



साउथ ईस्टर्न कोलफील्ड्स लिमिटेड
South Eastern Coalfields Limited

(एक मिनीरतना कंपनी)
(A MINIRATNA COMPANY)
कॉर्पोरेट कार्य विभाग

CORPORATE AFFAIRS DEPARTMENT

सीआईएन /CIN: U10102CT1985GOI003161

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Ref. No. SECL/BSP/CAD/195th CoFD EXT/23-24/791

Date: 21.10.2023

The subject item mentioned below was discussed in the 195th Meeting of the Committee of Functional Directors (CoFD) of South Eastern Coalfields Limited held on 20.10.2023 vide Item No.195.08. The extract of the approved Minutes of Meeting is quoted below:

QUOTE

Item No. 195.08


Sub: Proposal for approval of Mining Plan for Kusmunda OCP (50.0 MTY to 62.5 MTY) to obtain enhanced EC of 62.50 MTY in an area of 2991.943 Ha land.

Ref: GM(P&P)-HoD's e-Office Noting (e-1231948) Dtd. 17.10.2023.

The Committee of Functional Directors (CoFD) discussed on the subject Agenda and upon appraisal by Director (Tech.)P&P and further explained by GM (P&P)-HOD, the CoFD approved the subject Mining Plan for Kusmunda OCP (50.0 MTY to 62.5 MTY) (attached at **Note#33** of the e-Office file), as initiated by Kusmunda Area to obtain enhanced EC of 62.5 MTY in an area of 2991.943 Ha land, as examined and vetted by RI-V, CMPDI, P&P, Env./Forest & L&R Departments and recommended by Finance Department, SECL HQ, as detailed and brought out in the e-Office Agenda.

UNQUOTE

Accordingly, the case file relating to the subject item is being returned herewith.


21/10/23
(स्वप्निल सुधांशु/Swapnil Sudhanshu)
कम्पनी सचिव/Company Secretary

Director (Tech.) P&P

Encl: as above

Copy for kind information to:

Director (Fin.)/ Director (Tech.)Oprn./ Director (Personnel)

Distribution for action:

1) GM (P&P)-HOD, 2) GM (Fin.)-HOD & 3) Area GM, Kusmunda, SECL


महाप्रबंधक
साउथ ईस्टर्न कोलफील्ड्स लिमिटेड

MINING PLAN FOR KUSMUNDA OCP

1.1 BACKGROUND OF THE PROJECT REPORT

Kusmunda OC Expansion Project is a brownfield/running coal mining open cast project, tends to produce coal of average G11 (F, Equivalent GCV-4497 KCal/kg) quality. Kusmunda OCP Expansion, a part of Eastern Sector of Jatraj, Resdi and Sonpuri Blocks, is located in the south-central part of Korba Coalfield in Korba district of Chhattisgarh. (Refer Plate-1 & 2 for general location of the project). The location is shown in Survey of India Toposheet No. 64 J /11.

The Project Report for Kusmunda OCP Expansion Project was prepared in this geological block for mining out the balance 1005.40 Mt of mineable coal reserve at the rated capacity of 50.0 Mty

The Project Report of Kusmunda Opencast Expansion project for a targeted capacity of 50 Mty was approved by CIL Board (for departmental option) on 03.08.2013 for an additional capital investment of ₹ 6912.22 crs. In favourable techno-economical circumstances, the project may produce 1.25 times of the normative capacity and may attain peak production level of 62.50 Mty. Presently, EAC has granted EC for producing 62.50 Mty.

The Ministry of Environment & Forest has accorded Environment Clearance (EC) vide Letter No. J-11015 / 176 / 2014-IA.II (M) dt. 10th January 2020 for capacity of 50 MTPA (Normative) / 62.50 MTPA (Peak) in area 1655.825 ha. Stage-1 Forest Clearance (FC) was accorded vide FC no.8-08/2018 dated 26.04.2018. For the sake of present amendment proposal, the mine closure plan is revised for land area of 2991.943 ha.

The present production from Kusmunda OC is 43.051 Mt (2022-23).

