6.3 MINE PARAMETERS

Mine parameters are tabulated as below :-

TABLE – 6.2

MINE PARAMETERS

Sl. No.	Particulars	
1.	Area of the Quarry	
a)	On floor (ha)	148.50
b)	On surface (ha)	217.40
2.	Depth (m)	
a)	Initial	27
b)	Final	200
3.	Average Gradient of Seams	1in 6
4.	Average thickness of seams (m)	14
	Top Section	10
	Bottom Section	4
5.	Average Strike length (m)	2500
6.	Width on surface (m) [dip rise]	950
7.	Width on floor (m) [dip rise]	750
8.	Grade (0.05m dilution at each contact point)	E (UHV-3835)
	Top Section	E
	Bottom Section	E
9.	Mineable Reserves (Mt)	24.11
10.	Total OB (including access trench)	157.57
11.	Average stripping ratio (m^3/t)	6.54

6.4 CHOICE OF TECHNOLOGY:

The shovel dumper system of technology has been envisaged in this project report. As explained above in para 6.1 deployment of dragline & Surface miner would not prove to be effective and economical. Shovel-Dumper Technology is most flexible system and moreover, well adopted in coal mines of WCL.

Considering the average gradient of mine horizontal slicing method is envisaged in proposed mine.

6.5 EQUIPMENT SELECTION

The proposed mine envisages to excavate high quantity of annual OB (i.e. 8.45 Mm^3) and mine out 1.25 Mt of annual coal production. Considering the high volume of annual overburden removal, six nos. of 6.1 m^3 Diesel Hydraulic Shovels have been provided alongwith matching numbers (49 Nos.) of 60 T Rear Discharge Dumpers.

For extraction of coal, one no. of 4.3 m^3 Diesel Hydraulic Backhoe have been provided alongwith matching nos. of 60 T Rear Discharge Dumpers. Major HEMM Provision is as given below :-

TABLE – 6.3

Major HEMM Provision (Departmental Option)

Sl. No.	HEMM	Nos.				Nos.
I.	***For OB***			***II.***	***For Coal***	
1.	6.1 m3 (D)Hydrualic Shovel	6		1.	4.3 m^3 Diesel Hyd. B/H	1
2.	60 T RD Dumpers	49		2.	60 T RD Dumper	5
3.	160 mm (D) Drill	6		3.	160 mm Drill	1
4.	410 HP Dozer	6		4.	320 HP Dozer	1
III.	***For Common***			***III.***	***For Common***	
1.	70-80 t Rough Terrain Crane	1		6.	Diesel Bowser 8 kl	1
2.	12/15 t Mobile service crane	1		7.	Fire Fighting Truck	1
3.	28 kl Water Sprinkler	2		8.	Tyre Handler	1
4.	280 HP Motor Grader	1		9.	6.5 m^3 Front End Loader	1
5.	Mobile Maintenance Van	1		10	2.8 m3 Backhoe	1
IV.	***For Land Reclamation***			***IV.***	***For Land Reclamation***	
1.	300 HP Wheel Dozer	1		2.	Water Tanker 8 kl	1

In other option (Partial Hiring option) worked out in this PR following department HEMM is proposed to be deployed :-

TABLE – 6.3 A

Major HEMM Provision (Partial Hiring Option)

HEMM (Partial hiring option)		Nos.
I.	***For Coal & Parting***	
1.	2.8 m^3 Diesel Hyd. B/H	2
2.	60 T RD Dumper	9
3.	160 mm Drill	1
4.	320 HP Dozer	1
II.	***For Common***	
1.	12/15 t Mobile service crane	1
2.	28 kl Water Sprinkler	1
3.	280 HP Motor Grader	1
4.	Mobile Maintenance Van	1
5.	Fire Fighting Truck	1
6.	6.5 m^3 Front End Loader	1
7.	2.8 m^3 Backhoe	1

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6.6 MINING SYSTEM & SYSTEM PARAMETERS

- **WIDTH OF WORKING & NON-WORKING BENCHES**

The width of working & non working benches have been assumed as 30m & 20m respectively.

- **HEIGHT OF BENCHES**

The height of benches in OB has been assumed as 10-12m considering reach of 6.1 m^3 Diesel Hydraulic Shovel . The height of benches in seam sections has been assumed as thickness of coal seam sections.

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Chapter - VII

MINING AND DUMPING STRATEGY

7.1 CONSTRAINTS ON MINE DEVELOPMENT

The proposed quarry is fraught with following surface constraints :-

TABLE – 7.1 - Constraint on Mine Development

Sl. No.	Constraint	Proposed action	Capital Provision (Rs. Crs.)	Relevant Appdx.	Relevant Plan
1	Existing alignment of Lendi nala	To be diverted	4.07	A.8	Plate-X
2	Existing alignment of Sakhri nala	To be diverted	2.83	A.8	Plate-X
3	Existing alignment of Seasonal nala	To be diverted	3.39	A.8	Plate-X
4	Existing alignment of 66 kV HT line	To be diverted	2.40	A.8	Plate-X
5	Existing alignment of road connecting Sakhri & Chicholi village	To be diverted	6.42	A.8	Plate-X
6	Land acquisition	To be acquired	63.43	A.1	Plate-XIV

The projected mine area is traversed by number of nalas. These nalas are proposed to be diverted through the southern side of the proposed mine & dip side of Pauni-II OCP over the indicated coal bearing area. The area towards west of the proposed mine shows rising topography, making it difficult to align the diverted nalas in this direction. Hence, it is proposed that the diverted nalas would be aligned towards eastern direction of proposed mine. It is envisaged that diverted Lendi nala would meet into Sakhri nala and the Sakahri nalla would be further diverted to meet Pauni nala. Proposed tentative diverted route for these nalas have been shown in quarry & surface layout plan. Capital provision for scientific study to be done for nala diversion has been provided in this PR. It is also proposed that a scheme for master drainage plan for entire Ballarpur area may be formulated.

The 66kV HT line is proposed to be diverted along western boundary of mine and finally through northern side (dip side) of the proposed mine. The village road is proposed to be diverted along the diverted route of nalas and it would finally meet the PWD road connecting Rajura & Sakhri village. This diverted road would also act as coal transportation road.

Another alignment of this diverted route has also been proposed (length of about 4 km) from western end of the mine, as suggested in the planning committee meeting. This diverted road would meet Gauri-Ghughus road (in the dip side of the proposed mine) near Sakhari village. This alignment would be used for connecting Chincholi village to Sakhari village and may also be used for coal transportation as per requirement.

Diversions of sakhari nala, Sakhari-Chincholi road & 66kV HT line already proposed in the approved PR of Pauni-II OC may need reconsideration in light of proposals of Sakhari-Irawati (Pauni-III) OCP.

7.2 MINING STRATEGY

In opencast mines generally the stripping ratio is very high during initial years and very low in the concluding years. This is particularly felt with horizontal slicing method of mining. Therefore, it is envisaged that the mine be developed in stages so that the equipment (HEMM) provided on the basis of peak stripping ratio are sufficient to handle the workload of initial period. Access trench would be driven at a gradient of 1 in 16 to touch at subcrop of bottom section of seam (where thickness is 2.0m). in sector 'A'. The Access Trench would be driven through the rise side batter to economise the OB excavation. Another Access trench is proposed to be driven for Sector 'B' & 'C'. Part of this access trench would be common for both the sectors. This access trench would be retained throughout the life of the mine. The additional access trench would help in lead management and increased back filling.

The slope of the access trench batter upto unconsolidated strata is proposed to be kept at 1 in 2 for slope stability point of view and after unconsolidated strata about 45° slope is assumed till the floor of the bottom section of seam is touched. Haul Road would be constructed with help of motor grader and dozer on the floor of quarry at the gradient of 1 in 16.

In proposed Pauni-III OC, the quarry has been sub-divided into nine cuts viz. Cut – Box cut, 160-140m FRL, 140-120m FRL, 120-100m FRL, 100-80m FRL, 80-60m FRL, 60-40m FRL, 40-20m FRL, and balance cut. Details of these cuts along with quantities of coal and overburden in each cut is as shown in the Table-5.3. Volume of Top OB, Parting and coal have been calculated for each cut and total quantity of the mine has been arrived at after correcting the cut quantities on the basis of actual plan readings of volumes of coal, OB and parting of the quarries. The corrected cut quantities of Top OB and Parting in accordance with sequence of mining is utilized to arrive at the annual break-up of total programmed OB into Top OB and Parting in every year of the mine. This is required as the lead and lift is different for Top OB and Parting on any particular year and is thus, necessary for better deployment of HEMM.

For overburden keeping the bench height of 10-12 m, the width of working and non-working benches have been kept as 30 m and 20 m respectively. For coal, bench height would depend upon the thickness of seam, bench width for coal would also be kept as 30 m and 20m respectively for working and non-working benches.

Slope of quarry batter has been kept as 37^0 . in rise side of quarry whereas the dipside batter angle is proposed 40^0 . Slope of the working benches would be kept at 70^0. In addition to this capital provision has been kept in the report for slope stability study purpose.

7.2 DUMPING STRATEGY

Two dumps namely 'A' & 'B' of 90 m height and 57.38 Mm^3 (insitu) & 16.39 Mm^3 (insitu) of capacity are proposed to accommodate external dumping. A small top soil dump has been planned in the dip side of the property which will be reclaimed at later stage. Dump A has been proposed in rise side of property (southern side) in non coal bearing area and Dump B has been proposed in dip side of property (northern side) in non coal bearing area. It is proposed that individual tier should not exceed 30m in height.

After completion of 30m tier a transport horizon of 20m should be left. A safety berm of 6m width has been envisaged at the height of 15m in individual tier of 30m. The overall slope of the external OB dump has been proposed as 28^0.

