7	Explosive Van	2
8	Service Truck	1
9	Line Man Truck	1
10	Pick-up Van	2
11	Mobile Canteen Van	2
12	50 T Low Bed Trailor	1
13	Water Tanker (For Drinking water)	2
14	Cash Van	1
	Total	34


SANJELLY KISHORE
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CHANDRAGUPTA OPENCAST PROJECT
CCL AMRAPALLCHANDRAGUPTA AREA

Appendix-A.7

CHANDRAGUPT OCP(15.00 MTY)

Estimated Investment On Prospecting and Boring

VARIANT-II

(Amount in Rs. Lakhs)

Particulars	Total Provision	BALANCE PROVISION	Yearwise Phasing				
			1	2	3	4	5
Prospecting and Boring	152.00	152.00			76.00	76.00	


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CHANDRAGUPTA OPENCAST PROJECT
CCL AMRAPALI-CHANDRAGUPTA AREA

CHANDRAGUPTA OCP(15.0 MTY)
Estimated Capital for Capital Outlay in Mines

Appendix-A.8.1

MDO

(AMOUNT IN RS. LAKH)

Sl.No	Particulars	Total Provision	Phasing									
			Up to Target Year						Beyond Tgt.Yr.			
			1st yr.	2nd yr.	3rd Yr.	4th. Yr.	5th. Yr.	6th. Yr.	7th Yr.	8th Yr.	9th Yr.	10th Yr.
1	Biological reclamation of OB dump	586.65		5.00	10.00	10.00	10.00				50.00	501.65
2	Arboriculture	10.00	2.00	2.00	2.00	2.00	2.00					
3	Rain water harvesting scheme	20.00	10.00	10.00								
4	Progressive green belt development & other development	75.00	10.00	10.00	15.00	15.00	15.00				5.00	5.00
5	Cost of land development in mine & Industrial area i.e. Nala Diversion, Sedimentation Tank, Lagoon, Check Dam etc.	250.00	34.00	34.00	34.00	34.00	34.00	20.00	20.00	40.00		
6	Development of land for township	389.32	215.66	40.86	50.51	23.27	28.38	6.24	24.40			
7	Development of land for industrial infrastructures	393.73	100.00	100.00	193.73							
8	Cost of embankment against River	150.00	20.00	25.00	25.00	25.00	25.00	25.00	5.00			
9	Nalla diversion , length 1700 meter at the rate of Rs 6290/- per meter at DSR' 2007 escalated to CI 4025	252.88	252.88									
10	Barki Nadi diversion, length 100 meter at the rate of Rs 9450/- per meter at DSR' 2007 escalated to CI 4025	22.35								10.00	12.35	
11	Toe wall/Retaining wall along OB dumps, 2100 m @Rs.3900/-per m. at DSR'2007 escalated to CI 4025	276.69				20.00	20.00				20.00	216.69
12	Storm Water drain along OB dumps @Rs.104/-per m. at 100 CI for 2100 m escalated to CI 4025	125.58				10.00	10.00				10.00	95.58
13	Hydrological studies	10.00					10.00					
14	Total	2562.19	644.54	226.86	330.24	139.27	154.38	51.24	49.40	50.00	97.35	818.92
15	GST except item no. 1 (18% OF Above)	461.19	116.02	40.83	59.44	25.07	27.79	9.22	8.89	9.00	17.52	147.41
16	GRAND TOTAL (IN Rs. LAKHS.)	3023.38	760.55	267.69	389.68	164.34	182.17	60.46	58.29	59.00	114.87	966.33

MDO - 38X

RI-3, CMPDI

SANJEEV KUMAR

MANAGER

CHANDRAGUPTA OPENCAST PROJECT
CO, AMRAPALI-CHANDRAGUPTA AREA

CHANDRAGUPTA OCP(15.0 MTY)
SUMMARY OF THE CAPITAL INVESTMENT ON ROADS & CULVERTS.

MDO

Sl. NO.	PARTICULARS.	TOTAL PROV.	UP TO TARGET YEAR						BEYOND TGT. YR.	REFERENCE
			Y.1	Y.2	Y.3	Y.4	Y.5	Y.6		
1	COLONY ROADS	664.85	355.65	67.39	83.30	38.37	46.80	10.30	63.06	APP.A.8.2.1
2	HAUL ROAD	5661.92	1000.00	1000.00	1000.00	2661.92				APP.A.8.2.2
3	APPROACH ROAD TO THE PROJECT	761.34	100.00	200.00	200.00	261.34				APP.A.8.2.3
4	APPROACH ROAD TO COLONY	764.47	100.00	300.00	364.47					APP.A.8.2.4
5	APPROACH ROAD TO THE MAGAZINE	231.02	80.00	151.02						APP.A.8.2.5
6	BRIDGE	10000.00	5000.00	5000.00						
	TOTAL	18083.60	6635.65	6718.40	1647.77	2961.63	46.80	10.30	63.06	


SANJEEV KUMAR
 MANAGER
 CHANDRAGUPTA OCP PROJECT

MDO - 37X

RI-3, CMPDI

APPENDIX-A.8.2.1

CHANDRAGUPTA OCP(15.0 MTY)
STATEMENT SHOWING THE ESTIMATED CAPITAL
INVESTMENT ON COLONY ROADS.

MDO
UPTO TARGET YEAR
(AMOUNT IN Rs.'000')

SL	NO.	P A R T I C U L A R S				COST AT	COST AT	COST AT	COST AT
		LENGTH/	NO./KM	CI	CI	4025	CI	TOTAL	COST
1.	COLONY ROADS	7.50 mt wide 225 mm boulder soling							
		7.50 mt wide 75 mm W.B.M.(50-63 mm)							
		7.50 mt wide 75 mm W.B.M.(40-50 mm)							
		7.50 mt. wide 40 mm premix carpet							
		including cycle track							
2.	CULVERTS.		4.30	261.00	10505.25			45172.58	
		4.57 mt. span R.C.C. culvert	1	49.50	1992.38			1992.38	
		3.05 mt. span R.C.C. culvert	1	33.00	1328.25			1328.25	
		1.83 mt. span R.C.C. culvert	1	19.80	796.95			796.95	
		1.22mt. span R.C.C. culvert	1	13.20	531.30			531.30	
		0.61 mt.dia hume pipe culvert	4	4.10	165.03			660.10	
3.	TREE GUARDS (@ 40/Km.)		172	0.03	1.21			207.69	
4.	R.C.C. DRAIN CROSSING SLABS		257	0.03	1.21			310.57	
		40% of the total nos. of quarters.							
5.	TOTAL							50999.81	
6.	TOTAL AMOUNT IN Rs. LAKHS.							510.00	
7.	Add GST @ 18%							91.80	
8.	GRAND TOTAL (IN Rs. LAKHS.)							601.80	

SANJEEV KUMAR
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CHANDRAGUPTA OPENCAST PROJECT
CCL AMPAPALLI CHANDRAGUPTA AREA