1.2 SALIENT FEATURES OF THE APPROVED PR (15.0-50.0 MTY)

The salient features of the PR for Kusmunda OCP (15.0-50.0 Mty) sanctioned project were as follows: -

Sl. No.	Particulars	Unit	Value
1	Generalised thickness of Coal Seam		
	i) E&F Seam	m	10-12
	ii) Upper Kusmunda	m	27-28
	iii) Lower Kusmunda (top split)	m	38-40
	iv) Lower Kusmunda (bot. Split)	m	8-10
	v) Lower Kusmunda (Combined)	m	50-60
2	Overburden/parting thickness		

Mining Plan for Kusmunda OCP (50.0-62.50 Mty)

Sl. No.	Particulars	Unit	Value
	a) Top OB	m	10.0 -104.0
	b) Between E&F and UK	m	56.84 - 88.85
	c) Between UK & LKT/C	m	34.20 - 91.0
	d) Between LKT & LKB	m	3.0-19.83
3	Average Grade		F
	Total Mineable Reserves (Seamwise) (As on 1.4.11)	Mt.	1005.40
4	a) E&F	Mt.	32.26
	b) Upper Kusmunda	Mt.	234.70
	c) Lower Kusmunda Top	Mt.	225.80
	d) Lower Kusmunda (Bot./Comb)	Mt.	512.64
5	Volume of OB	M.Cum	1342.45
6	Stripping Ratio (Av.)	Cum/t	1.34
7	Target Output	Mt/Yr.	50.0
8	Peak OBR	Mcum/yr.	68.33
9	Project life	Year	24
10	a) Total capital investment	Rs. crores	7227.20
	b) Capital outlay /te of annual output	Rs./t	1445.44
11	a) Capital requirement of P&M	Rs. crores	5595.95
	b) Per tonne of annual output	Rs./t	1119.19
12	Selling price (95% of notified selling price) of processed ROM Coal.	Rs./ t	898.00
13	Estimated cost of production		
	a) at 100% level	Rs./t	445.88
	b) at 85% level	Rs./t	506.31
14	Profit per tonne		
	a) at 100% level	Rs./t	452.12
	b) at 85% level	Rs./t	391.69
15	Break-even-point (%)		43.10
	(Mty)		21.55
16	No. of personnel		4130
17	OMS	t	43.16
18	EMS	Rs.	2839.32
19	Anticipated year of achieving target	Year	8 th
20	IRR at 100% level of production	%	91.77
21	IRR at 85% level of production	%	56.86
22	Completion capital (upto target year)	Rs. crores	9083.69

1.3 MINING METHOD OF THE APPROVED PR (15.0-50.0 MTY)

As per the approved PR, shovel-dumper mining system has been adopted for OB removal by departmental HEMM while extraction of coal is being done by Surface Miner.

1.4 HEMM PROVISION OF THE APPROVED PR (15.0-50.0 MTY)

Mine will be worked out by departmental equipment for extraction of coal and OB removal. OB removal will be done by the combination of 42 & 10 cum Elect. Rope

Mining Plan for Kusmunda OCP (50.0-62.50 Mty)

Shovels and 240T & 100T Rear Dumpers. For extraction of coal, surface Miner with a combination of 10 cum FEL & 45/60 T RD coal body dumper / truck will be used.

1.5 COAL TRANSPORT SYSTEM AND AS PER APPROVED PR

Surface miner shall be deployed with FEL and dumper with inpit conveyor system for coal production. Around 10 Mty of coal will be transported to a 20000Te OH RCC bunker through belt conveyors either directly for supply of coal to CSPGCL power plant. Supply of coal from the bunker to the power plant will be through CSPGCL belt conveyors. Approximately 40 Mty of coal through Silo and 18 Mty through 3 nos. of Siding shall be dispatched to distant consumers by rail.

2.0 PERFORMANCE OF KUSMUNDA OC

Past performance of Kusmunda OC for last few years are as given in the table:

YEAR	COAL (MT)	OB (Mcum)	YEARWISE SR
2013-14	18.42	24.06	1.31
2014-15	18.75	18.64	0.99
2015-16	24.50	28.78	1.17
2016-17	26.00	35.96	1.38
2017-18	26.00	37.59	1.45
2018-19	40.00	43.64	1.09
2019-20	42.33	32.20	0.76
2020-21	37.26	33.77	0.91
2021-22	28.90	35.94	1.24
2022-23	43.05	51.55	1.20

2.1 MAJOR HEMM

As per approved PR, shovel-dumper mining system has been adopted for OB removal by departmental HEMM, while extraction of coal is being done by Surface Miner.