Internal dumping has also been proposed in the mine towards western side of the property in the sector A of the proposed mine. It has been projected to backfill 72.68 Mm^3 of OB in this dump. Out of 72.68 Mm^3 of backfilled OB, 48.03 Mm^3 of OB will be dumped upto surface level and 24.65 Mm^3 of OB will be dumped above surface level. It has been proposed to merge the internal dump in sector A of the proposed mine and external Dump B. The OB accommodated in the merged portion works out to 11.32 Mm^3 of OB. The details of OB dumps have been tabulated in the table below :-

TABLE – 7.2
Details of Overburden Dumping

S.NO.	PARTICULARS	OB Quantity (Mm3)
1	External Dump 'A'	57.38
2	External Dump 'B'	16.39
3	Sub Total (1 to 2)	73.77
4	Internal Dump	
a)	Upto surface level	48.03
b)	Above Surface level	24.65
c)	Merged Dump	11.12
5	Sub Total (4)	83.80
	Total OB (73.77+83.80)	157.57

- **YEAR OF STARTING INTERNAL DUMPING**

The internal dumping has been proposed to start from VI year or IV year of quarry operation).

- **ANY FOREST LAND USED FOR EXTERNAL DUMPING.**

The proposed external OB dumps are on non-coal bearing area. Some fo land (zudpi jungle) is used for external dumping (based on the land details provi by mine officials).

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- **PLACE FOR TOP SOIL DUMPING**

Temporary top soil dump has been proposed in the dip side of the property at the place of Dump B. After completion of Dump A, top soil dump would be reclaimed above Dump A.

YEAR-WISE EXTERNAL AND INTERNAL DUMPING AND STAGE PLAN:

TABLE – 7.3
Schedule of Overburden Dumping

Year	Volume of External Dumping (Mm^3)	Volume of Internal Dumping (Mm^3)	Reclamation Plan Nos. of Trees to be Planted
1	LAND ACQUISITION		
2	LAND ACQUISITION		
3	4.00		
4	7.40		
5	8.45		
6	8.20	0.25	
7	7.70	0.75	2500
8	7.20	1.25	2500
9	6.45	2.00	5000
10	4.45	4.00	7500
11	1.80	6.65	10000
12	3.00	5.45	50000
13	1.73	6.72	100000
14	1.88	6.57	105000
15	1.44	7.01	2500
16	0.49	7.96	2500
17	2.96	5.49	2500
18	5.05	3.40	5000
19	1.57	6.88	10000
20		8.45	25000
21		7.00	5000
22		3.87	25000
23		0.10	25000
Total	73.77	83.80	385000

7.4 SEQUENCE OF DUMPING OPERATIONS AND STAGE-WISE DETAILS

TABLE – 7.4

Sequence of Dumping Operations

SL.NO.	PARTICULARS OF WORKING	SECTIONS
A	**At the end of 5th year**	
1.	COAL MINED (Mt)	2.45
2.	OB REMOVED (MCUM)	19.85
3.	STRIPPING RATIO (MCUM/t)	8.10
4.	EXCAVATED QUARRY AREA (HA)	66.75
5.	INTERNAL DUMP (MCUM)	0.00
6.	EXTERNAL DUMP (MCUM)	19.85
B	**At the end of 10th year**	
1.	COAL MINED (MT)	8.70
2.	OBR (MCUM)	62.10
3.	STRIPPING RATIO (MCUM/t)	7.14
4.	EXCAVATED QUARRY AREA (HA)	125
5.	INTERNAL DUMP (MCUM)	8.25
6.	EXTERNAL DUMP (MCUM)	53.85
C	**At the end of 15th year**	
1.	COAL MINED (Mt)	14.95
2.	OBR (MCUM)	104.35
3.	STRIPPING RATIO (MCUM/t)	6.98
4.	EXCAVATED QUARRY AREA (HA)	197.75
5.	INTERNAL DUMP (MCUM)	40.65
6.	EXTERNAL DUMP (MCUM)	63.70
D	**At the end of 20th year**	
1.	COAL MINED (Mt)	21.20
2.	OBR (MCUM)	146.60
3.	STRIPPING RATIO (MCUM/T)	6.92
4.	EXCAVATED QUARRY AREA (HA)	217.40
5.	INTERNAL DUMP (MCUM)	72.83
6.	EXTERNAL DUMP (MCUM)	73.77

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SL.NO.	PARTICULARS OF WORKING	SECTIONS
E	**At the end of Mine Life**	
1.	COAL MINED (Mt)	24.11
2.	OBR (MCUM)	157.57
3.	STRIPPING RATIO (MCUM/t)	6.54
4.	EXCAVATED QUARRY AREA (HA)	217.40
5.	INTERNAL DUMP (MCUM)	83.80
6.	EXTERNAL DUMP (MCUM)	73.77

7.5 DUMPING ARRANGEMENTS

- **MAXIMUM HEIGHT OF OB DUMP ABOVE GROUND LEVEL (M)**

The maximum height of External Dump and Internal Dump has been proposed as 90m.

- **ANY HEIGHT SUBJECT TO STABILITY**

Dumping beyond 90m height is subject to stability. However, capital provision to conduct slope stability study has been provided in this PR.

- **MAXIMUM OVERALL SLOPE**

The maximum overall slope of external dump has been proposed as 28^0.

- **HEIGHT OF INDIVIDUAL BENCH (M)**

Height of individual bench of OB dump has been proposed as 30m but every 30m bench will have two tiers of 15m each with a berm of 6m between two tiers.

- **BERM WIDTH**

About 25 m berm would be left after completion of 30m high dump.

- **VOID LEFT AT THE END OF MINE LIFE (IN HA)**

116.50 Ha void would be left at the end of quarry to safeguard the proposed haul road. This haul road may be used for accessing sector 'D' in future.

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Chapter - VIII

MINING SCHEDULE AND EQUIPMENT PHASING

8.1 DESIGN CRITERIA

- **WORKING REGIME**

Project report for Sakhri-Irawati (Pauni-III) OCP envisages following working regime :-

- **NUMBER OF DAYS OF WORKING IN A YEAR**

330 days of working has been assumed in a year based on 7 days schedule of mine working

- **NUMBER OF SHIFTS**

As per the prevalent practice in WCL, there will be 3 working shifts in a day in proposed Sakhari-Irawati (Pauni-III) OC mine.

- **NUMBER OF HOURS/SHIFT**

It has been envisaged in the PR that every shift will be of 8 hours duration.

- **EXCAVATION CATEGORY ASSUMED.**

The excavation category of OB material has been assumed as 50% Category III + 50% Category IV. Whereas, for Coal it is assumed as Category IV.

- **INSITU VOLUME WEIGHT t/m3.**

The insitu volume weight of OB material has been assumed as 2.1 t/m^3 whereas for coal it is assumed as 1.60 t/m^3.

- **STRENGTH PARAMETERS OF COAL AND ROCK IF ANY -**

The physico mechanical study conducted for cores of borehole no. MWCH-17 is enclosed as Annexure-III in this PR.

8.2 ANNUAL PRODUCTIVITY OF HEMM PROPOSED

TABLE – 8.1

Annual Productivity of HEMM Proposed

(A) Overburden:

Sl.No	Particulars	Productivity
1.	6.1 m^3 Diesel hydraulic shovel with 60 T Rear Discharge dumpers	1.46 Mm^3
2	60 T Rear Discharge Dumpers for 3 km lead with Hyd. Shovel	0.1750 Mm^3

(B) Coal:

Sl. No	Particulars	Productivity
1.	4.3 m^3 Diesel Hydraulic Backhoe with 60 T Rear Discharge dumpers	1.10 Mm^3
2.	60 T Rear Discharge Dumpers for 3.5 km lead with Hyd. backhoe	0.1619 Mm^3

(C) SYSTEM CAPACITY

Particulars	Annual Workload (Mm^3)	Annual Digging Capacity (Mm^3)	Annual Transport Capacity (Mm^3)	System C (Mm^3)
Coal	0.78	1.10	0.81	0.81
OB	8.45	8.76	8.57	8.57
Total	9.23	9.86	9.38	9.38
Cushion %	-	6.83	1.63	1.63

It may be seen from the above table that the system capacity is limited by the transport capacity which is less than excavation capacity.

8.3 CALENDAR PROGRAMME OF EXCAVATION

The proposed Report has been prepared for a targeted capacity of 1.2 Mt/annum. The parameters of opencast mine field and technical conditions of development make this target feasible with normal indices namely length, width depth of the excavated block, number of coal seams, seam gradient, method mining, location of equipment, deployment, etc. Moreover, with proposed target 1.25 Mty the rate of deepening works out to about 10m per year, which is close prevailing rate of deepening in the adjacent blocks. The proposed calend programme of excavation envisagbes to excavate peak OB of 8.45 Mm3 per annu for a target output of 1.25 Mt. The peak OB is only about 3% higher then average OB per annum.

YEAR	COA BOTTOM SECTION	TO SE
1		
2		
3	0.07	
4	0.18	
5	0.42	
6	0.44	
7	0.44	
8	0.44	
9	0.39	
10	0.35	
11	0.35	
12	0.35	
13	0.43	
14	0.43	
15	0.41	
16	0.36	
17	0.34	
18	0.27	
19	0.30	
20	0.38	
21	0.41	
22	0.60	
23	0.06	

8.3A EQUIPM

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TABLE – 8.2
Calendar Programme of Excavation

YEAR	COAL (Mt)			NATURAL OB (Mm3)			PROGRAMMED OB (Mm3)			SR (m3/t)
	BOTTOM SECTION	TOP SECTION	TOTAL	TOP OB	PART	TOTAL OB NAT.	TOP OB	PART.	TOTAL OB	
1	LAND ACQUISITION									
2	LAND ACQUISITION									
3	0.07	0.33	0.40	3.50	0.19	3.69	3.81	0.19	4.00	10.00
4	0.18	0.62	0.80	7.12	0.26	7.38	7.14	0.26	7.40	9.25
5	0.42	0.83	1.25	8.39	0.30	8.69	8.15	0.30	8.45	6.76
6	0.44	0.81	1.25	8.08	0.29	8.37	8.16	0.29	8.45	6.76
7	0.44	0.81	1.25	8.08	0.29	8.37	8.16	0.29	8.45	6.76
8	0.44	0.81	1.25	8.08	0.29	8.37	8.16	0.29	8.45	6.76
9	0.39	0.86	1.25	7.15	0.30	7.45	8.15	0.30	8.45	6.76
10	0.35	0.90	1.25	6.25	0.31	6.56	8.14	0.31	8.45	6.76
11	0.35	0.90	1.25	6.25	0.31	6.56	8.14	0.31	8.45	6.76
12	0.35	0.90	1.25	6.30	0.31	6.61	8.14	0.31	8.45	6.76
13	0.43	0.82	1.25	6.97	0.30	7.27	8.15	0.30	8.45	6.76
14	0.43	0.82	1.25	6.97	0.30	7.27	8.15	0.30	8.45	6.76
15	0.41	0.84	1.25	7.91	0.30	8.21	8.15	0.30	8.45	6.76
16	0.36	0.89	1.25	10.97	0.28	11.25	8.17	0.28	8.45	6.76
17	0.34	0.91	1.25	10.76	0.27	11.03	8.18	0.27	8.45	6.76
18	0.27	0.98	1.25	10.18	0.22	10.40	8.23	0.22	8.45	6.76
19	0.30	0.95	1.25	9.72	0.25	9.97	8.20	0.25	8.45	6.76
20	0.38	0.87	1.25	8.56	0.34	8.90	8.11	0.34	8.45	6.76
21	0.41	0.84	1.25	6.53	0.35	6.88	6.65	0.35	7.00	5.60
22	0.60	0.95	1.55	3.76	0.42	4.18	3.45	0.42	3.87	2.50
23	0.06	0.05	0.11	0.07	0.03	0.10	0.07	0.03	0.10	0.91