MDO - 38X

RI-3, CMPDI

**CHANDRAGUPTA OCP(15.0 MTY)
STATEMENT SHOWING THE ESTIMATED CAPITAL
INVESTMENT ON COLONY ROADS.**

**MDO
BEYOND TARGET YEAR
(AMOUNT IN Rs.'000')**

Sl. NO.	PARTICULARS	LENGTH/ NO./KM	COST AT 100 CI	COST AT 4025 CI	TOTAL COST
1.	COLONY ROADS				
	7.50 mt wide 225 mm boulder soling				
	7.50 mt wide 75 mm W.B.M.(50-63 mm)				
	7.50 mt wide 75 mm W.B.M.(40-50 mm)				
	7.50 mt. wide 40 mm premix carpet including cycle track	4.60	261.00	10505.25	48324.15
2.	CULVERTS.				
	4.57 mt. span R.C.C. culvert	2	49.50	1992.38	3984.75
	3.05 mt. span R.C.C. culvert	1	33.00	1328.25	1328.25
	1.83mt. span R.C.C. culvert	1	19.80	796.95	796.95
	1.22mt. span R.C.C. culvert	1	13.20	531.30	531.30
	0.61 mt.dia hume pipe culvert	5	4.10	165.03	825.13
3.	TREE GUARDS (@ 40/Km.)	184	0.03	1.21	222.18
4.	R.C.C. DRAIN CROSSING SLABS				
	40% of the total nos. of quarters.	274	0.03	1.21	330.86
5.	TOTAL				56343.56
6.	TOTAL AMOUNT IN Rs. LAKHS.				563.44
7.	Add GST @ 18%				101.42
8.	GRAND TOTAL (IN Rs. LAKHS.)				664.85

MDO - 39X


RI-2, CMBDI
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CHANDRAGUPTA OPENCAST PROJECT
CCL, AMRAPALI-CHANDRAGUPTA

**CHANDRAGUPTA OCP(15.0 MTY)
STATEMENT SHOWING THE ESTIMATED CAPITAL
INVESTMENT ON HAUL ROAD (100/120 T).**

MDO
(AMOUNT IN Rs. '000')

Sl. NO.	PARTICULARS	LENGTH/ NO./KM	COST AT 100 CI	COST AT 4025 CI	TOTAL COST
A.	HAUL ROAD SPECIFICATION				
1.	30.0 mt wide 400 mm moorum				
2.	30.0mt wide 400 mm moorum + sand	5.4	1778.00	71564.50	386448.30
3.	30.0 mt wide 700 mm WBM				
	SUB-TOTAL				386448.30
B.	CULVERTS				
1.	Cost of 4.57 mt span R.C.C culvert	3	169.00	6802.25	20406.75
2.	Cost of 3.05 mt span R.C.C culvert	2	113.00	4548.25	9096.50
3.	Cost of 0.61 mt span R.C.C culvert	5	14.00	563.50	2817.50
C.	DRAIN	10	57.00	2294.25	22942.50
D.	FIXED WATER SPRINKLER		L.S.		20000.00
E.	Cost of 10m long bridge on Chutua Nala	1	450.00	18112.50	18112.50
	GRAND TOTAL				479824.05
	TOTAL AMOUNT IN RS. LAKHS				4798.24
	Add GST @ 18%				863.68
	GRAND TOTAL (IN Rs. LAKHS.)				5661.92


SANJEEV KUMAR
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 CHANDRAGUPTA OPTICAST PROJECT
 CCL, AMRAPALI-CHANDRAGUPTA AREA

**CHANDRAGUPTA OCP(15.0 MTY)
STATEMENT SHOWING THE ESTIMATED CAPITAL
INVESTMENT ON APPROACH ROAD TO THE PROJECT**

MDO
(AMOUNT IN Rs.'000')

SL. NO.	PARTICULARS	LENGTH KM/NO.	COST AT 100 CI	COST AT 4025 CI	TOTAL COST
1.	APPROACH ROAD TO THE PROJECT				
	7.50 mt wide 225 mm boulder soling				
	7.50 mt wide 75 mm W.B.M.(50-63 mm)				
	7.50 mt wide 75 mm W.B.M.(40-50 mm)				
	7.50 mt. wide 40 mm premix carpet	4	290.00	11672.50	46690.00
2.	CULVERTS				
	4.57 mt. span R.C.C. culvert	1	49.50	1992.38	1992.38
	3.05 mt. span R.C.C. culvert	1	33.00	1328.25	1328.25
	1.83 mt. span R.C.C. culvert	1	19.80	796.95	796.95
	1.22 mt. span R.C.C. culvert	1	13.20	531.30	531.30
	0.61 mt.dia hume pipe culvert	4	4.10	165.03	660.10
3	TREE GUARDS (@ 40 /KM)	160	0.03	1.21	193.20
4	DRAIN	4	57.00	2294.25	9177.00
5	E/W in excavation & banking	20000		157.55	3151
	TOTAL				64520.18
	TOTAL AMOUNT IN Rs. LAKHS.				645.20
	Add GST @ 18%				116.14
	GRAND TOTAL (IN Rs. LAKHS.)				761.34

APPENDIX-A.8.2.4

**CHANDRAGUPTA OCP(15.0 MTY)
STATEMENT SHOWING THE ESTIMATED CAPITAL
INVESTMENT ON APPROACH ROAD TO COLONY**

**MDO
(AMOUNT IN Rs.'000')**

SL. NO.	PARTICULARS	LENGTH KM/NO.	COST AT 100 CI	COST AT 4025 CI	TOTAL COST
1.	APPROACH ROAD TO THE COLONY				
	7.50 mt wide 225 mm boulder soling				
	7.50 mt wide 75 mm W.B.M.(50-63 mm)				
	7.50 mt wide 75 mm W.B.M.(40-50 mm)				
	7.50 mt. wide 40 mm premix carpet	4	290.00	11672.50	46690.00
2.	CULVERTS				
	4.57 mt. span R.C.C. culvert	1	49.50	1992.38	1992.38
	3.05 mt. span R.C.C. culvert	1	33.00	1328.25	1328.25
	1.83 mt. span R.C.C. culvert	2	19.80	796.95	1593.90
	0.61 mt.dia hume pipe culvert	4	4.10	165.03	660.10
3.	TREE GUARDS (@ 40 /KM)	160	0.03	1.21	193.20
4.	DRAIN	4	57.00	2294.25	9177.00
5	E/W in excavation & banking	20000		157.55	3151
	TOTAL				64785.83
	TOTAL AMOUNT IN Rs. LAKHS.				647.86
	Add GST @ 18%				116.61
	GRAND TOTAL (IN Rs. LAKHS.)				764.47

CHANDRAGUPTA OCP(15.0 MTY)
STATEMENT SHOWING THE ESTIMATED CAPITAL
INVESTMENT ON APPROACH ROAD TO THE MAGAZINE

MDO
(AMOUNT IN Rs.'000')

SL. NO.	PARTICULARS	LENGTH KM/NO.	COST AT 100 CI	COST AT 4025 CI	TOTAL COST
1.	APPROACH ROAD TO THE MAGAZINE.				
	3.75 mt wide 150 mm boulder soling				
	3.75 mt wide 75 mm Sand/Moorum				
	3.75 mt wide 150 mm W.B.M.				
	3.75 mt. wide 20 mm premix carpet	3	132.00	5313.00	15939.00
2.	CULVERTS				
	4.57 mt. span R.C.C. culvert	1	37.50	1509.38	1509.38
	3.05 mt. span R.C.C. culvert	1	25.00	1006.25	1006.25
	1.83 mt. span R.C.C. culvert	1	15.00	603.75	603.75
	0.61 mt.dia hume pipe culvert	3	3.10	124.78	374.33
3.	TREE GUARDS (@ 40 /KM)	120	0.03	1.21	144.90
	TOTAL				19577.60
	TOTAL AMOUNT IN Rs. LAKHS.				195.78
	Add GST @ 18%				35.24
	GRAND TOTAL (IN Rs. LAKHS.)				231.02


SANJEEV KUMAR
MANAGER
 CHANDRAGUPTA OPENCAST PROJECT
 AMRAPALI-CHANDRAGUPTA

APPENDIX-A.8.3

CHANDRAGUPTA OCP(15.0 MTY)
SUMMARY OF THE CAPITAL INVESTMENT ON WATER SUPPLY & SEWERAGE.