The population of major HEMM are as given in the following table: -

Sl. No	Particulars	Unit	Size/ Capacity	Existing As on 1.4.23	Balance Provision as per PR	Total Provision as per PR
A.	OVERBURDEN					
1	Electric Rope Shovel	Cum	42	2	3	5
2	Electric Rope Shovel	Cum	10	10	2	12
3	Electric Rope Shovel	Cum	4.6/5	0	0	0
4	Rear Dumpers	T	240	20	32	52

Mining Plan for Kusmunda OCP (50.0-62.50 Mty)

Sl. No	Particulars	Unit	Size/ Capacity	Existing As on 1.4.23	Balance Provision as per PR	Total Provision as per PR
5	Rear Dumpers	T	120	3	19	22
6	Rear Dumpers	T	100	95	20	115
7	Rear Dumpers	T	85	8	0	1
8	Elect.RBH Drills	mm	250	20	2	22
9	Dozers	HP	850	5	0	5
10	Dozers	HP	410	14	0	14
11	Wheel Dozer	HP	460	4	0	4
B. COAL						
1	Surface Miner	KW	>1000	10	0	10
2	Diesel RBH Drills	mm	160	4	0	4
3	FEL	Cum	10/10.75	15	05	20
4	Truck for Coal	T	60	133	15	148
5	Backhoe	Cum	5	6	0	3
6	Truck for in seam band	T	60	18	3	21
7	Water Tanker	KL	28	6	0	5
8	Diesel Bouser	KL	22	3	0	3
9	Dozers	HP	410	10	0	10
C. RECLAMATION						
1	Dozers	HP	400-410	2	0	2
2	Dozer	HP	850	2	2	4
3	Water Sprinkler	KL	60/70	14	0	10
D. COMMON						
1	Grader	HP	500	6	4	10
2	Grader	HP	280	11	0	7
3	Diesel Hydraulic Backhoe	Cum	1.3-1.5	0	0	2
4	Vibratory Compactor	T	25	0	2	2
5	Crane	T	200/200/75	3	0	3
6	Crane	T	40-60	6	0	6
7	Crane	T	20	4	0	4
8	Crane	T	8-10	4	0	6
9	Mobile Field Workstation				3	3
10	Diesel Bouser	KI	22		3	3
11	Cable Reeler				3	3

2.3 PAST PERFORMANCE AND PROFITABILITY

Past performance of the mine showing yearwise coal, OB removal, cost of production and profitability of mine for last ten years are as given in the table.

YEAR	COAL (MT)	OB (Mcum)	YEARWISE SR	COST OF PROD (Rs/Per Te)	SELLING PRICE Rs/Per Te	PROFIT / LOSS (Rs/PerTe)
2013-14	18.42	24.06	1.31	470.86	971.57	500.71

Mining Plan for Kusmunda OCP (50.0-62.50 Mty)

YEAR	COAL (MT)	OB (Mcum)	YEARWISE SR	COST OF PROD	SELLING PRICE	PROFIT / LOSS
2014-15	18.75	18.64	0.99	547.04	919.38	372.34
2015-16	24.50	29.25	1.17	461.30	784.52	323.22
2016-17	26.00	35.96	1.38	484.13	980.55	496.42
2017-18	26.00	37.59	1.45	466.30	1124.65	658.35
2018-19	40.00	44.07	1.09	397.09	1057.65	660.56
2019-20	42.33	32.20	0.76	476.35	1110.30	633.95
2020-21	37.26	33.96	0.91	536.70	991.17	498.18
2021-22	28.90	37.62	1.24	724.36	1276.36	552.00
2022-23	43.05	51.55	1.20	635.88	1058.83	422.94

2.4 DETAILS OF LAND

The type wise breakup of this land is as tabulated below:-

Table 2.4

Sl. No.	Head	Land Area
1	Tenancy land	2110.320 Ha
2	Government land	631.720 Ha
3	Forest land	249.903*
Total land area		2991.943 Ha**