8.3A EQUIPMENT SCHEDULE

The Schedule of major equipment alongwith its phasing for different options are shown as below

TABLE – 8.3
Phasing of Major Hemm

Sl. No.	HEMM	Nos.	PHASING		
DEPARTMENTAL OPTION					
I.	***For OB***		***III***	***IV***	***V***
1.	6.1 m3 (D)Hydrualic Shovel	6	4	2	
2.	60 T RD Dumpers	49	17	19	13
3.	160 mm (D) Drill	6	4	2	
4.	410 HP Dozer	6	4	2	

Sl. No.	HEMM	Nos.	PHASING		
II.	***For Coal***				
1.	4.3 m^3 Diesel Hyd. B/H	1	1		
2.	60 T RD Dumper	5	2	1	2
3.	160 mm Drill	1	1		
4.	320 HP Dozer	1	1		
III	***For Common***				
1.	70-80 t Rough Terrain Crane	1	1		
2.	12/15 t Mobile service crane	1	1		
3	28 kl Water Sprinkler	2	1	1	
4	280 HP Motor Grader	1	1		
5	Mobile Maintenance Van	1	1		
6	Diesel Bowser 8 kl	1	1		
7	Fire Fighting Truck	1	1		
8	Tyre Handler	1	1		
9	6.5 m^3 Front End Loader	1	1		
10	2.8 m^3 Backhoe	1	1		
IV.	**For Land Reclamation**				
1.	300 HP Wheel Dozer	1			1
2.	Water Tanker 8 kl	1			1

2.HEMM (Partial hiring option)		Nos.	***PHASING***		
I.	***For Coal & Parting***		*III*	*IV*	*V*
1.	2.8 m^3 Diesel Hyd. B/H	2	1	1	
2.	60 T RD Dumper	9	2	3	4
3.	160 mm Drill	2	1	1	
4.	320 HP Dozer	2	1	1	
II.	***For Common***				
1.	12/15 t Mobile service crane	1	1		
2.	28 kl Water Sprinkler	1	1		
3.	280 HP Motor Grader	1	1		
4.	Mobile Maintenance Van	1	1		
5.	Fire Fighting Truck	1	1		
6.	6.5 m^3 Front End Loader	1	1		
7.	2.8 m^3 Backhoe	1	1		

Year of replacement of these HEMM has been provided in cash fl statement as per their scheduled life.

8.5 DRILL

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8.5 DRILLING & BLASTING

Drilling pattern in overburden, with a bench height of 12 m, the burden has been assumed as 6 m and spacing of 6.5m. The powder factor of 3.00 m^3/kg has been considered for planning purpose.

For coal and parting depending upon the thickness, bench height from 4 m to 10 m is being proposed. For coal bench, height of 4 m to 10 m as per thickness of section of seam, drilling pattern with burden and spacing of 3.0 m & 4.0 m respectively has been proposed. A powder factor of 5 t/kg has been considered for blasting in coal for planning purpose. However at the time of operation of mine, drilling parameters have to be optimized on the basis of actual field trial depending upon joint pattern, bedding plane and local geology of the blast site and accordingly powder factor for OB & coal may be deviated after final trial of blasting.

For storage of explosive three magazines having 3 t capacity each have been proposed in the proposed PR.

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Chapter - IX

COAL QUALITY

1 INTRODUCTION

The proposed mining area is being a single seam splitted into two seam ection i.e. Top section & Bottom section separated by parting of about 4 m. The etails have been tabulated below

TABLE – 9.1

SEQUNCE OF COAL SEAMS, AREA WEST OF PAUNI EXTN.BLOCK

Coal seam/ Parting	Thickness range (m)		Generalised thickness range (m)
	Minimum	Maximum	
Composite Top Section	5.56	13.99	8.00 - 12.00
Parting	1.33	5.13	
Composite Bottom Section	2.05	6.00	2.00 - 6.00

9.2 QUALITY ANALYSIS

Both the seam section are inter-banded . Details of bands are tabulated as below

(i) Bottom Seam Section

No. of boreholes (full seam thickness) devoid of dirt bands – 15 boreholes.

Dirt Bands	No. of boreholes	No. of dirt bands.	Total thickness range (m)	Percentage
Combustible (up to 1.00 m)	27	1 - 3	0.11 – 0.87	2.50 – 21.79
Obvious bands	3	1 - 2	0.18 – 0.42	4.86 – 8.47
Total combustible + obvious bands	29	1 - 3	0.11 – 0.89	2.50 – 21.79

(ii) Top Seam Section

No. of boreholes (full seam thickness) devoid of dirt bands – NIL.

Dirt Bands	No. of boreholes	No. of dirt bands.	Total thickness range (m)	Percentage
Combustible (up to 1.00 m)	35	1 - 6	0.11 – 1.92	1.07 – 17.78
Obvious bands	14	1 - 2	0.15 – 0.91	1.39 – 7.68
Total combustible + obvious bands	36	1 - 6	0.17 – 2.35	1.68 – 19.85

- **MINEABLE RESERVES SEAM-WISE, GRADE-WISE DISTRIBUTION ALONG WITH OVERALL SPECIFIC GRAVITY/UHV :**

NAME OF SEAM	GRADE-WISE DISTRIBUTION OF RESERVE				SP.GR. OVERALL	UHV OVERALL
	D	E	F	TOTAL		
Top section	-	16.81	-	16.81	1.60	3990
Bottom section	-	7.42	-	7.42	1.60	

9.3 PROJECTED COAL QUALITY

The proposed coal quality in the envisaged quarry area works out to Grade 'E'. The details of undiluted and diluted quality parameters are as given below:

TABLE – 9.2

Overall Projected Coal Quality

Particulars	M %	Ash %	UHV (k.Cal/kg)	Grade	GCV (k.Ca
Overall Quality Parameters (Undiluted)	7.5	28.08	3990	E	4830 (Cal
Overall Quality Parameters (Diluted, 0.05m at each contact point)	7.4	29.30	3835	E	4726 (Cal
Overall Quality Parameters (Diluted, 0.15m at each contact point)	7.2	31.78	3520	E	4519 (Cal

As both the sections of Composite Seam have diluted Grade 'E' , there is no advantage in sectional mining.

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10.1 GENEI

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10.2 THE S

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(i)
(ii)
(iii)

10.3 PRED

Sl. No.	Year
1.	2001
2.	1995
3.	2002
4.	1999
5.	2000
6.	1998
7.	2003
8.	1996
9.	1997
10.	2004
	M= 10

Chapter - X

PUMPING AND DRAINAGE

10.1 GENERAL :

The proposed Sakhari-Irawati (Pauni-III) OC project is located in Ballarpur Area of WCL. In absence of sufficient hydro-geological data and actual make of water of the mine, ground seepage is assumed 20% of maximum rainfall water accumulated in a day. Pumping provision made in this report is sufficient to sustain the production for target plus five years.

10.2 THE SOURCE OF WATER :

The source of water accumulation in the quarry area as follows :

(i) Ground water flow to the quarry

(ii) Rain water falling directly within the excavated area

(iii) Rain water from beyond excavated area.

10.3 PREDICTION OF MAXIMUM RAINFALL IN A DAY :

Table –I

Rain Guage Station :- Pauni OCM

Sl. No.	Year	Max. prev. Filation in a day(hn)in mm	Modal Coeff. K= hn/ ham	(K-1)	$(K-1)^2$	$P\% = \frac{(N-0.3)}{100} \times \frac{}{(M+0.4)}$
1.	2001	156	1.658	1.712	0.507	6.731
2.	1995	154	1.540	1.690	0.476	16.346
3.	2002	98	1.491	1.076	0.006	25.962
4.	1999	96	1.003	1.054	0.003	35.577
5.	2000	95	0.983	1.043	0.002	45.192
6.	1998	85	0.969	0.933	0.004	54.808
7.	2003	67	0.844	0.735	0.070	64.423
8.	1996	67	0.587	0.735	0.070	74.038
9.	1997	50	0.509	0.549	0.203	83.654
10	2004	43	0.416	0.472	0.279	93.269
	M= 10	911			1.62	

Calculated Rainfall in mm (h):

i) Mean value of recorded max. rainfall ham = $\sum$ hn / 10 = 911 /10 = 91.10 mm

ii) Co-efficient of variation

$$Cv = \sqrt{\frac{\sum(K-1)^2}{(M-1)}} = \sqrt{1.62/9} = 0.424$$

iii) Co-efficient of Asymetrical ratio (Cs) = 3 C_V = 0.424 x 3 =1.272

Table –II

S.N.	Probability %	F (Cs) = φ	Ms= φ x Cv	Ks = Ms +1	h= Ksxham
1	0.1	4.88	2.07	3.07	279.6
2	1	3.18	1.35	2.35	213.9
3	5	1.92	0.81	1.81	165.3
4	10	1.34	0.57	1.57	142.9
5	30	0.34	0.14	1.14	104.2
6	50	(-) 0.20	(-) 0.08	0.92	83.4
7	75	(-) 0.74	(-) 0.31	0.69	62.5
8	95	(-) 1.22	(-) 0.52	0.48	44.0
9	99	(-) 1.42	(-) 0.60	0.40	36.3
10	99.9	(-) 1.53	(-) 0.65	0.36	32.0

Calculation of probability :

Life of the mine : 21 years

Probability % : $\frac{1}{\text{Life of mine (Yrs.)}} \times 100 = 4.76$

The probability curve was drawn as shown in fig. 1 from the probability curve it was found that the maximum probable rainfall at 4.76% probability will be to the tune of 165 mm.