MDO

SI. NO.	PARTICULARS.	TOTAL PROV.	UP TO TARGET YEAR						BEYOND TGT. YR.	REFERENCE
			Y.1	Y.2	Y.3	Y.4	Y.5	Y.6		
1.	SOURCE OF WATER	424.07	50.00	50.00	50.00	50.00	224.07			APP.A.8.3.1.
2.	COLONY WATER SUPPLY	487.39	255.96	48.50	59.95	27.62	33.68	7.41	54.28	APP.A.8.3.2.
3.	COLONY SEWERAGE	362.89	200.84	38.05	47.04	21.67	26.43	5.81	23.05	APP.A.8.3.3.
4.	INDUSTRIAL WATER SUPPLY	1063.42		100.00	200.00	300.00	463.42			APP.A.8.3.4.
5.	INDUSTRIAL SEWERAGE	718.28		100.00	100.00	100.00	418.28			APP.A.8.3.5.
	T O T A L	3056.05	506.80	336.55	456.99	499.29	1165.88	13.22	77.32	


SANJEEV KUMAR
MANAGER
CHANDRAGUPTA OPENCAST PROJECT
CCL, AMRAPALI-CHANDRAGUPTA AREA

CHANDRAGUPTA OCP(15.0 MTY)
STATEMENT SHOWING THE ESTIMATED CAPITAL INVESTMENT
ON SOURCE OF WATER SUPPLY

MDO
(AMOUNT IN Rs.'000')

SL. NO.	PARTICULARS	UNIT OF MEASURE	UNIT COST(RS)	QUANTITY	COST AT 100 CI	COST AT 4025 CI
1.	INTAKE WELL AND RAW WATER PUMP HOUSE					
a.	1354.00 INDUSTRIAL WATER	KL	170.00	1354	230.18	9264.75
b.	317.00 POTABLE WATER	KL	170.00	317	53.89	2169.07
2.	RAW WATER BOOSTING PUMPING STATION					
a.	INDUSTRIAL WATER	LS				1000.00
b.	POTABLE WATER	LS				500.00
3.	RAW WATER RISING MAINS					
a.	INDUSTRIAL WATER(150 MM)	RM	240.80	1000	240.80	9692.20
b.	POTABLE WATER(100 MM)	RM	124.06	500	62.03	2496.71
4	FOR POTABLE WATER					
a.	317.00 WATER TREATMENT PLANT	KL	280.00	317	88.76	3572.59
b.	59.00 CLEAR WATER RESERVOIR	KL	650.00	59.00	38.35	1543.59
c.	CLEAR WATER RISING MAINS	RM	124.06	500.00	62.03	2496.71
d.	CLEAR WATER PUMP AND PUMP HOUSE	LS				1000.00
5	VALVES & SPECIALS (@15% OF THE COST OF PIPES)					2202.84
	TOTAL COST					35938.45
	TOTAL (IN Rs.LAKHS.)					359.38
	Add GST @ 18%					64.69
	GRAND TOTAL (IN Rs. LAKHS.)					424.07

Sanjeev Kumar
SANJEEV KUMAR
 MANAGER
 CHANDRAGUPTA OPENCAST PROJECT
 CCL, AMRAPALI-CHANDRAGUPTA ARE.

CHANDRAGUPTA OCP(15.0 MTY)
STATEMENT SHOWING THE ESTIMATED CAPITAL INVESTMENT
ON COLONY WATER SUPPLY SCHEME.

MDO
 UPTO TARGET YEAR
 (AMOUNT IN Rs.'000')

SL. NO.	PARTICULARS	UNIT OF MEASURE	UNIT COST(RS)	QUANTITY	COST AT 100 CI	COST AT 4025 CI
1.	GROUND RESERVOIR 1.20 0.90 LAKHS GALLON CAPACITY	GALLON	3.00	90000	270.00	10867.50
2.	OVERHEAD TANK 0.60 0.40 LAKHS GALLON CAPACITY	GALLON	5.00	40000	200.00	8050.00
3.	PUMP HOUSE ,2 NOS.	SQ.METER	260.00	20	10.40	418.60
4.	PUMPS & MOTORS	L.S.				300.00
5.	4300 PIPE LINE					
a.	2150 M (DIA. 100 MM.)	R.M.	78.70	2150	169.21	6810.50
b.	1075 M (DIA. 80 MM.)	R.M.	62.70	1075	67.40	2712.95
c.	1075 M (DIA. 50 MM.)	R.M.	44.90	1075	48.27	1942.77
6.	VALVES & SPECIALS (15%OF THE ABOVE ITEM)					1719.93
7.	COLONY DISTRIBUTION SYSTEM(@ RS.150/UNIT)		150.00	643	96.45	3882.11
	TOTAL COST					36704.36
	TOTAL (IN Rs.LAKHS.)					367.04
	Add GST @ 18%					66.07
	GRAND TOTAL (IN Rs. LAKHS.)					433.11


SANJEEV KUMAR
 MANAGER
 CHANDRAGUPTA OCP PROJECT
 EPL AREA, CHANDRAGUPTA OCP AREA

CHANDRAGUPTA OCP(15.0 MTY)
STATEMENT SHOWING THE ESTIMATED CAPITAL INVESTMENT
ON COLONY WATER SUPPLY SCHEME.

MDO
BEYOND TARGET YEAR
(AMOUNT IN Rs. '000')

SL. NO.	PARTICULARS	UNIT OF MEASURE	UNIT COST(RS)	QUANTITY	COST AT 100 CI	COST AT 4025 CI
1.	GROUND RESERVOIR 1.30 1.00 LAKHS GALLON CAPACITY	GALLON	3.00	100000	300.00	12075.00
2.	OVERHEAD TANK 0.60 0.50 LAKHS GALLON CAPACITY	GALLON	5.00	50000	250.00	10062.50
3.	PUMP HOUSE ,2 NOS.	SQ.METER	260.00	20	10.40	418.60
4.	PUMPS & MOTORS	L.S.				500.00
5.	4600 PIPE LINE					
a.	2300 M (DIA. 100 MM.)	R.M.	78.70	2300	181.01	7285.65
b.	1150 M (DIA. 80 MM.)	R.M.	62.70	1150	72.11	2902.23
c.	1150 M (DIA. 50 MM.)	R.M.	44.90	1150	51.64	2078.31
6.	VALVES & SPECIALS (15%OF THE ABOVE ITEM)					1839.93
7.	COLONY DISTRIBUTION SYSTEM(@ RS.150/UNIT)		150.00	686	102.90	4141.73
	TOTAL COST					41303.94
	TOTAL (IN Rs.LAKHS.)					413.04
	Add GST @ 18%					74.35
	GRAND TOTAL (IN Rs. LAKHS.)					487.39


SANJEEV KUMAR
MANAGER
CHANDRAGUPTA OPENCAST PROJECT
CCL AMRAPALI-CHANDRAGUPTA AREA

CHANDRAGUPTA OCP(15.0 MTY)
STATEMENT SHOWING THE ESTIMATED CAPITAL INVESTMENT
ON COLONY SEWERAGE .