* FC stage-1 has been issued for 205.961 ha Revenue Forest Land vide letter No. F.No. 8-08/2018-FC dated 26.04.2018. Application for obtaining Stage-1 FC for balance 43.942 Ha Revenue Forest Land has been registered by Nodal Officer (FCA) on 10.02.2021 (Proposal No. FP/CG/MIN/41604/2019 dated 18.10.2019)

**Balance Land area of Kusmunda Expansion Opencast Project (2991.943 Ha) after transfer of 518.405 Ha Land (including 99.979 Ha Revenue Forest Land) from Kusmunda Opencast Expansion Project 50 MTY (3510.348 Ha, TOR: F.No. J-11015/176/2014-IA.II(M) dated 01.12.2014) to Gevra Opencast Expansion Project 70 MTY (4781.798 Ha, TOR: F.No. J-11015/85/2010-IA.II(M) dated 09.01.2023).

3.0 Kusmunda MINE PLAN (50.0-62.50 MTY)

3.1 NEED FOR ENHANCEMENT

Liberalization of power sector by Government of India has generated wide spread interests for private and public sector investments in power generation and other industrial development. As such, there is an appreciable increase in the number of upcoming new projects in both private and public sectors.

The subsidiary-wise year-wise breakup of the production projection is as given in the Table no 3.1.

Table 3.1: Subsidiary-wise year wise breakup of the production projection
(Figures in Mt)

SUB.	2022-23	2023-24	2024-25	2025-26	2026-27	2027-28	2028-29	2029-30	2030-31
ECL	50	51	52	60	65	68	69	70	70
BCCL	32	41	45	50	50	50	52	54	55
CCL	76	84	106	135	142	150	163	170	172
NCL	122	133	134	135	135	135	135	135	135
WCL	62	67	68	70	70	70	70	70	70
SECL	182	200	220	260	265	272	276	285	288
MCL	176	204	225	290	303	310	325	336	340
CIL	700	780	850	1000	1030	1055	1090	1120	1130

As can be seen from the table above, huge jump in coal production is required over the present production levels in order to meet the coal demand of the country. Preparation of Mining Plan for Kusmunda Opencast Expansion Project (50.0-62.50 Mty) is therefore proposed with a view to fulfill part of the above indicated growth in production projection.

3.2 PROPOSED MINE WORKING

The project report was prepared for targeted capacity of 50 MTPA in the year 2011 and the report was approved on 03.08.2013. In favourable techno-economical circumstances the project may produce 1.25 times of the normative capacity and may attain production level of 62.50 Mty.

3.3 LOCATION

Kusmunda OCP Expansion, a part of Eastern Sector of Jatraj, Resdi and Sonpuri Blocks, is located in the south-central part of Korba Coalfield in Korba district of Chhattisgarh. These blocks cover an area of 16.03 sq.km. and are bounded by latitudes 22°15'18" to 22°21'30" and longitudes 82°38'39" to 82°42'08" (ref. Plate No.I) and included in Survey of India Toposheet No. 64J/11.

3.4 COMMUNICATION AND ACCESSIBILITY

The blocks are well connected by rail and road. 'Gevra Road' and 'Korba Railway Stations' on Champa-Gevra Road branch line of S.E. Central Railway are at a distance of 1.5 km and 5 km respectively. SECL headquarters, Bilaspur, is at a distance of about 90 km by road. Important distance by Rail to Gevra Road Station –

3.5 MINE BOUNDARIES

For delineation of mine boundary particular attention is focused to minimize external dumping and techno-economic option. All efforts are made to delineate the mine boundary keeping in view the external dumping limited to available space to avoid any acquisition of additional land as well as sufficient strike length and reserves available to achieve the desired target for a reasonable period of mine life.