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h= Ksxham
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165.3
142.9
104.2
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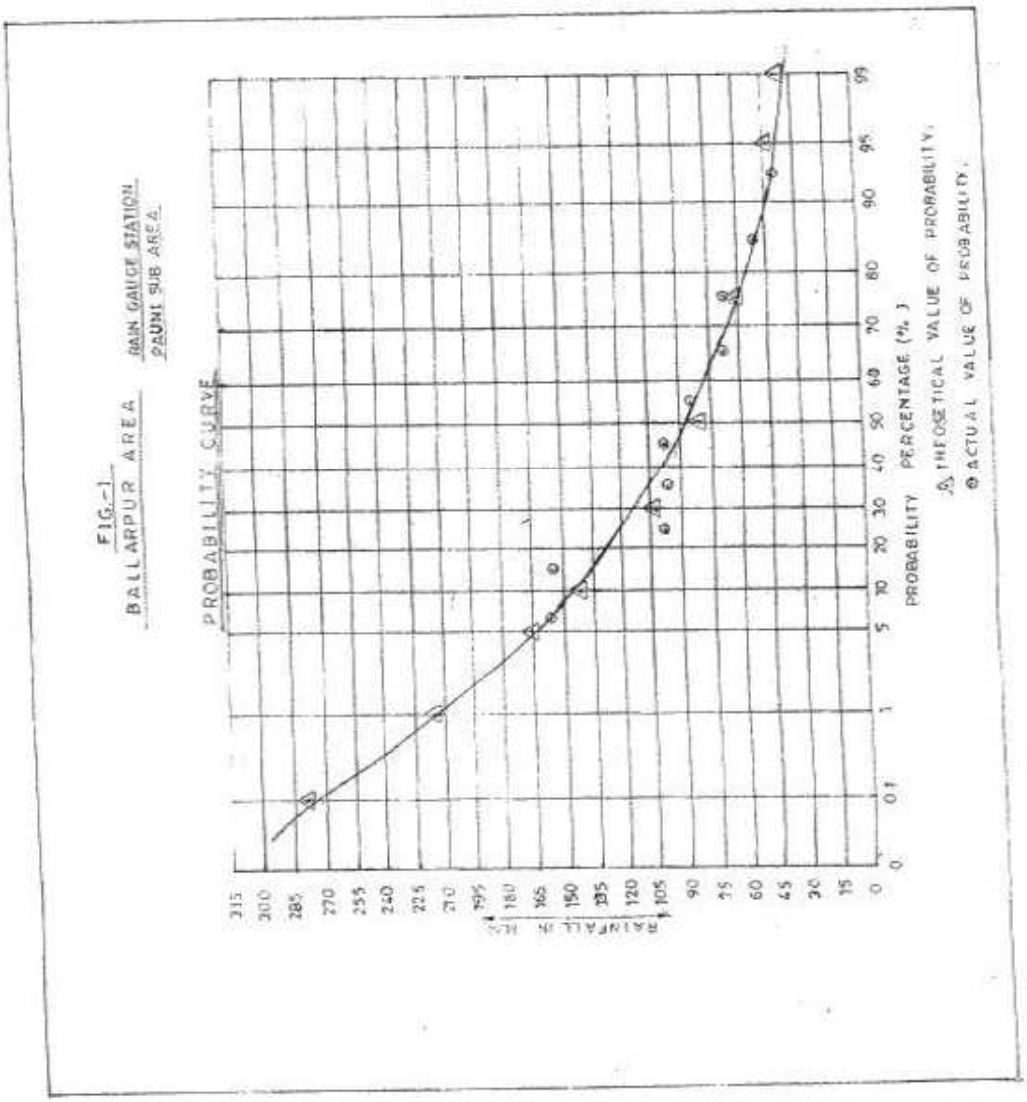

10.4 CALCULATION OF PUMPING CAPACITY :

The Pumping capacity required at the time of five years after reaching the target has been calculated as under:-

S.N.	DESCRIPTIONS	CALCULATED DAT
1	Maximum exposed area (ha)	112.0
2	Maximum backfilled area (ha)	NIL
3	Surface area of mine considered for excavation (ha)	112.0
4	Area beyond excavation (ha),5% of item (3)	5.60
5	Run-off co-efficient for	
	Open excavation	0.85
	Area beyond excavation	0.10
6	Rainfall infiltration co-efficient for backfilled area	0.20
7	Probable maximum rainfall in a day (mm)	165
8	Water collected in the quarry due to exposed area, backfilled area and area beyond excavation (m^3/day)	158004
9	Required pumping capacity to handle the whole water of the rain water in 100 hrs (lps)	439
10	Seepage due to strata (20% of Item 8)	88
11	Required pumping capacity to handle the whole water of the mine (lps)	527
12	Depth in target plus five years (m)/ after 10^{th} year	70
13	Depth after 5^{th} year (m)	40
14	Mine out area after 5^{th} year (ha)	19
15	Mine out area after 10^{th} year (ha)	23.3
16	Backfilled area after 5^{th} year (ha)	nil
17	Backfilled area after 10^{th} year (ha)	5

Pumping system has been designed for the volume of water accumulated i the mine at the target plus five year production considering maximum rainf in a day as **165**mm. Peak pumping capacity worked out as **158004** m^3. Abo volume of water will be dewatered in **5** days at the rate of **20** hrs pumping p day. Pumping capacity per day thus worked out as **31601** m^3.

10.5 SELECTION OF PUMPS DELIVERY RANGES (DEPARTMENTAL OPTIO

For total hiring option pumping provision has been proposed on hir However for departmental option pumping provision would be as follows:

(i) Four pumps of 200 lps x 120m head have been proposed. Out of four pumps one pump is standby.

(ii) Three pumps of 80 lps x 80m head have been proposed for auxiliary and initial stage pumping

(iii) One diesel pumps of 80 lps x 60m head have been proposed.

(iv) Five face pumps of 11 lps x 30 m head have been envisaged in this report and out of five pumps one is standby.

(v) One delivery ranges of 406.4 mm dia. have been proposed for main pumps of 200lps x 120m head and maximum two working pump shall be connected to this delivery range.

(vi) One delivery ranges of 324 mm dia. have been proposed for main pumps of 200lps x 120m head and maximum one working pump shall be connected to this delivery range.

(vii) Three delivery range of 219 mm dia. have been proposed for the pumps of 80lps x 80m head.

(viii) 80 mm dia. G.I. pipe will be used for face pumps. No piping provision have been made for standby pumps.

10.6 SUMP :

The sumps shall be made at the one end of strike in the dip side. The working benches shall be graded suitably, so that the entire water flows down to the sump.

10.7 DRAINAGE OF WATER ON SURFACE :

Fresh garland drains shall be made before every monsoon at the periphery of active edge of the quarry to prevent the surface rain water to enter the quarry. A sedimentation pond/ lagoon shall be made between the quarries and mine water will be discharged into it. After sedimentation of suspended particles, the fresh water will be discharged into river/ nallah.

10.8 PROCUREMENT, INSTALLATION AND OPERATION

In mines the pump has to be shifted from one location to another to suit the working conditions, as such the performance of the pump is greatly effected. The following points should be kept in mind to get satisfactory results.

(i) The pump should be procured multistage.

(ii) The pump characteristic curves (H vs Q) should be steep and the rating of the motor should be 10% more than power required at cut off point.

(iii) 10% increase in rated head should give 25% decrease in rated discharge

(iv) 10% decrease in rated head should give 15% increase in rated discharge

(v) The pump shall be installed as close to the sump as possible and difference of sump water level and pump center line should not be more than 4 - 4.45 m. The length of suction pipe should not be increased unnecessarily.

(vi) As far as possible the pump should be allowed to operate at rated head.

(vii) The pumps of same make, same specifications and same characteristic shall be used for parallel operation of pumps.

10.9 The details of pumps, pipes, pipe fittings and estimated capital requirement including installation and foundation cost of above for departmental option have been given in Appendix – A.3.4.

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Chapter - XI

COAL HANDLING AND DESPATCH ARRANGEMANT

11.1 Introduction

A small coal handling plant has been proposed to handle the entire production of coal from Sakhari-Irawati (Pauni-III) OCP.

11.2 Design Parameters

11.2.1 Basic Data

a)	Target production from mine	- 1.25 Mty.
b)	Mine Operation	- 3 Shifts/Day
c)	CHP Operation	- 3 Shifts/Day
d)	Life of the mine	- 21 Years
e)	Size of coal (ROM)	- (-) 200 mm
f)	Grade of coal	- Grade E
g)	Mode of Despatch	- By road
h)	Customer	- M.S.E.B. and other misc. consumer

11.2.2 CHP Working Schedule

CHP will work for 330 days in a year. There will be 3 shifts in a day. It w work 5 hours per shift.

11.2.3 System Capacity of CHP

System capacity of CHP is around 400 tph.

11.2.4 Salien

The salier

a) Feeder br

b) Conveying

c) Storage o

d) Despatch

e) Dust supp

f) Power su

g) Civil and s

h) Weighme

11.2.5 Syste

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11.2.4 Salient Features of CHP

The salient features of CHP are as follows:

a) Feeder breaker for crushing of coal to (-) 200 mm size
b) Conveying of coal by 1200 mm wide belt conveyor
c) Storage of coal in a 2 x 100 t capacity overhead twin hopper
d) Despatch of coal on road by trucks
e) Dust suppression and fire extinguisher system
f) Power supply, illumination and control systems
g) Civil and structural cost
h) Weighment of coal with the help of road weighbridges

11.2.5 System Description

Rear discharge dumpers of 60T capacity or equivalent type / tipping trucks will carry coal from mine and discharge onto a fixed inclined plate installed before the hopper of the feeder breaker.