MDO
 UPTO TARGET YEAR
 (AMOUNT IN Rs.'000')

SL. NO.	PARTICULARS	UNIT OF MEASURE	UNIT COST(RS)	QUANTITY	COST AT 100 CI	COST AT 4025 CI
1.	COMBINED OPEN SURFACE DRAIN					
	a)MAIN DRAIN (60CMx90CM)	R.M.	104.00	1075	111.80	4499.95
	b)CONNECTING DRAIN (30CMx45CM)	R.M.	57.00	1075	61.28	2466.32
	c) SMALL DRAIN (22.5CMx30CM)	R.M.	28.00	2150	60.20	2423.05
2.	SEWAGE TREATMENT PLANT	NO.	750.00	643	482.25	19410.56
	TOTAL COST					28799.88
	TOTAL (IN Rs.LAKHS.)					288.00
	Add GST @ 18%					51.84
	GRAND TOTAL (IN Rs.LAKHS.)					339.84


SANJEEV KUMAR
 MANAGER
 CHANDRAGUPTA OPENCAST PROJECT
 CCL AMRAPALI-CHANDRAGUPTA AREA

CHANDRAGUPTA OCP(15.0 MTY)
STATEMENT SHOWING THE ESTIMATED CAPITAL INVESTMENT
ON COLONY SEWERAGE .

MDO
BEYOND TARGET YEAR
(AMOUNT IN Rs.'000')

SL. NO.	PARTICULARS	UNIT OF MEASURE	UNIT COST(RS)	QUANTITY	COST AT 100 CI	COST AT 4025 CI
1.	COMBINED OPEN SURFACE DRAIN					
	a) MAIN DRAIN (60CMx90CM)	R.M.	104.00	1150	119.60	4813.90
	b) CONNECTING DRAIN (30CMx45CM)	R.M.	57.00	1150	65.55	2638.39
	c) SMALL DRAIN (22.5CMx30CM)	R.M.	28.00	2300	64.40	2592.10
2.	SEWAGE TREATMENT PLANT	NO.	750.00	686	514.50	20708.63
	TOTAL COST					30753.01
	TOTAL (IN Rs.LAKHS.)					307.53
	Add GST @ 18%					55.36
	GRAND TOTAL (IN Rs.LAKHS.)					362.89


SANJEEV KUMAR
MANAGER
CHANDRAGUPTA OPENCAST PROJECT
CCL, AMRAPALI-CHANDRAGUPTA AREA

CHANDRAGUPTA OCP (15.0 MT)
CAPITAL INVESTMENT ON INDUSTRIAL WATER SUPPLY

MDO

Amount in Rs. 000

APPENDIX - A.1.3

S/No.	Particulars	Unit	Quantity	rate	Amount at CI	Amount at CI
A	WORKSHOP					
1	Industrial water reservoir	Gallon	298000	3.00	894.00	35983.50
2	100-150mm dia pipe line from	m	2000	124.06	248.12	9986.83
3	bulk reservoir to workshop, CHP and overhead tank					
4	Valves and specials					
5	Extra for masonry anchor blocks	LS				1498.02
6	Internal distribution system	LS				250.00
7	Overhead tank	Gallons	4000	5.00	200.00	8050.00
8	Ground sump	Gallons	4000	3.00	12.00	483.00
9	Pump house	sqm	50	260.00	13.00	523.25
10	Water supply pump at storage reservoir	LS				1000.00
11	100-150mm dia fire fighting pipe line	m	500	78.70	39.35	1583.84
12	Valves and specials					237.58
13	Fire fighting pumps	LS				300.00
Sub total (A)						60146.02
B	QUARRIES					
1	Pipe line 100-150mm dia	m	1000	124.06	124.06	4993.42
2	Valves & specials					749.01
Sub total (B)						5742.43
C	ADMINISTRATIVE COMPLEX					
1	Distribution system	m	500	44.90	22.45	903.61
2	Valves and specials					135.54
Sub total (C)						1039.15
D	QUARRY FIRE FIGHTING					
1	Central sump	Gallons	20000	3.00	60.00	2415.00
2	Pipe line for quarry	m	5000	78.70	393.50	15838.38
3	Valves and specials					2375.76
4	Pumps	LS				2000.00
5	Pump house	sqm	30	260.00	7.80	313.95
6	Electricals	LS				250.00
Sub total (D)						23193.08
Grand Total (A to D)						80120.68
Total in Rs. Lakhs						801.21
Add GST @ 18%						162.22
GRAND TOTAL (IN Rs. LAKHS.)						1063.43

SANJEEV KUMAR
MANAGER
CHANDRAGUPTA OPENCAST PROJECT
CCL AMRAPALI-CHANDRAGUPTA AREA

**CHANDRAGUPTA OCP(15.0 MTY)
STATEMENT SHOWING THE ESTIMATED CAPITAL INVESTMENT
ON INDUSTRIAL SEWAGE.**

MDO
(AMOUNT IN Rs.'000')

SL. NO.	PARTICULARS	UNIT OF MEASURE	UNIT COST(RS)	QUANTITY	COST AT 100 CI	COST AT 4025 CI
1.	COMBINED OPEN SURFACE DRAIN					
a.	60 CM. X 90 CM.	METER	104.00	500	52.00	2093.00
b.	30 CM. X 45 CM.	METER	57.00	500	28.50	1147.13
2.	EFFLUENT TREATMENT PLANT		L.S.			57631.00
	TOTAL COST					60871.13
	TOTAL (IN Rs.LAKHS.)					608.71
	Add GST @ 18%					109.57
	GRAND TOTAL (IN Rs.LAKHS.)					718.28


SANJEEV KUMAR
MANAGER
CHANDRAGUPTA OPENCAST PROJECT
CCL AMRAPALI-CHANDRAGUPTA AREA

PROJECT REPORT OF CHANDRAGUPT OCP (15.0 MTP)
STATEMENT SHOWING ESTIMATED YEAR WISE OPERATING COST AT 100% CAPACITY UTILISATION