The project boundary is given as in Table-3.5

Table-3.5

Direction	Boundary particulars
North	Geological block boundary of Resdi and Jatraj
South	Geological block boundary of Resdi and Sonpuri Block
East	Safe Distance from Right Bank Canal
West	Common Boundary of Gevra- Kusmunda Opencast Expansion Project

3.6 BRIEF GEOLOGY OF THE MINEABLE AREA

The east-west trending crescent shaped Korba Coalfield which derives its name from the Korba town is spread over an area of about 520 sq.km. in the Korba District of Chhattisgarh. This is 64km long and its width varies from 4.8km to 16km. The southerly flowing Hasdeo River divides the coalfield in two unequal parts, the western and the eastern. The target area falls in the western part of the coalfield.

The Mining block covers an area of 16.03 sq km. This comprises 5.73 sq km of Jatraj exploration block in the north, the 2.61 sq km of Sonpuri exploration block in the east and 7.69 sq km of Resdi exploration Block in the west. The entire block is capped with thick soil cover. There is no rock exposure in the block.

The existence of three well defined coal seams has been proved in the project area. These seams are named as Lower Kusmunda, Upper Kusmunda and E&F in ascending order.

The Lower Kusmunda seam is composite in the western part of the mining block and it splits into mainly two sections in the eastern part. There is a grey shale/sandy

Mining Plan for Kusmunda OCP (50.0-62.50 Mty)

shale band approximately 40 m below the roof of the seam that has a tendency of increasing in thickness from west to east. In the area where the thickness of the band becomes 3m and above, the Lower Kusmunda seam has been considered to split into 2 sections, Lower Kusmunda Top and Lower Kusmunda Bottom. The Upper Kusmunda, a composite seam has tendency to increase in thickness from north to south.

Three sections on the basis of seam composition can be clearly identified as Top shaly coal section, middle inter-banded section and bottom coaly section.

Seam E&F which is the top most horizon in the block has also splitting tendency in the bottom part with the development of a carb.shale band. However, the thickness of this band is less than 3m in the project area and hence E&F seam has been considered as a single horizon.

Altogether 23 faults have been deciphered in the block. Out of these, two faults F2-F2 and F10-F10 having throw of 10-75m & 5-95m are the major faults. However, presence of a few minor faults cannot be ruled out.

3.6.1 DETAILS OF SEQUENCE OF COAL SEAM AND THEIR PARTING

The sequence of coal seams with their thickness and parting range is as shown below:-

Coal Seam Name/ parting	Nomenclature	Thickness Range (m)		General Listed Thickness	No. of Boreholes inter-section (Full Thickness)	Area (sq km)	Seam Wise BH Density (no. per sq km)	No. of samples actually tested for proximate Analysis (determined/ calculated)
Seam	E	1.45 (CMKL-123)	9.05 (CMKL-37)	5-7	27			
Parting		0.70	4.67					
Seam	F	0.80 (MPK-2)	3.17 (CKKS-14)	1.5-2	37			
	E&F	6.40 (CMKR-5)	14.79 (CMKK-1)	10-12	20	0.72	27.78	7
Parting		56.85	88.85					
Seam	Upper Kusmunda	20.03 (CMKS-13)	34.41 (CMKL-166)	24-28	97	5.85	16.58	54
Parting		34.20	91.00					
Seam	Lower Kusmunda Composite	48.06 (MKD-19)	64.40 (CMKL-64)	50-60	53	1.86	17.20	95
Seam	Lower Kusmunda Top	31.50 (CMKR-49)	42.38 (CMKR-27)	38-40	83	5.85	14.19	
Parting		3.00	19.83					
Seam	Lower Kusmunda Bottom	2.86 (CMKR-21)	16.65 (NCKK-28)	8-10	56	7.2	7.78	