There will be two streams. Each stream consists of one feeder breaker, one conveyor and a 2 x 100 t capacity overhead twin hopper. Out of two streams, only one stream will work at a time.

The feeder breaker will be used to crush coal to (-)200 mm size which is conveyable. A conveyor C1 of 1200mm wide will be installed below the feeder breaker. The conveyor C1 will be used to receive the crushed coal from feeder breaker. Coal dust and muck below feeder breaker will also be collected on the same conveyor C1. Coal collected by conveyor C1 will be discharged into overhead twin hoppers of 2 x 100 t capacity.

The second feeder breaker will also be used to crush coal to (-)200 mm size which is conveyable. Another conveyor C2 of 1200mm wide will be installed below the second feeder breaker. The conveyor C2 will be used to receive the crushed coal from feeder breaker. Coal dust and muck below feeder breaker will also be collected on the same conveyor C2. Coal collected by conveyor C2 will be discharged into overhead twin hoppers of 2 x 100 t capacity.

Trucks will be loaded from below these overhead hoppers with the help of reciprocating feeders provided at the bottom openings of the hoppers.

Two nos. of electronic road weighbridges of 100t capacity each will be used for weighing of empty and loaded trucks and for preparation of bills.

In case there is no off-take and the hoppers are full, coal from processed ROM hoppers will be dumped by trucks at a suitable location on ground. These heaps will be liquidated at a later date, as and when possible, by using front-end loaders / pay loaders, available in the project.

11.2.6 System Description

11.2.6.1 Coal Receipt Section and crushing Section

Rear discharge dumpers of 60T capacity or equivalent type / tipping trucks will carry coal from mine and discharge onto fixed inclined plates installed before the hoppers of the feeder breakers. Out of two feeder breakers one feeder breaker will be working and the second feeder will be used as stand by.

11.2.6.2 Conveyor

A conveyor C1 of 1200 mm wide will be provided below feeder breaker to receive crushed coal from feeder breaker, dust and muck from below feeder breaker. Conveyor C1 will discharge coal into a 2 x 100 t. capacity overhead twin hopper.

Another conveyor C2 of 1200 mm wide will be provided below the second feeder breaker to receive crushed coal from feeder breaker, dust and muck from below feeder breaker. Conveyor C2 will discharge coal into another 2 x 100 t capacity overhead twin hopper.

Out of two conveyors C1 and C2, only one conveyor will work at a time.

11.2.6.3 Storage

Two nos of 2 x 100 t capacity overhead twin hopper will be provided for storage of processed ROM coal.

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All the coal hoppers will be 6m x 6m size. The slope of hopper faces will be 55 deg with horizontal. Abrasion resistant tiscral / equivalent liners of minimum 10 mm thickness will be fixed to the base plate by means of plug welding.

11.2.6.4 Truck Loading

Trucks will be loaded below the overhead hoppers. For this purpose, reciprocating feeders of 200 t capacity each will be provided at the discharge openings of the hoppers.

11.2.6.5 Weighment

The trucks will be weighed with the help of two nos. 100t. capacity electronic road weighbridges, each of 100t. capacity, before and after loading to assess the correct quantity of coal being despatched and for preparation of despatch statements and bills.

11.2.6.6 Dust Suppression System

Coal dust will be created at all transfer points where there is a fall of coal. The dust, if escapes into atmosphere, creates environmental pollution. Environmental pollution can be reduced by suppressing dust at the point of dust generation. Water will be sprayed under relatively high pressure in atomized condition through nozzles at various dust generating points. Fixed type water sprinklers will also be provided for suppression of dust for vehicular movement etc.

11.2.6.7 Fire extinguisher System

Dry powder type fire extinguishers and sand buckets will be provided near drive pulleys of conveyors C1, C2, sub-station building, CHP office etc. for immediate action on electrical fire.

11.2.6.8 **Plant Cleaning System**

Three nos. of general mazdoors will be provided, one in each shift, for cleaning of coal handling plant.

11.2.6.9 **Plant Maintenance System:**

Proper maintenance of the plant is necessary for smooth operation of the plant. For this purpose, two nos. of mechanical fitters, three nos. of electrical fitters and one no. of welder have been provided.

11.3 POWER SUPPLY, ILLUMINATION AND CONTROL:

11.3.1 Source of Power and Supply Voltage:

Normal total connected load of this CHP has been estimated at 350 kW. Transformer capacity has been provided so that both the feeder breakers will run simultaneously whenever required. The proposed substation shall receive power at 3.3 kV from the project main substation.. An independent substation, located at a suitable location near the feeder breaker house, will supply power to the various equipment operating in the CHP.

11.3.2 Power Distribution Scheme:

The various outdoor installation in the substation will be as follows:

1) 3.3 kV, 400A, 150 MVA VCB for primary control of transformer.
2) Power transformer 1000kVA, 3.3 kV/415 V outdoor type.

To feed power to different CHP equipment a 17 panel motor control cent has been proposed.

11.3.3 **Motor**

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various major equ

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2) Cor
3) Cor
4) Rec
5) Dus

Ammeter
distribution board
be provided

11.3.4 **Protec**

The incom
over current (O/C
be provided with
have protective g
of required rating

11.3.5 **Reacti**

Capacitor
capacity 75kVAR
0.96 lagging

11.3.6 **Illumir**

11.3.6.1 **Lightir**

One 11-p
200A, MCCB. E
lighting circuits.

11.3.3 **Motor Control Centre:**

The MCC shall have 17 Nos. of panels, suitable for 440 V, 3 Ph system. The various major equipment / electrical load receiving power from MCC are as follows:

1) Feeder Breakers – 2 Nos.
2) Conveyor C1
3) Conveyor C2
4) Reciprocating feeders – 4 Nos.
5) Dust suppression pump

Ammeter with selector switches will be provided in all the panels of the power distribution board. Voltmeter, ammeter with selector switches and energy meter shall be provided in the incomer panel.

11.3.4 **Protections:**

The incomer ACB panel in the MCC will be provided with short circuit (S/C) over current (O/C) and earth fault (E/F) protections. All other ACB's in the MCC will be provided with O/C and E/F protections. All the D.O.L. starters in the M.C.C. will have protective gears for overload and single phasing prevention. Fuse switch units of required rating will be provided as a protection against short circuit.

11.3.5 **Reactive power compensation:**

Capacitor bank of total capacity 375 KVAR incorporating 5 banks each of capacity 75kVAR will be provided to achieve the overall power factor of the CHP as 0.96 lagging.

11.3.6 **Illumination scheme:**

11.3.6.1 **Lighting distribution board:**

One 11-panel lighting distribution board has been provided controlled by 200A, MCCB. Each panel shall be having 20A D.P. MCB for control of various lighting circuits.

11.3.6.2 **Luminaires:**

'llumination of conveyor gantries, drive houses, transfer houses, areas surrounding feeder breaker, platforms below the loading hoppers will be done with the help of industrial type well glass, 125 W HPMV lamps having integral control gear & 2 x 40 W, industrial dust & jet proof fluorescent lamps. The indoor of the substation building, CHP office, pump house will be illuminated with the help of 2 x 40 W industrial type fluorescent lamps. High-pressure sodium vapour lamps of 250 W will be used for outdoor yard lighting. For this purpose four numbers of 12 m high lighting towers, each fitted with four Nos. 250 W HPSV lamp fittings will be provided. Provision of 250 W HPSV luminaries have been kept for miscellaneous outdoor installations (as stated above). These fittings will be fitted over the structures of substation building, transfer / drive houses, conveyor gantry etc. as per requirement of outdoor lighting.

11.3.7 **Earthing:**

The plant earthing will be in accordance with IS: 3043, IS: 737 and as per IE rules in vogue. The number of earth pits will depend on the actual soil resistivity of the plant area. Pipe electrode type earthing has been adopted. The transformer neutral will have two separate and distinct connections to the earth.

11.3.8 **Interlocking of starters for sequence operation:**

Each drive will have facility to be controlled manually by the respective starters in the motor control centre. Starters of various drives in the motor control centre will be interlocked in such a way that they can be operated in a definite sequence. However, for repair and maintenance and inspection work, interlock defeat switches will be provided.

11.4.0 **CIVIL**

11.4.1 **Retain**

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11.4.2 **Feede**

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11.4.3 **Conve**

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11.4.0 CIVIL AND STRUCTURAL WORKS:

11.4.1 Retaining Wall:

A RCC retaining wall of height 6m from G.L. and length 24m suitable for discharging coal by LW-60t. rear discharge dumpers to accommodate two feeder breakers is conceived. The retaining wall shall have a pair of wing wall of length 9m and the backfilling returned with proper slope.

11.4.2 Feeder breaker supporting structures:

The cost of providing structural steel supports for supporting the feeder breaker is included in the estimate.

11.4.3 Conveyor structures & drive house of conveyor C1 & C2:

The conveyor C1& C2 is supported on the ground over PCC pedestals and this portion is covered with roof by an arrangement of column and truss. Above ground the conveyor is supported on standard gantries, which are in turn supported on standard trestles. The trestles are both up to 10m ht. and above 10m ht. also.

The conveyor C1& C2 supported by gantries is supported at the other end on a truck loading house. An intermediate drive house is located near the ground conveyor portion for locating the drive head of the conveyor C1 & C2.

11.4.4 Truck Loading House:

The conveyor C1& C2 discharge coal to the truck loading houses. Each house consists of two different floors at various levels. The floor at the top supports in addition to the gantry for conveyor C1& C2, the discharge drum also. The second platform is located below the 2 x 100t. capacity ROM coal hopper, which supports the reciprocating feeders for truck loading. The entire structure shall be adequately braced in all directions against wind and belt tension.

11.4.5 Allied Structures:

Provision for hardstand below the truck loading hoppers is included in the cost estimate. The estimate also includes a sump of 35 cum. capacity with a pump house over it for dust suppression arrangements, a CHP office and a substation building with an open yard for transformer, which is provided with barbed wire fencing. General land development of the entire CHP area, soil investigations and provisions for foundations in poor soil etc. has all been kept in the cost estimate.