MDO

Sl.No	Particulars	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25
1	Salary & Wages	2697.81	2464.84	2589.58	3222.89	3624.42	3088.65	3588.65	3588.65	3588.65	3588.65	3588.65	3588.65	3588.65	3588.65	3588.65	3588.65	3588.65	3588.65	3588.65	3588.65	3588.65	3588.65	3588.65	3588.65	3588.65
2	Stores	9428.44	12188.88	18888.94	21888.94	25152.84	26824.41	27384.88	27384.88	27384.88	27384.88	27384.88	27384.88	27384.88	27384.88	27384.88	27384.88	27384.88	27384.88	27384.88	27384.88	27384.88	27384.88	27384.88	27384.88	27384.88
3	Power	379.58	379.58	617.64	1504.34	1779.16	1887.99	1941.96	1888.08	2037.94	2448.22	2188.66	2233.79	2383.73	2403.03	2535.43	2624.18	2624.18	2624.18	2624.18	2624.18	2624.18	2624.18	2624.18	2624.18	2624.18
4	Misc. Expenses	1141.16	1792.38	2795.02	3392.88	3888.37	4081.19	4089.79	4089.79	4109.97	4125.84	4192.34	4192.34	4192.34	4192.34	4192.34	4192.34	4192.34	4192.34	4192.34	4192.34	4192.34	4192.34	4192.34	4192.34	4192.34
5	Administrative Cost (Cash)																									
6	Mine closure Cost																									
7	OB Outourcing																									
8	COAL Outourcing																									
9	Other Outourcing cost	139.08	242.67	358.96	546.33	586.63	595.27	595.27	595.27	595.27	595.27	595.27	595.27	595.27	595.27	595.27	595.27	595.27	595.27	595.27	595.27	595.27	595.27	595.27	595.27	
10	Reserve Price																									
11	Bank Guarantee Charges (L5)																									
12	Interest on Working Capital	159.28	219.23	310.82	368.72	421.58	447.90	450.80	453.91	453.33	461.71	464.34	468.22	468.22	468.22	468.22	468.22	468.22	468.22	468.22	468.22	468.22	468.22	468.22	468.22	468.22
13	Total cash Cost	13304.30	18278.52	25987.14	30883.64	35318.95	37915.40	37758.30	38018.48	37970.82	38672.12	38884.48	39048.70	44483.75	43837.53	48904.90	49472.26	49482.12	49496.30	49677.14	49300.51	49398.75	49398.60	49325.44	49378.79	49378.38
14	Interest on Loan																									
15	Administrative Cost (Non-cash)	3633.14	5709.35	8519.88	18123.25	11820.81	11492.36	11506.85	11622.25	11627.99	11712.17	12817.88	12017.98	13823.73	13801.80	15370.30	15319.86	15526.72	15526.72	15526.72	15526.72	15526.72	15526.72	15526.72	15526.72	15526.72
16	Depreciation	10997.45	22987.86	34888.85	41883.89	48911.48	49007.76	49015.18	49040.73	48998.81	50384.29	50382.48	51007.68	58327.49	57839.33	64274.40	64992.18	65002.82	65002.82	65002.82	65002.82	65002.82	65002.82	65002.82	65002.82	65002.82
Total		10997.45	22987.86	34888.85	41883.89	48911.48	49007.76	49015.18	49040.73	48998.81	50384.29	50382.48	51007.68	58327.49	57839.33	64274.40	64992.18	65002.82	65002.82	65002.82	65002.82	65002.82	65002.82	65002.82	65002.82	65002.82

Amount In Rupees

(Signature)

SANJEEV KUMAR
MANAGER
CHANDRAGUPTA OPENCAST PROJECT
CCL, AMRAPALI CHANDRAGUPTA AREA

MDO, 52X

RI-3, CMPDI

FINANCIAL RESULT


SANJEEV KUMAR
MANAGER
CHANDRAGUPTA OPENCAST PROJECT
CCL AMRAPALI-CHANDRAGUPTA AREA

PROJECT REPORT OF CHANDRAGUPT OCP (15.00 MTY)
STATEMENT SHOWING ESTIMATED AVERAGE COST OF PRODUCTION AND PROFITABILITY
COMBINED

COST IN RS/TE

TARGET OUTPUT(M.TE)	15.00	MANPOWER	149
PEAK OUTPUT(M.TE)	15.00		
PEAK OB (M M3)	32.60	INVESTMENT	
AVERAGE STRIPPING RATIO(M3/TE)	1.86	(Rs in Crores)	973.50

SR.NO	PARTICULARS	COST/TE	FIXED	VARIABLE	%GE ON TOTAL COST
1	SALARY & WAGES	37.48	37.48		6.22%
2	STORES	221.33	0.50	220.83	36.71%
3	POWER	15.34		15.34	2.55%
4	MISC EXP	42.66	4.86	37.80	7.07%
5	ADMINSTRATIVE COST (CASH)	15.81	15.81		2.62%
6	MINE CLOSURE COST	4.56	4.56		0.76%
7	CONTRACTUAL OB REMOVAL				
8	CONTRACTUAL COAL COST				
9	OTHER OUTSOURCING COST	4.34		4.34	0.72%
	RESERVE PRICE				
	BANK GUARANTEE CHARGES (Is)				
10	INTEREST ON WORKING CAPITAL	5.71	3.05	2.65	0.95%
	TOTAL CASH COST	347.22	66.26	280.96	57.59%
11	11.5% INTEREST ON LOAN CAPITAL				
12	DEPRECIATION	113.43	113.43		18.81%
13	ADMINSTRATIVE COST (NOTIONAL)	142.26	142.26		23.59%
	TOTAL COST	602.91	321.95	280.96	100.00%

B-PROFITABILITY		AT 100%	AT 85%
1	RATED OUTPUT (MTY)	15.00	12.75
2	COST OF PRODUCTION (RS/TE)	602.91	699.66
3	SELLING PRICE (RS/TE)	1023.25	1023.25
4	PROFIT/LOSS (RS/TE)	420.34	323.59
5	BREAK EVEN POINT (%)	43.37%	56.41%
6	BREAK EVEN POINT (M.te)	6.506	8.461
7	ANNUAL PROFIT/LOSS (Rs in Crores)	630.51	412.58
8	COST/CUM	238.62	276.91


SANJEEV KUMAR
 MANAGER
 CHANDRAGUPTA DEPCAST PROJECT
 CCL, AMRAPALLI-CHANDRAGUPTA AREA

Project Report for Chandragupt OCP (15.0MTR), CCL MDO MODE-March 2020

PROJECT REPORT OF CHANDRAGUPT OCP (15.0 MTR)