3.6.2 MINE PARAMETERS AS PER PR

The Mining characteristics of the quarry have been tabulated as follows: -

Sl.No.	Particulars	Unit	Value
I:	COAL SEAMS		
1.	Thickness : (In-bands) :		
	E&F	Metre	6.40 – 14.79
	Upper Kusmunda	Metre	20.03 – 30.73
	Lower Kusmunda (Top)	Metre	31.50 – 42.38
	Lower Kusmunda (Combined)	Metre	48.06 – 64.40
	Lower Kusmunda (Bottom)	Metre	2.86-16.65
2.	Dip	Degree	4° - 10°
3.	Specific Gravity		1.67
4.	Excavation category of coal	Assumed	III
II:	OVERBURDEN / PARTINGS		
1.	Thickness :		
	Top O.B.	Metre	10.00 – 104.00
	Between E&F and UK	Metre	56.84 – 88.85
	Between UK and LK (T) / LK (C)	Metre	34.20 – 91.00
	Between LK (T) and LK (B)	Metre	3.00 - 19.83
2.	Specific Gravity	Assumed	2.40
3.	Excavation Category	Assumed	50% III + 50% IV
III:	QUARRY PARAMATERS		
1.	Maximum Width Along Strike :		
	^ At Surface	Kilometre	6.5
	^ At Floor	Kilometre	6.0
2	Minimum width Along Strike:		
	^ At Surface	Kilometre	4.4
	^ At Floor	Kilometre	3.9
3.	Maximum Length Along Dip :		
	^ At Surface	Kilometre	3.2
	^ At Floor	Kilometre	2.6
4.	Maximum Depth	Metre	300
5.	Minimum Depth	Metre	90
6.	Maximum Lift	Metre	310
7.	Area of Excavation :		
	^ At Surface	SqKm	16.0
	^ At Floor	SqKm	12.0

3.7 MINING METHOD & RESERVES**3.7.1 MINING METHOD**

Mining Plan for Kusmunda OCP (50.0-62.50 Mty)

The coal deposit mainly constitutes of three thick coal seams occurring at shallow to moderate depth at favourable stripping ratio considering the grade. Present depth of workings are about 190 m against an ultimate planned depth of 300 m (as per 50Mty PR).

Top Overburden and the parting in between E&F, UK & LK Seams would be excavated in a series of generally horizontal slices (benches). Generally, the maximum bench height would be maintained at 18 m.

The width of non-working and working benches has been kept as 25 m and 50 m respectively. The running slope of the benches will be kept 65° to 70°. The provision of coal mine regulations and related circulars shall be strictly followed for designing bench parameters in coal and OB.

Considering the average mine floor gradient of about 60° to 70°, the coal benches are proposed parallel to seam floor and self-draining. As surface miner will be deployed, height of coal bench will be same as that of seam thickness. Width of bench will be kept as 95m which is the summation of following four passages.

1. Ramp of 20m along the bench crest
2. Clear width of 30m for cutting
3. Ramp of 20m to be left adjacent to cutting width to be used for next cut
4. A passage of 25m to be used for upper OB bench.

It is proposed that mine will be operated for 330 days in a year. In a day, there will be 3 shifts and each shift is of 8 hours. But, operating manpower of HEMM and CHP will be deployed for 4 shifts in a day with overlapping system. This will eradicate the discontinuance of operation between two shifts due to change over and increase the utilization of resources to a great extent.

3.7.2 BALANCE MINEABLE COAL RESERVES AND OB REMOVAL

As on 01.04.2011, mineable reserves in the proposed quarry is 1005.40 Mt and volume of OB is 1342.46 Mm³. While calculating this mineable reserves, a geological loss of 10% and a mining loss of 5% have been considered.

As on 31.03.2023 , 335.21 Mte of coal has been extracted and 380.24 Mcum of OB has been removed respectively since the inception of the approved PR .

As on 01.04.2023, the balance mineable reserves of Coal is 670.19 Mt. and the balance OB volume is 962.21 Mcum respectively.

Table 3.7 a

Particulars	Coal (Mt.)	OB (Mcum.)
Mineable reserves as on 01.04.2011	1005.40	1342.45
Extracted till 31.03.2023	335.21	380.24
Balance as on 01.04.2023	670.19	962.21

The life of the mine tends to be 14 years as per the proposed normative coal production of 50.0 MTPA with the peak coal production capacity of 62.50 MTPA within the proposed boundary.