11.5.0 CAPITAL REQUIREMENTS AND OPERATING COST:

The total capital requirement for provision made in this report (as on March, 2009) works out to Rs. 1018.40 lakhs. The details are given in Appendix – A.3.5. The operating cost of the CHP is estimated as Rs. 29.53/ t. of coal.

The details of manpower as per the provision of the Project Report is given in Appendix – B.

The estimates of Plant & Machinery are based on 'Standard Price List of Mining Machinery', November, 2007 (**escalated to March, 2009**) circulated by CMPDI (HQ), and the latest supply order of the equipment. The civil & structural costs are based on cost index 360 (in 1st half of 2009) with reference 100 base at Nagpur as on 1.1.92.

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Chapter - XII

WORKSHOP, STORES & MAGAZINE

12.1 BRIEF TEXT

12.1.1 Introduction :

To provide maintenance and repair of various HEMM, CHP, equipment, pumps, LMVs, electrical etc of the mine,independent full fledge unit workshop has been envisaged for the project. Proposed workshop will consist of two types of maintenance and repair shops. These maintenance and repair shops will be as follows: -

i) Excavation workshop: - This workshop would extend basic engineering support in respect of maintenance and repair of various HEMM deployed in the mine. Capital repair of HEMM and other equipment would be carried out at central workshop, Tadali.

ii) E & M workshop: - Separate E & M workshop facilities have also been provided to carry out maintenance & repair of the CHP, equipment, pumps, LMVs, electrical etc.

These workshops are essentially a unit workshop and will depend on central/regional workshop for major repair and part manufacture. Shovel and drill maintenance & minor repairs will be carried out at site and components/assemblies requiring running repair will be dismantled from the machine and transported to the workshop for necessary repairs. Provision of dumper repair and maintenance facilities has been made taking into account that 60t dumpers will be deployed in the project.

12.1.2 Maintenance Facilities :

Work load, equipments, electrical load and manpower of the workshop has been assessed on the basis of population of various HEMM, CHP, equipment, pumps, LMVs, electrical etc and fulfill their running repairs and maintenance.

12.1.3 Scope of Work :

Following activities are proposed to be carried out in the respective workshop:

12.1.3.1 Unit Excavation workshop:

i) Daily cleaning, by weekly washing of dumpers and other HEMM, daily inspection, checking of air system, hydraulic system, electrical & mechanical system of dumpers.
ii) Daily oiling, greasing, lubrication of assemblies/ sub-assemblies of various HEMM.
iii) Replacement of leaky hoses, tubes, filters, air cleaners etc.
iv) Tyre replacement and tyre inflation.
v) Incidental minor repairs/ replacement of assemblies/ sub- assemblies.
vi) Changing of piston rings, valves, crankshaft bearings, packing, parts of transmission, axles, differentials etc.
vii) Battery charging, repairs of self-starters, dynamos, coil of HEMM.
viii) Machinery/ minor repairs/ limited manufacture of various parts of HEMM as per the requirement.
ix) Welding on dumper bodies, shovels, buckets etc.
x) Miscellaneous structural works.
xi) Scheduling for repair needs at central workshop.

12.1.3.2 Main Workshop :

Central/Regional workshops are envisaged main workshop for this project. These workshop will provide all the support to unit workshop under their scope.

12.1.3.3 Unit E&M Workshop:

Following activities are proposed to be carried out in the respective workshop:

i) Maintenance and repair of CHP equipment, Pumps, LMVs, Electrical etc of the Project.

ii) Manufacture of spares to a limited extent

iii) Transformer oil filtration

12.2 PROPOSED FACILITIES:

In order to carry out the above activities the following facilities are proposed in the workshop:

i) Maintenance and repair sheds for all functional shops.

ii) Stores sheds

iii) POL store

iv) Washing stations

v) Pavement for parking of mining equipment/HEMM

vi) Material handling facilities

vii) Substation

viii) Supporting facilities like pump house, security post, fire fighting etc.

ix) Material handling facilities for workshop and stores.

x) Store yard

xi) Mobile servicing van and mobile refueling facilities

xii) E&M workshop shed consisting of machine shop, Mechanical repair, Electrical repair, welding and structural sections.

xiii) LMVs repair shed

ix) Washing platform

xv) Workshop office

xvi) Necessary provision for plant and equipments, tools, testing equipment etc has been provided in the respective shops for efficient repair and maintenance of the HEMM and other equipment of the project.

In addition to the above, mobile crane, tyre handler etc. have been proposed in this report for field servicing/ maintenance of HEMM.

12.3 WORKSHOP AND STORES LAYOUT:

For efficient operation and effective supervision, the layout of facilities in the workshop have been prepared taking into consideration the sequence of operation for maintenance & repair, minimum inter-shop movement of men & material etc. The area of each shop/ shed has been worked out after studying the space requirement and layout design of machines and also providing reasonable working and movement space. The general layout plan of excavation workshop is given in drawing No. R4 E&M 400789 and E& M workshop in drawing No. R4 E&M 400790.

12.4 WORKSHOP AND STORE PLANT & MACHINERY :

The plant and machinery provided in this workshop is sufficient to meet the requirement of the scope of the workshop. Adequate P& M for main functional shops including stores have been provided. Besides that adequate provision for washing equipment, material handling equipment, floor cleaning equipment, ventilation equipment, general purpose tools, special purpose tools, installation & commissioning, electrical for workshop P & M and initial spares have been provided.

12.5 PROJECT STORE :

One small and independent unit stores at convenient location has been provided to cater the routine needs of consumables, spares, POLs etc. This will depend on Regional/Central stores for major spares.

12.6 CAPITAL INVESTMENT :

Total capital investment requirement has been given in appendix A.3.3.

12.7 LIST OF WORKSHOP P & M :

Details of shop wise P & M requirement for excavation workshop, their cost and phasing have been given in appendix A.3.3.1 and for E & M workshop in appendix A.3.3.2.

12.8 DRAWINGS :

Location of the workshop and stores will be decided at the time of start of the mine at convenient location for maintenance & repair. Overall area, Covered area, paved area, roads, gates, provision of repair bays, details of workshop complex, functional shops, bracket height, height of different shops, location of washing and fuel delivery station etc are given in appendix A.2.1 & drawing of workshop given in this project. Separate complex of unit store with separate entry have been provided at convenient place. Drawing of unit store has not been provided in this report.

One dozer repair shop has been provided at pi top for maintenance and repair of dozers of the project with facilities of dozer repair shed, washing system with sump and pump house. Drawing of dozer shop is not given in this report

12.9 MAGAZINES

Three magazines of three tonne capacity has been provided in this PR for storage of Explosive.

12.10 BRIEF TEXT (IN CASE OF TOTAL HIRING OPTION)

All HEMM deployed in this mine will be hired and their maintenance will be contractor's responsibilities. Hence, there is no provision of any unit excavation workshop in the report. E & M workshop facilities have been provided to carry out the maintenance and repair of the CHP equipment, pumps, electrical etc. of the mine. This E & M workshop will be supported by Regional/Central workshop for major repairs and parts manufacture, because it is essentially a pithead maintenance workshop.

Maintenance and repairs of CHP equipments, pumps, electrical, manufacture of spares to a limited extent, transformer oil filtration, scheduling for repair needs at Regional/Central workshop etc. have been provided in the scope of activities of the workshop. Facilities provided in this workshop are machine shop, mechanical repair shop, electrical repair shop, welding and structural section, etc. Necessary provision for plant and machinery, tools, testing equipment etc. has been provided in respective shops for efficient repair and maintenance of the mine equipments.

The layout of the facilities in the workshop has been shown in the drawing No. R4 E&M 400792. The requirement of plinth area for workshop sheds and other engineering details have been given in appendix A.2.1. The summary of estimated capital investment for workshop plant and machinery has been given in appendix A.3.3. The manpower required for the supervision and operation of the workshop is given in appendix-B

12.10.1 UNIT STORES: -

One small and independent unit stores has been provided at convenient location to cater the routine needs of consumables, spares, POLs etc. This will depend on Regional/Central stores for major spares. Unit store lay out drawing is not given in this project.

*****

Chapter - XIII

POWER SUPPLY, ILLUMINATION AND COMMUNICATION

13.1 POWER SUPPLY

13.1.1 SOURCE OF POWER

In the project report of Pauni-II a 12 km. Long 11 kV feeder has been proposed to be drawn from 66 / 11 kV sasti substation of WCL for supplying power to the Pauni – II opencast project. Proposed Sakhari-Irawati (Pauni-III) OCP is located further two kms. away from Pauni-II O/C. If we extend the 11 kV feeder from Pauni-II to Pauni-III by further 2 kms., voltage drop may exceed the specified limit.

Hence it is proposed that power supply for Sakhari-Irawati (Pauni-III) OCP shall be obtained at 11 kV from 66 / 11 kV Sasti substation of WCL by drawing separate 14 km. long 11 kV overhead feeder upto the project. An amount of Rs. 112 lakhs has been provided in Appendix A.8.1 under the head of permanent incoming power supply arrangement for erection of 14 kms long OHL with 100 sq.mm DOG conductor & rail pole.

One 66 kV overhead line rural feeder is passing over the proposed quarry area. An amount of 160 lakh has been provided in the PR for Pauni II for diversion of 4 km. stretch passing over the project. An additional 2 km. of 66 kV OHL will have to be diverted for Pauni III project. Capital has been provided for this purpose in Appendix – A.8.1.

The power supply for the township which will come near Sakri village will be provided from Pauni III Main substation. Capital provision has been made in Appendix – A. 3. 2 for 2.5 km. 11kV overhead line for this purpose along with associated incoming control.