STATEMENT SHOWING YEAR WISE OPERATING COST AT 100% CAPACITY UTILISATION

COMBINED

COMBINED - 2X

RI-3, CMPDI

SANJEEV KUMAR
MANAGER
CHANDRAGUPTA OPERATIONS
CCL, MDO, CHANDRAGUPTA

Sl	Particulars	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25
1	Salary & Wages	3232.74	3816.24	4485.82	4803.82	5110.59	5177.82	5177.82	5187.51	5171.19	5191.27	5214.68	5215.88	5215.88	5215.88	5215.88	5215.88	5215.88	5215.88	5215.88	5215.88	5215.88	5215.88	5215.88	5215.88	5215.88
2	Stores	9634.44	11832.30	19625.94	21904.06	25217.94	26908.41	27196.89	27359.47	27286.48	27515.88	27901.25	27990.89	28324.86	28324.86	28324.86	28324.86	28324.86	28324.86	28324.86	28324.86	28324.86	28324.86	28324.86	28324.86	28324.86
3	Power	379.59	379.59	617.64	1504.34	1778.19	1897.99	1941.90	1990.60	2027.04	2046.22	2106.86	2223.79	2383.73	2400.03	2505.42	2621.19	2621.17	2621.17	2626.77	2619.48	2617.39	2663.36	2767.91	2963.38	3261.07
4	Misc. Expenses	1485.65	2551.38	3820.93	4740.63	5287.68	5719.48	5748.10	5757.40	5759.28	5764.15	5858.65	5859.68	6299.09	6277.83	6657.13	6668.94	6699.28	6700.17	6699.71	6697.62	6702.91	6702.91	6702.91	6702.91	6702.91
5	Administrative Cost (Cash)	513.94	896.80	1358.89	1811.39	2088.94	2352.06	2352.06	2352.06	2352.06	2352.06	2352.06	2352.06	2352.06	2352.06	2352.06	2352.06	2352.06	2352.06	2352.06	2352.06	2352.06	2352.06	2352.06	2352.06	2352.06
6	Miscellaneous Cost	324.12	348.33	357.35	375.21	393.98	413.67	434.36	456.66	479.88	502.82	527.96	554.35	582.08	611.18	641.74	673.83	707.52	742.80	780.04	819.05	859.80	901.00	948.15	995.56	1045.33
7	Oil Outsourcing																									
8	COAL Outsourcing																									
9	Other Outsourcing cost	142.05	265.98	388.82	538.14	688.43	837.08	837.08	837.08	837.08	837.08	837.08	837.08	837.08	837.08	837.08	837.08	837.08	837.08	837.08	837.08	837.08	837.08	837.08	837.08	
10	Interest on Working capital	272.18	375.66	523.09	620.67	686.62	744.19	748.86	752.24	752.76	752.90	758.36	758.36	830.86	825.25	887.22	895.50	887.30	859.18	908.75	940.88	963.64	966.69	987.88	915.97	
11	Total cash Cost	15784.72	21714.89	30588.47	36348.26	41282.99	43941.71	44206.29	44409.23	44464.68	45191.89	46493.60	43903.12	50929.86	50985.05	55493.65	56085.45	56130.63	56181.91	60201.69	56095.94	56294.11	56294.73	56296.21	56229.25	5681.01
12	Interest on Loan																									
13	Administrative Cost (Non-cash)	4535.50	7261.24	12319.98	16302.51	18795.08	21168.57	21168.57	21168.57	21168.57	21168.57	21168.57	21168.57	21168.57	21168.57	21168.57	21168.57	21168.57	21168.57	21168.57	21168.57	21168.57	21168.57	21168.57	21168.57	21168.57
14	Depreciation	4577.92	7943.75	11538.75	12191.19	14044.65	14636.53	14701.00	14706.40	14772.14	14858.31	15102.13	15102.13	17057.87	16945.94	18514.85	18664.04	18664.04	18673.86	18673.86	18673.86	18673.86	18673.86	18673.86	18673.86	18673.86
	Total	24888.14	36518.88	54467.19	65841.66	74622.82	79706.79	80075.86	80424.20	80455.39	81216.77	81791.30	81933.82	89165.50	88489.57	95166.67	95983.24	95983.24	95983.24	95983.24	95983.24	95983.24	95983.24	95983.24	95983.24	95983.24
	Cost/ha (Rs.)			680.39	598.56	572.48	531.65	533.64	536.16	538.04	541.45	545.08	546.23	594.44	596.00	634.44	638.75	640.14	640.27	639.55	634.54	627.96	625.43	623.82	626.41	
	Fixed Cost (Rs./ha)			68.54	79.61	63.18	56.88	57.62	57.17	57.30	57.50	57.67	57.72	57.84	57.88	57.88	57.88	57.88	57.88	57.88	57.88	57.88	57.88	57.88	57.88	
	Variable Cost (Rs./ha)			592.85	518.95	509.30	474.77	475.82	478.98	478.71	483.95	487.40	488.50	536.96	538.12	576.56	581.33	581.26	581.39	581.67	574.66	564.58	562.55	560.53	575.53	

Amount in Rs./Ha/ha

Project Report for Chandragupt OCP (15.0MTY), CCL MDO MODE-March 2020

**PROJECT REPORT OF CHANDRAGUPT OCP (15.0 MTY)
STATEMENT SHOWING ESTIMATED CASH FLOW ANALYSIS AT 100% CAPACITY UTILISATION
COMBINED**

Appendix-D

SLNo.	Particulars	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25
1	Initial Capital (Equity)	81616.77	71451.80	72679.75	32833.26	18912.83	3223.07	1520.80	818.00	110.87	1282.51	3490.93		25818.25	296.19	25803.71	2635.84		164.84		296.19	296.19		412.12		592.37
2	Debt Service																									
3	Replacement Capital					291.00	438.00	727.00	3172.79	2341.38	17173.79	28381.39	11780.53	13349.01	8506.59	8917.50	1911.75	3381.18	2213.12	20998.21	18348.51	20887.42	17432.42	17588.69		
4	Less: GDT credit on Capital Goods	5203.87	2910.52	4992.84	2330.87	1491.28	498.03	185.46	482.77	357.16	2984.81	3643.87	1784.83	5841.87	894.32	4888.43	734.18	515.77	353.11	3051.40	2538.82	4804.28	2558.18	2142.15	872.17	1547.42
5	Cash Operating Expenses	10784.72	21714.85	20598.47	36348.26	41282.89	43881.71	44206.29	45889.23	44804.88	45191.89	45430.90	45903.12	50829.08	50385.85	55483.85	56885.45	58130.83	58181.81	58201.88	58885.84	58204.11	58247.03	58226.21	58128.25	58881.81
6	Total Cash Outflow	92185.83	80255.37	88272.38	80859.76	89086.52	47102.75	48288.83	47119.18	48583.79	89963.27	85689.85	55518.82	84852.70	55383.81	82035.88	88108.88	88986.00	88185.78	73259.48	70291.81	88387.71	73879.45	74237.00	58128.25	30879.80
7	Inflow from Sales	29011.90	48648.25	81886.89	112557.50	133022.90	153487.50	153487.50	153487.50	153487.50	153487.50	153487.50	153487.50	153487.50	153487.50	153487.50	153487.50	153487.50	153487.50	153487.50	153487.50	153487.50	153487.50	153487.50	153487.50	153487.50
8	Net Cash Flow	-63164.83	-4208.12	-18412.38	46708.74	73936.88	106384.75	107188.87	106368.32	106823.71	92824.23	87817.65	97988.88	89434.88	98133.98	70851.64	83378.84	94491.58	95390.74	80279.82	83285.88	87098.78	79808.05	78250.48	87287.25	184386.50
9	Pre Tax internal rate of return			39.78%																						
10	Desired Selling Price to Yield 12% IRR (Rs/t)			634.80																						
11	Net Present Value (Rs. Lakhs)			375833.38																						

SANJEEV KUMAR
MANAGER
CHANDRAGUPTA OPENCAST PROJECT
CCL AMBAPALI-CHANDRAGUPTA AREA

Project Report for Chandragupt OCP (15.0MTY), CCL MDO MODE-March 2020

**PROJECT REPORT OF CHANDRAGUPT OCP (15.00 MTY)
STATEMENT SHOWING ESTIMATED CASH FLOW ANALYSIS AT 85% CAPACITY UTILIZATION
COMBINED**