COAL PRODUCTION AND OB REMOVAL

The production achieved since inception of the approved PR has been tabulated as under:

PRODUCTION ACHIEVEMENT

Table 3.7 b

Year	Coal (Mt.)	OB (Mcum.)
2011-12	15.00	16.89
2012-13	15.00	20.92
2013-14	18.42	24.06
2014-15	18.75	18.64
2015-16	24.50	28.78
2016-17	26.00	35.96
2017-18	26.00	37.59
2018-19	40.00	43.64
2019-20	42.33	32.20
2020-21	37.26	33.77
2021-22	28.90	35.94
2022-23	43.05	51.86
TOTAL	335.21	382.24

The summarized calendar programme of balance minable coal reserves and balance OB removal has been provided in the following table

CALENDAR PROGRAMME OF EXCAVATION

Table 3.7 c

YEAR	Year	Coal (Mt)	OB (Mcum)	TOTAL
1	23-24	50.00	74.00	1.48
2	24-25	58.00	85.84	1.48
3	25-26	62.50	92.50	1.48
4	26-27	50.00	74.00	1.48
5	27-28	50.00	74.00	1.48
6	28-29	50.00	74.00	1.48

Mining Plan for Kusmunda OCP (50.0-62.50 Mty)

YEAR	Year	Coal (Mt)	OB (Mcum)	TOTAL
7	29-30	50.00	74.00	1.48
8	30-31	50.00	74.00	1.48
9	31-32	50.00	74.00	1.48
10	32-33	50.00	74.00	1.48
11	33-34	50.00	74.00	1.48
12	34-35	40.00	51.20	1.28
13	35-36	40.00	45.60	1.14
14	36-37	19.69	21.07	1.07
TOTAL		670.19	962.21	1.44

As per the approved PR, the mine is running in the 11th year. In favourable techno-economic circumstances the project may produce 1.25 times of the normative capacity and may attain the peak coal production level of 62.50 Mty. The average stripping ratio to mine out balance mineable coal reserve is 1.44 cum/t.

3.7.3 MINING STRATEGY/MINING SEQUENCE

Top Overburden and the parting in between E&F, UK & LK Seams would be excavated in a series of generally horizontal slices (benches). Generally, the maximum bench height would be maintained at 18 m.

Coal too will be excavated in a series of horizontal slices of maximum thickness corresponding to the size of the excavating equipment.

Some major system parameters are given below:-

1. Maximum Bench Height O.B. - 18m
2. Width of working bench O.B. - 50m
3. Width of non-working bench O.B. - 25m
4. Width of permanent haul road - 80m
5. Width of the temporary transport ramp - 15m
6. Usual height of the spoil dump bench - 30m
7. The width of the active dump bench - 30m
8. Bench Slope (working)
 - O.B. bench - 70°
 - Coal bench - 70° (Surface Miner)
 - Dump bench - 37°
9. Overall pit slope (for 300m depth) - 37°

3.7.4 HAUL ROAD

Haul roads have been planned at a maximum gradient of 1 in 16, the width of the haul road has been kept as 30 m.

3.7.5 SEQUENCE OF MINING OPERATIONS

The existing Kusmunda Opencast Expansion project (15.0-50.0 Mty) was approved by CIL Board (for departmental option) on 03.08.2013. The approved EC capacity of the project is 62.50 Mty (EC No.J-11015/176/2014-IA.II(M) dated 10.01.2020) . However, Gap in Capacity due to any constraints is to be met by subsequent approvals of Contract for achieving targeted production.

Due to number of splits in LK seam, UK seam and number of partings in between them, coal from UK and above seams cannot be brought down on the floor of the LK seam or the floor of the bottommost split of LK Seam.

It was proposed that Coal transportation from bottom coal horizons (LK seam and splits) will be carried out by Inpit belt conveyor.

It is proposed that about 105m width corridor for main haul road and conveyor belt installation be kept. The alignment of the belt route and haul road for trucks and dumpers are made side by side, to enhance the space availability for back filling and easy maintenance of belt conveyor etc.

The mine will advance towards dip direction exposing the floor of seam LK or the bottommost split of seam LK. The alignment of the face has been planned as to facilitate the drainage of water to one or two places.

Multiple faults of varying magnitude and direction will be exposed during working of the mine within proposed quarry area. Safety angle 37deg all along the fault line should be maintained to support the fault plane and to avoid collapsing of strata.

The proposed sequence has been chosen to maximize the internal dumping. To maintain the production the mining will be carried out in orderly manner as defined through sector lines. After completion of one sector next sector will be mined and so on.