13.1.2 PROPOSED STAGE

13.1.2.1 MAIN SUB-STATION

Outdoor installations

In the main substation yard following equipments are proposed to be installed :

- Airbreak isolator, gang operated, off load, outdoor type pole mounted, 11k V, 400 A with DO fuse — 1 no.
- Airbreak isolator, gang operated, off load, outdoor type pole mounted, 11k V, 400A without DO fuse — 5 Nos.
- Lightning arrester, station class, 9 kV, 5 kA for 11 kV System — 5 Sets
- Outdoor type V.C.B., 11 KV, 400 Amp, 250 MVA having protections and metering along with C.T, P.T. and control — 4 Nos
- Transformer, outdoor type, DY-11, 11/3.4 KV, 2000 KVA, Cu, as per IS:2026 with off load tap changer and complete with all accessories as per IS:2026 — 2 Nos

Indoor installations

3.3 kV Indoor switch Board

A 3.3 kV, 11 panel sectionalized power distribution board with all Vacuum circuit breakers, will be provided inside the substation building to receive power from the secondary of the two nos. of 2000 kVA, 11 kV / 3.4 kV transformers. The power distribution board with all protections provided in the sub station will control power supply to all the installations of the project. The details of the Switch board will be as follows:-

- Incoming feeder control V.C.B with CTR 350 / 5 A	2 Nos.
- Sectionalizer control V.C.B with CTR 350 / 5 A	1 No.
- Capacitor bank control V.C.B with CTR 50 / 5 A	2 Nos.
- Quarry pumping feeder control V.C.B with CTR 200 / 5 A	2 Nos.
- Spare V.C.B	2 No
- Workshop feeder control V.C.B with CTR 100 / 5 A	1 No.
- CHP feeder control V.C.B with CTR 100 / 5 A	1 No.
Total :	**11 Panels**

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Lighting Switch Board

A station transformer 100 kVA, 11 kV / 230 V (L-L) V will be installed at the main substation to have an independent power supply to meet the lighting load & other miscellaneous load of service buildings, service roads, approach roads, area around substation etc. At the secondary of station transformer a three phase power distribution board with 10 panels for control of office loads & lighting loads shall be provided. The LT distribution board receives power through a MCCB of 200 A, 415 V with H.R.C Fuse of 100 Amps.

Connected Load & Maximum Demand

The various groups of electrical receivers and their operating loads, the estimated maximum demand, transformer capacity and power consumption are given in the table of Power Demand. Connected load for mines including township for departmental / partial hiring option is 3470 kW / 2735 kW respectively

The estimated maximum demand of mine loads of Pauni III OC Mine for Departmental / Partial hiring option (as detailed in power demand table) works out to 1223 kVA / 1112 kVA respectively.

The power supply for the township will be made from Pauni III main substation by extending the 11KV feeder up to a suitable distance near the proposed colony. A total of 406 / 174 nos.of quarters has been provided in the township of Pauni III OC mine for Departmental / Partial hiring options respectively. Projected power demand for township for different options are 398 kVA / 217 kVA. respectively.

Sufficient financial provision for electrification of these quarters have been made in Appendix A.3.2.

PROTECTION OF SUBSTATION, CONTROL & SIGNALLING

Vacuum circuit breakers shall be used for primary control of the 2000 kVA transformers. The operating voltage of the spring charging motor and the tripping device of the VCB shall be fed through the in built rectifier provided in the circuit breaker. The VCB shall in conjunction with current transformer IS: 2705 (current) offer protection of the transformers against over current, short circuit and earth fault. These circuit breakers shall also trip for internal fault of transformers, actuated by differential relay and winding and oil temperature relays. For these, the following protections have been envisaged.

i) Combined IDMT and high set instantaneous relay consisting of three overload unit (Range 50% to 200%) one earth fault unit (range 10% to 40%) and three high set instantaneous units (range 400% to 1600%).

ii) Auxiliary relays for oil and winding temperature and alarm.

The tripping circuit of the transformers shall have provision for connection to the auxiliary contacts of auxiliary relays for oil and winding temperature alarm.

The live parts of the circuit breakers shall be properly shrouded as per relevant safety rules. Remote control of 11kV circuit breakers will be performed by the control switches built in the control board of the attendant's room.

The following system of signalling will be used in substation :-

- Signalling to inform personal about automatic tripping of circuit breakers due to fault.
- Warning signal about occurrence of abnormality in any particular device.
- Signalling to show actuation of automatic and protective relays.
- Flags and pointer on relays.

Similar control, protection and signaling devices are to be incorporated in the 3.3 kV indoor panels also.

PROTECTION AGAINST LIGHTNING :

For protection against lightning, lightning arrestors conforming to IS: 3070 and IS : 4004 are to be provided in the substation yard. For protection against direct strokes 15 m high lightning masts will be erected.

For the protection of the building from lightning, an earthing net on the roof of the buildings connected to the earth pits at the four corners of the building will be provided.

INTERLOCKING SYSTEM :

The air break isolators associated with 11 kV circuit breaker shall be interlocked with the circuit breakers to avoid mal - operation.

The 3.3 kV sectionaliser circuit breakers in the 3.3 kV switch board panel will have electrical interlock with the incoming 3.3 kV circuit breakers respectively to avoid parallel operation of transformers. Primary and secondary control circuit breakers are to be connected for inter tripping i.e. the secondary control circuit breaker shall trip automatically when the primary control circuit breakers trips.

SAFETY & FIRE FIGHTING

The boundary of the substation shall be suitably covered by wire net fencing. Soak pits shall be provided for each transformer in order to prevent damages due to oil leakage. Rubbles shall be spreaded in the yard to prevent fire hazard. Following fire fighting facilities should be provided :

- Sand bucket.
- Portable foam type chemical fire extinguisher CO_2 fire extinguisher.

The following safety appliances shall also be provided :-

- Electrician rubber gloves for HT working.
- Standard discharging rod.
- Danger notice plate.
- First aid box complete with necessary content.
- Electric shock treatment chart.
- Rubber matting tested for an insulation level of 1100 V.
- Trolley mounted ladder, safety belt etc.

Earthing:

The neutrals of the main transformers in the main substation will be earthed through neutral grounding resistor to restrict earth fault current to minimum as per existing IE rules & DGMS guidelines. As per the Indian Electricity Rules, Fault current shall not be more than 50 amps in 3.3 kV/6.6 kV systems in opencast mines. The magnitude of the earth fault current shall be limited to these specified value by employing suitably designed Neutral Grounding Resistor. Resistance value for 3.3 kV system shall be 38.1 ohms and shall be provided with monitoring relay for tripping mechanism for various fault conditions.

Independent earth pits will be constructed as per IS:3043 (current) at the substation for earthing of lightning arrestors, transformer neutrals, substation fencing etc. In addition to the above, adequate number of earth pits would be constructed in the substation yard for earthing of various electrical equipment.

Earthing of various equipment working in the quarry will be provided from the substation through an additional conductor drawn along with 3.3 kV over head line feeders and armouring of the cables.

Separate earth pits will also be constructed around workshop. All the drives in the workshop. would be properly earthed by G.I strips of adequate size connecting to the main bus laid around the workshop connecting all the earth pits. Separate earth pits will be laid at the service buildings for earthing of various equipment/installations.

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13.1.2.2 ENERGY CONSUMPTION

Specific energy consumption for the Pauni III OC mine for Departmental & Partial hiring options are 3.96 kWh/Te & 3.24 kWh/Te respectively. All other salient electrical parameters are given in 13.4.

13.1.2.3 SYSTEM VOLTAGE

The utilization voltages of various equipment/installations proposed for this project would be as follows :-

Installation	Voltage
- Incoming power supply	11 kV
- Quarry power distribution	3.3kV
- Workshop Power Supply	415 V
- CHP Power Supply	415 V
- Pumps	3.3 kV/ 440 V
- Surface illumination	230 V (L-L)

13.1.2.4 Power factor improvement

3 phase capacitor banks of 3.3 kV, 75 KVAR rating of suitable capacity will be provided at main substation and pump houses of the Quarry respectively to achieve a power factor of 0.96. The capacitor banks will have the facility to connect or disconnect the required number of units.

13.1.2.5 Quarry Power Distribution:

It is proposed to draw two nos. of 3.3 kV over head line from the main proposed substation to main pump house inside the quarry for supplying power to pumps . From the overhead lines, power will be tapped off by means of isolator and load break switches to energize the power distribution board at pump house.

The conductors of the overhead lines will be of 100 sq.mm ACSR conductors. An earth conductor of the same diameter will also be drawn along with the above conductors for facilitating earthing of the equipment and installations.

POWER SUPPLY TO PUMPS

A 3.3 kV, 9 panel, 400 A sectionalized switch board has been provided for power supply to 3.3 kV pumps. One of the 3.3 kV panel shall act as incoming control for the 3.3 kV / 440 V transformer provided for power supply to LT pumps. A transformer 3.3 kV / 440 V, 630 kVA is proposed to be installed for power supply to LT pumps in quarry. A 10 panel LT distribution board with one no. incoming MCCB of 630 A and 9 no. outgoing MCCB / MCB shall be provided for power supply control of pumps.

POWER SUPPLY TO WORKSHOP

A transformer 3.3 kV / 440 V, 500 kVA / 315 kVA is proposed to be installed in the workshop complex to feed power to workshop equipments for Departmental / Partial hiring options respectively.

13.2 ILLUMINATION

Haul road Illumination :

The illumination of haul road is permanent in nature and will be illuminated by 250 W HPSV lamps fitted in street light fittings. These fittings will be mounted on 12.0 m high poles installed along the length of haul road either on one side or on two sides depending on the width of haul road.

Illumination of Coal & OB face and OB dump

Illumination of quarry general area/dump area will be by 400 W, HPSV lamps fitted in flood light luminaries. A cluster of six lamps mounted on 15 m high lighting towers will be provided. Sufficient nos. of such towers have been provided.

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13.3 Power

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Sl. No.	ITEM HEAD
1	PROJECTE
A)	ONLY MINE
B)	ONLY TOW
C)	TOTAL
2	SPEC. C E
A)	WITH RESF
B)	WITH RESF PRODUCTI
C)	WITH RESF
D)	WITH RESF
3	SPECIFIC P
4	FIXED PER
5	VARIABLE COST
6	AVERAGE POWER

CMPDI

The production faces will be illuminated by 400 W HPSV lamps fitted in symmetrical flood light fittings and mounted on 5.5 m high towers (self supporting) or may be mounted on HEMM itself.

Service road and approach road illumination :

The service road and part of approach road will be illuminated by 150 W HPSV lamps fitted in street light fittings mounted on 10.5 m high poles along the length of road.