Appendix-D.1

SL.No.	Particulars	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25
1	Initial Capital	81614.77	71451.06	73576.75	32613.36	18612.83	3223.07	1520.80	818.83	114.87	1262.51	3496.50		25816.25	206.19	25003.71	2635.84		144.84		295.19	295.19		412.12		892.37
2	Debt Service																									
3	Replacement Capital					291.00	406.00	727.00	2172.79	2341.29	12173.28	20291.29	11700.53	12249.01	5188.58	6917.90	1911.75	3381.14	2213.12	20909.21	16346.51	29687.42	17432.42			
4	Less: GST credit on Capital Goods	5263.87	2570.52	4962.84	2330.81	1401.20	498.03	165.46	462.77	357.19	2664.91	3643.07	1764.83	5961.62	884.32	4887.60	734.18	915.77	353.11	3951.48	2570.02	4604.29	2659.18			
5	Cash Operating Expenses	15465.45	11413.47	29953.59	35389.47	40389.55	42940.13	43206.89	43477.84	43668.90	44176.11	44395.81	44558.00	44714.62	44864.86	44985.06	45081.38	45176.33	45276.46	45397.51	45499.63	45617.89	45680.93	45748.81	45830.55	45874.00
6	Total Cash Outflow	91876.55	89955.05	97537.50	68082.97	58182.18	48101.17	45283.20	46107.58	45568.51	59947.49	64635.06	54473.78	82638.26	54132.52	81148.15	59704.01	57592.30	56783.30	71805.31	68805.60	88805.87	74852.52	55248.81	54630.55	55874.00
7	Inflow from Sales	24355.35	39139.31	66581.09	96673.89	112069.13	130464.38	130464.38	130464.38	130464.38	130464.38	130464.38	130464.38	130464.38	130464.38	130464.38	130464.38	130464.38	130464.38	130464.38	130464.38	130464.38	130464.38	130464.38	130464.38	130464.38
8	Net Cash Flow	-67521.20	-50815.64	-28956.50	29590.91	54876.95	84353.20	85181.17	84258.79	84904.37	70516.89	65829.31	75990.60	47626.11	76331.60	48316.18	71709.87	72872.08	73681.07	58659.00	61658.77	49559.50	55511.85	75215.86	75633.83	74998.37
9	Pve Tax Internal rate of return			39.88%																						
10	Desired Selling Price to Yield 12% IRR (Rs/mt)			708.29																						
11	Net Present Value (Rs. Lakhs)			240207.39																						


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CHANDRAGUPTA OPENCAST PROJECT
DCL, AMRAPALI-CHANDRAGUPTA AREA

ANNEXURES


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CHANDRAGUPTA OPENCAST PROJECT
CCL, AMRAPALI-CHANDRAGUPTA AREA

ANNEXURE-I

Subject:- Finalization of bifurcation of scope of work of Authority and Mine developer and Operator(MDO) in respect of Model Contract Agreement(MCA) prepared for Kotre-Basantpur-Pachmo OCP

Reference:- Committee constituted by Director (P&P) CCL vide Office Order No. DTPP-CCL/2019 dated 10.09.2019.

Committee meeting on the captioned subject held on 09.03.2020 at the conference room of DT(P&P) along with RD (RI-III) and other representatives of CMPDIL. The meeting was also addressed by DT(P&P) CCL.

Minutes of the meeting:-

1. The committee discussed the above subject and in-principally agreed to bifurcate the scope of work of Authority and Mine developer and Operator (MDO) in line of approved Model Contract Agreement(MCA) by CIL Board.
2. During discussion various issues raised by committee members which was cleared by CMPDIL representatives.

Finally, a detail bifurcation of scope of work was prepared by the committee, which is as under:-

A. Scope of work of CCL (Authority) :-

The Authority shall provide support to the Mine Operator and undertakes to observe, comply with and perform, subject to and in accordance with the provisions of this Agreement and Applicable Laws, the following:

- (a) procure access to the Site,
- (b) depute its representatives for participation in public hearings for the purposes of procuring **environmental and forest clearance** in accordance with Applicable Laws;
- (c) procure issuance of notification for land acquisition for the Project under **section 11 of Coal Bearing Areas (Acquisition & Development) Act, 1957** or section 11 of the Right to Fair Compensation and Transparency in Land Acquisition, Rehabilitation and Resettlement Act, 2013, as applicable, in accordance with the provisions of this Agreement,
- (d) **reimburse to the Mine Operator** in accordance with the applicable R&R Policy all direct and documented R&R Costs incurred by the Mine Operator in undertaking the Rehabilitation and Resettlement in accordance with the Agreement;
- (e) upon written request from the Mine Operator, and subject to the Mine Operator complying with Applicable Laws, provide all reasonable support and assistance to the Mine Operator in procuring Applicable Permits required by the Mine Operator for performance of its obligations under Agreement.
- (f) **Provide statutory manpower** for mining activities.


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CHANDRAGUPTA OPENCAST PROJECT
CCL, AMRAPALU-CHANDRAGUPTA AREA

- (g) Procurement and maintenance of vehicles for use of statutory and other persons deployed by authority.
- (h) support, cooperate with and facilitate the Mine Operator in the implementation and operation of the Project in accordance with and subject to the provisions of the Agreement.
- (i) Payment of additional fixed amount to MOC as per allotment agreement with them.
- (j) Payment of balance upfront amount to nominated authority as per existing agreement with nominated authority.
- (k) CSR activities as per applicable laws.

B. Scope of work of Mine developer and Operator(MDO):-

(a) Land :-

(1) The Mine operator shall facilitate ^{in the possession of} to acquire all the land and will take physical possession of land by keeping liaisoning with district administration / state government and tenants

(2) R&R :-

The Mine operator shall construct R&R colony including development of basic infrastructure as per approved R&R plan of CCL under applicable laws The scope of work shall include, but not limited to, following:

1. To engage PAPs in discussion and to win them over as partners of the R&R plan.
2. Mine operator shall make arrangement for shifting of PAPs to the colony.
3. The mine operator shall provide assistance to PAPs in relocation ^{amicably}.
4. The Mine operator shall follow all the guidelines/instructions issued by state Government/CCL, from time to time, in regard to R&R ^{Colony Policy}.
5. The Mine operator shall have interaction with PAPs for disbursement of compensation ^{as per applicable provisions} on account of R&R including Annuity, Self-Resettlement Grant; Cattle shed Grant, Shifting Grant etc. ^{and applicable}.
6. Preference of Employment to PAPs as per approved R&R Plan/CIL/CCL R&R Policy to the extent possible.
7. To evolve and assist CCL in carrying out community development activities ^{meeting the needs of local population as well as meeting the statutory provisions.} ^{CSR}
8. At all time, the Mine Operator shall ensure to complete at least such facilities as per applicable Act, which are sufficient to accommodate PAPs likely to be shifted in next five year.

(3) Forest Land Clearance:-

Procure issuance of the forest clearance from the Ministry of Environment, Forests and Climate Change, Government of India; On line application for issuance of FC has been submitted on 22.01.2019 for forest land falling in Ramgarh district) and on 18.03.2019 for forest land falling in Bokaro district.


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 CHANDRAGUPTA OPENCAST PROJECT
 CCL AMRAPALI CHANDRAGUPTA

(b) Environment Clearance:-

Procure issuance of the environmental clearance from the Ministry of Environment, Forests and Climate Change, Government of India. Term of reference (TOR) has been issued on 28.04.19 by Ministry of Environment, Forests and Climate Change, Government of India.

Baseline data generation work is in progress. Draft EMP is under preparation at CMPDIL.

(c) Development of Infrastructure and Operation :-

(i) The mine operator will construct Coal Handling Plant, Coal Depot, Power sub station, workshop, roads, laboratory and testing facilities, fire hydrant system, security equipment including CCTV etc. as per MCA and Mining plan.

(ii) Subject to, and on the terms and conditions of Agreement, the Mine Operator shall, at its own cost and expense, procure, finance for, and undertake the design, engineering, procurement, construction and operation of the Mines for excavation and Delivery of Coal at delivery point and shall observe, fulfill, comply with and perform all its obligations set out in Agreement or arising hereunder. Delivery point of coal will be at Kedla washery and upcoming Basantpur Tapin Washery as per mining plan. In case of unforeseen circumstances, MDO may be asked to deliver the coal at alternate point as decided by the authority.

(iii) Procure that all equipment and facilities at the Mines are operated and maintained in accordance with the Specifications and Standard, Maintenance Requirements, Safety Requirements and Standard Industry Practice.

(iv) All infrastructure required for removal of OB, extraction of coal and delivery of coal at specified delivery point will be responsibility of mine developer and operator (MDO)

(v) MDO will Construct and maintain Rail track from Daniya station to Kedla Washery as per mining plan.

(vi) The Mine Operator shall comply with all Applicable Laws and Applicable Permits (including renewals as required) in the performance of its obligations under Agreement.

(vii) There is switching station located at Ghato, from where MDO will draw, operate and maintain a double circuit feeder at 33 KV to provide power to mine and other domestic use.

(d) Development of Township and Infrastructure :-

(i) The mine operator will construct and maintain for use of authority administrative building such as PO Office, site office, town administration office with furniture and fittings, boundary wall, residential buildings, service building etc as per Mining plan.

(ii) He will be responsible to construct and maintain common facilities like security post, car parking, cycle stand, fire fighting station, canteen, rest shelter, toilet, substation building, time office, pavement, boundary wall as per Mining plan.

(iii) It will be responsibility of MDO to construct and maintain Magazine Building and boundary wall, substations, statutory buildings such as first aid centre, rest shelter, toilet, canteen with their boundary wall and community buildings as per Mining plan.

(iv) MDO will construct and maintain Community Buildings as per mining plan.

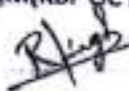
(v) MDO will construct approach road between the boundary of the Mines and the nearest existing road.


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MANAGER
CHANDRA GUPTA SPENCAST PROJECT
ANUPALL CHANDRAGUPTA AG/2
3
An-3

The scope elaborated as above is only the indicative scope of activities expected to be performed by Mine Operator for reliable and efficient mining operation and to fulfill the associated statutory and other obligations. Any other activity which is necessary for the discharge of Mine Operator's obligations under this Contract and to fulfill statutory requirements is deemed to be included in the scope unless excluded specifically in the Project Agreement.

Put up to DT(P&P) for approval please.


GM(KBP OC Project) 09/03/2020


GM(Civil) CCL

GM (Fin)(FC) CCL

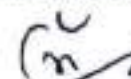

GM(Operations) CCL 09/03/2020

GM(L&R) CCL


GM(Legal) CCL 09/03/2020


GM(E&M) CCL 09/03/2020

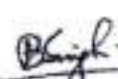

GM(CMC) CCL 09/03/2020


HOD(E&F) CCL 09/03/2020

GM(P&P)

In the same line, the scope of work of MDO operator should be same in respect of Chandraguppa OC (15 MTPA) and Sanghmitra OC (20 MTPA) excluding few more of EC and FC, which has already been done in case of Kotri-Bansoutpur - Pachana OCP.

Submitted for approval.


DT(P&P)


09/03/2020


SANJEEV KUMAR
MANAGER
CHANDRAGUPPA PROJECT AREA

From: "Manoj Kumar" <rdri3.cmpdi@coalindia.in>
To: "JAYANT CHAKRAVARTY" <jayant.chakravarty@coalindia.in>
Sent: Friday, March 27, 2020 2:58:04 PM
Subject: Fw:Request for preparation & submission of Revised Abridged PR, Mining Plan and Modified & Updated Cost Estimate of KBP OCP in MDO mode.

Sent from my Huawei Mobile

----- Original Message -----

Subject: Request for preparation & submission of Revised Abridged PR, Mining Plan and Modified & Updated Cost Estimate of KBP OCP in MDO mode.

From: Bhola Singh

To: Manoj Kumar

CC: Kaushlendra Kumar Mishra ,Devendra Prasad

Dear Sir,

During deliberation with competent authority , it has been decided that the Railway siding (10.25 km) should be removed from the scope of work of MDO. It should be in the scope of work of CCL/ Authority. The change in scope of work is very marginal.

In view of above, it is requested to kindly revise the Abridged PR, Mining Plan and Modified & Updated Cost Estimate of KBP OCP prepared in MDO mode.

As the deadline for floating of tender is 31.03.2020 and it has to be put up before CCL Board through RBC by today evening, Hence it is requested to kindly arrange to submit Revised Abridged PR, Mining Plan and Modified & Updated Cost Estimate of KBP OCP prepared in MDO mode by today evening i.e. by 5.00 PM on 27.03.20.

Matter is most urgent.

Regards,

भोला सिंह
निदेशक तकनीकी (यो. एवं. प.)
सेंट्रल कोलफील्ड्स लिमिटेड, राँची
झारखण्ड-834001


SANJEEV KUMAR
MANAGER
CHANDRAGUPTA OPENCAST PROJECT
CCL, AMRAPALI-CHANDRAGUPTA AREA

REGISTERED OFFICE
Gondwana Place, Kanke Road
Ranchi - 834 031
(Jharkhand)

REGIONAL INSTITUTES

क्षेत्रीय संस्थान-I
वेस्ट एंड, जी.टी.रोड
आसनसोल-713 301
(पश्चिम बंगाल)

क्षेत्रीय संस्थान-II
कोयला भवन, कोयला नगर
धनबाद- 826 005
(झारखंड)

क्षेत्रीय संस्थान-III
गोंदवाना प्लेस, कान्के रोड
राँची- 834 031
(झारखंड)

क्षेत्रीय संस्थान-IV
जरीपटका, कास्तूरबा नगर
नागपुर-440 014
(महाराष्ट्र)

क्षेत्रीय संस्थान-V
सीपात रोड
बिलासपुर-495 001
(छत्तीसगढ़)

क्षेत्रीय संस्थान-VI
पोस्ट जयंत कोलरी,
जिला : सिंगरौली
पिन नं०- 486 890
(मध्य प्रदेश)

क्षेत्रीय संस्थान-VII
गृह निर्माण भवन
सचिवालय मार्ग
भुवनेश्वर-751001
(उड़ीसा)

Regional Institute - I
West End, G.T Road
Asansol - 713 301
(West Bengal)

Regional Institute - II
Koyla Bhawan, Koyla Nagar
Dhanbad - 826 005
(Jharkhand)

Regional Institute - III
Gondwana Place, Kanke Road
Ranchi- 834 031
(Jharkhand)

Regional Institute - IV
Jaripathka, Kasturba Nagar
Nagpur - 440 014
(Maharashtra)

Regional Institute - V
Seepat Road
Bilaspur - 495 001
(Chattisgarh)

Regional Institute - VI
P.O Jayant Colliery
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सेन्ट्रल माईन प्लानिंग एंड डिजाइन इन्स्टीच्यूट लिमिटेड

(कोल इंडिया की अनुषंगी कम्पनी)
एक विनी रल कम्पनी

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