Pole mounted transformers of 16 kVA, 3.3 kV/230 V (L-L) lighting transformers along with lighting distribution boards comprising 1 No. incomer control 63 A, 2 pole MCB), 2 nos. out goings (30 A, 2 pole MCB) have been provided for feeding the illumination/lighting loads as mentioned above.

13.3 Power Balance and annual energy consumption

Power balance chart for different options have been prepared and are produced below :-

13.4 SALIENT FEATURES OF THE ELECTRICAL PARAMETERS :

Sl. No.	ITEM HEAD	DEPARTMENTAL OPTION	PARTIAL HIRING OPTION
1	**PROJECTED MAXIMUM DEMAND**		
A)	ONLY MINE	1223 kVA	1112 kVA
B)	ONLY TOWNSHIP	398 kVA	217 kVA
C)	TOTAL	1621 kVA	1329 kVA
2	**SPECIFIC ENERGY CONSUMPTION**		
A)	WITH RESPECT TO OB PRODUCTION	0 kWh/t	0 kWh/t
B)	WITH RESPECT TO COAL PRODUCTION	0.97 kWh/t	0.97 kWh/t
C)	WITH RESPECT TO COMMON LOAD	2.99 kWh/t	2.27 kWh/t
D)	WITH RESPECT TO TOTAL LOAD	3.96 kWh/t	3.24 kWh/t
3	**SPECIFIC POWER COST**	19.97 Rs./t	16.65 Rs./t
4	**FIXED PERCENTAGE OF POWER COST**	68.84 %	65.60 %
5	**VARIABLE PERCENTAGE OF POWER COST**	31.16 %	34.40 %
6	**AVERAGE COST OF PURCHASED POWER**	5.04 Rs./kWh	5.14 Rs./kWh

POWER DEMAND CHART FOR PR OF SAKHARI-IRAWATI (PAUNI-III) OCP

MARCH 2009

DEPARTMENTAL OPTION — **COAL PRODUCTION** 1.250 CMPDI MTY

Sl. No.	EQUIPMENT / INSTALLATION	UNIT LOAD	INSTALLED QUANTITY	WORKING QUANTITY	ANNUAL WORKING HOURS	CONNECTED LOAD	TOTAL LOAD IN OPERATION	DEMAND FACTOR	POWER FACTOR	ACTIVE POWER (KW)	REACTIVE POWER (KVAR)	APPARENT POWER (KVA)	ANNUAL ENERGY CONSUMPTION (MKWH)
	1. OVERBURDEN												
	OB REMOVAL BY DIESEL EQUIPMENT												
	Sub-- Total (1.)					**0**	**0**			**0**	**0**	**0**	**0.000**
	2. COAL WINNING												
	COAL PRODUCTION BY DIESEL EQUIPMENT												
A	Coal Handling Plant.	350	1	1	4950	350	350	0.7	0.7	245	250	350	1.213
	Sub-- Total (2.)					**350**	**350**			**245**	**250**	350	**1.213**
	3. COMMON												
A	Workshop	450	1	1	1980	450	450	0.5	0.7	225	230	321	0.446
	PUMPING LOADS												
1	200 LPS, 120 M HEAD(3.3 KV)	400	2	1	900	800	400	0.7	0.8	280	210	350	0.252
2	200 LPS, 120 M HEAD(3.3 KV)	400	1	1	2920	400	400	0.7	0.8	280	210	350	0.818
3	80 LPS, 80 M HEAD(550/440 V)	110	3	3	200	330	330	0.7	0.8	231	173	289	0.046
4	11 LPS, 30 M HEAD (550/440 V)	9.3	5	4	3285	47	37.2	0.7	0.8	26	20	33	0.086
	Sub-Total (Pumping Load)					1577	1167			817	613	1021	1.202
C	Surface,Quarry,OB dump,& other service establishment illumination load	150	1	1	4380	150	150	0.9	0.9	135	65	150	0.591
D	Office Loads& other misc loads	50	1	1	3300	50	50	0.9	0.9	45	22	50	0.149
	Sub-- Total (3.)					**2227**	**1817**			**1222**	**930**	**1535**	**2.388**
	TOTAL (1.+ 2.+ 3.)					**2577**	**2167**			**1467**	**1179**	**1882**	**3.601**

POWER DEMAND CHART FOR PR OF SAKHARI-IRAWATI (PAUNI-III) OCP

MARCH 2009

DEPARTMENTAL OPTION — COAL PRODUCTION 1.250 CMPDI MTY

Sl. No.	EQUIPMENT / INSTALLATION	UNIT LOAD	INSTALLED QUANTITY	WORKING QUANTITY	ANNUAL WORKING HOURS	CONNECTED LOAD	TOTAL LOAD IN OPERATION	DEMAND FACTOR	POWER FACTOR	ACTIVE POWER (KW)	REACTIVE POWER (KVAR)	APPARENT POWER (KVA)	ANNUAL ENERGY CONSUMPTION (MKWH)
										1174	944	1506	

D	Office Loads& other misc loads	50	1	1	3300	50	50	0.9	[illegible]	45	22	50	0.149
	Sub– Total (3.)					2227	1817			1222	930	1535	2.388
	TOTAL (1.+ 2.+ 3.)					2577	2167			1467	1179	1882	3.601

POWER DEMAND CHART FOR [illegible]

DEPARTMENTAL OPTION — COAL PRODUCTION 1.250 MTY

Sl. No.	EQUIPMENT / INSTALLATION	UNIT LOAD	INSTALLED QUANTITY	WORKING QUANTITY	ANNUAL WORKING HOURS	CONNECTED LOAD	TOTAL LOAD IN OPERATION	DEMAND FACTOR	POWER FACTOR	ACTIVE POWER (KW)	REACTIVE POWER (KVAR)	APPARENT POWER (KVA)	ANNUAL ENERGY CONSUMPTION (MKWH)
	Taking Diversity Factor as	1.25								1174	944	1506	
	At Improved Power Factor of 0.96								0.96	1174	342	1223	
	Capacitor Bank Required										601		
	Capacitor Bank Provided										600		
	System Losses (@ 5%)												0.180
	MINE'S SUB-TOTAL					2577	2167			1174	344	1223	3.781
	TRANSFORMER SELECTED FOR MINE	2000 KVA, 11 KV / 3.4 KV -- 2 Nos., 100 KVA, 11 KV / 230 V (L - L) -- 1 No.											
	TOWNSHIP ELECTRICITY LOAD												
1	QUARTERS ALL TYPE INCLUDING ALL MISC. LOAD			406		893	893	0.9	0.9	804	389	893	1.111
	Taking Diversity Factor as	2.1								383	185	425	
	At Improved Power Factor of 0.96								0.96	383	112	399	
	Capacitor Bank Required										74		
	Capacitor Bank Provided										75		
	System Losses (@ 5%)												0.056
	TOWNSHIP'S SUB-TOTAL					893	893			383	110	398	1.167
	PROJECT OVERALL TOTAL					3470	3060			1556	454	1621	4.948
	TRANSFORMER SELECTED FOR TOWNSHIP	160 KVA, 11 KV / 415 V -- 4 Nos., (DEPARTMENTAL OPTION)											

JOB No.:-4021291

Chapter XIII Page 38

5.6

POWER DEMAND CHART FOR PR FOR SAKHARI-IRAWATI (PAUNI-III) OCP

MARCH 2009 CMPDI

PARTIAL HIRING OPTION

COAL PRODUCTION 1.250 MTY

Sl. No.	EQUIPMENT / INSTALLATION	UNIT LOAD	INSTALLED QUANTITY	WORKING QUANTITY	ANNUAL WORKING HOURS	CONNECTED LOAD	TOTAL LOAD IN OPERATION	DEMAND FACTOR	POWER FACTOR	ACTIVE POWER (KW)	REACTIVE POWER (KVAR)	APPARENT POWER (KVA)	ANNUAL ENERGY CONSUMPTION (MKWH)
	1. OVERBURDEN												
	OB REMOVAL BY DIESEL EQUIPMENT												
	Sub-- Total (1.)					**0**	**0**			**0**	**0**	**0**	**0.000**
	2. COAL WINNING												
	COAL PRODUCTION BY DIESEL EQUIPMENT												
A	Coal Handling Plant.	350	1	1	4950	350	350	0.7	0.7	245	250	350	1.213
	Sub-- Total (2.)					**350**	**350**			**245**	**250**	**350**	**1.213**
	3. COMMON												
A	Workshop	225	1	1	1980	225	225	0.5	0.7	112.5	115	161	0.223
	PUMPING LOADS												
1	200 LPS, 120 M HEAD(3.3 KV)	400	2	1	900	800	400	0.7	0.8	280	210	350	0.252
2	200 LPS, 120 M HEAD(3.3 KV)	400	1	1	2920	400	400	0.7	0.8	280	210	350	0.818
3	80 LPS, 80 M HEAD(550/440 V)	110	3	3	200	330	330	0.7	0.8	231	173	289	0.046
4	11 LPS, 30 M HEAD (550/440 V)	9.3	5	4	3285	47	37.2	0.7	0.8	26	20	33	0.086
	Sub-Total (Pumping Load)					1577	1167			817	613	1021	1.202
C	Surface,Quarry,OB dump,& other service establishment illumination load	150	1	1	4380	150	150	0.9	0.9	135	65	150	0.591
D	Office Loads& other misc loads	50	1	1	3300	50	50	0.9	0.9	45	22	50	0.149
	Sub-- Total (3.)					**2002**	**1592**			**1110**	**815**	**1377**	**2.165**
	TOTAL (1.+ 2.+ 3.)					**2352**	**1942**			**1355**	**1065**	**1723**	**3.378**

POWER DEMAND CHART FOR PR FOR SAKHARI-IRAWATI (PAUNI-III) OCP

MARCH 2009 CMPDI

PARTIAL HIRING OPTION

COAL PRODUCTION 1.250 MTY

Sl. No.	EQUIPMENT / INSTALLATION	UNIT LOAD	INSTALLED QUANTITY	WORKING QUANTITY	ANNUAL WORKING HOURS	CONNECTED LOAD	TOTAL LOAD IN OPERATION	DEMAND FACTOR	POWER FACTOR	ACTIVE POWER (KW)	REACTIVE POWER (KVAR)	APPARENT POWER (KVA)	ANNUAL ENERGY CONSUMPTION (MKWH)