3.7.6 DUMPING STRATEGY & RECLAMATION

Internal dump has been divided into two parts by the positioning of haul road i.e. eastern dump and western dump.

OB dumps will be properly benched and the maximum height of the bench will be kept not more than 30m. Dump benches will have a mild gradient of 0.6% to facilitate the drainage.

Wherever possible, simultaneous land reclamation will be done along with the OB dumping. Once, the internal dumping starts reaching its maximum R.L, the spoil will be graded and landscaped in harmony with surrounding topography and biological reclamation carried out in stages.

No OB should be dumped on the old quarries of Upper Kusmunda Seam, where the underlying LK Seam is still virgin. The spoil dump benches in the internally backfilled OB will be in the form of benches. With the sufficient advance of coal production bench, the non-active backfilled OB will be leveled with dozer. Dumper/Tipper will transport soil/alluvium OB from the top OB bench and will dump the soil directly on the leveled backfilled OB. Otherwise; top soil will be removed and stored separately. This soil will be directly spread over the levelled graded backfilled spoil for reclamation of the quarried out land. OB dumps will be properly benched and the maximum height of the bench will be kept not more than 30m.

The final void at the end of mining operations in the mine can be converted into a water reservoir. It is also possible that with dynamics of input costs and coal prices, prevailing in future, mining operations can be extended considerably towards the south and west of Kusmunda OC in which case will be available only after exhaustion of coal upto metamorphic and possibly after 50 years.

The following design criteria have been considered for waste dumps:

- (i) OB in internal dumps will also be stacked in 30 m high benches.
- (ii) A berm width of 30 m has been provided for transport etc.
- (iii) Dump slope for each deck to be at natural repose (37°).
- (iv) Dozers to be deployed for shaping the dumps overall slope is 28°.
- (v) Final reclamation will be achieved using the equipment provided for the purpose.

Table 3.7 d - OB Removal and Backfilling

(Values in Mcum)

Year	OB Removal (Cumulative)			External Dump (Cumulative)		Internal Backfilling (Cumulative)	
	Top Soil	OB	Total	Top Soil	OB	Top Soil	OB
Y-10	2.85	431.87	434.72	0.994	19.806	1.16	401.94
Y-15	3.822	771.468	775.29	0.994	19.806	2.130	737.030
Y-20	4.449	1115.171	1119.62	0.994	19.806	3.108	1075.852
Y-24	4.800	1337.66	1342.46	0.994	19.806	3.806	1317.894
<i>Post Closure</i>							
MC 1	4.800	1337.660	1342.46	0.994	19.806	3.806	1317.894
MC 2	4.800	1337.660	1342.46	0.994	19.806	3.806	1317.894
MC 3	4.800	1337.660	1342.46	0.994	19.806	3.806	1317.894

*Note- As on 01.04.2023, Mine has completed 10 years of the planned production & about 382.321 Mcum volume of overburden has already been accommodated in the internal dump.

LAND DEGRADATION & RESTORATION SCHEDULE

The land reclamation of mined out areas is the prime need. It not only involves backfilling of overburden into the excavated voids but also includes operations required to bring the land to some productive use, i.e. agricultural, forestry or recreational purposes. The Longitudinal and Transverse section of overburden reclaimed area have been provided in Plates. The Final Stage dumping plan & section are provided in Plate.

In this project the technical reclamation will be dumping of overburden in a systematic manner. It depends on the depth and volume of overburden removed and equipments used for mining. The technical reclamation would involve breaking and levelling the top of OB dumps, filling of gulleys and terracing etc. The height of external dump bench is restricted to about 30 metres. The top area of external & internal overburden dumps will be levelled by means of dozers keeping a mild slope of about 1 in 200 for surface water drainage and for plantation and other recreational purposes.

Table 3.7 e Land Degradation and Restoration
(Figures in cumulative ha)

Stage	Land Degraded (Ha)				Technically Reclaimed Area (Ha)			
	Excavated	Dump - External + Top Soil	Infra/ Others	Total	Backfill	Dump - External+ Top Soil	Others	Total
Y-10	950	325	1066.943	2341.94	380.24	325		705.24
Y-15	1274.11	325	1066.943	2666.05	696.61	325		1021.61
Y-20	1483	325	1066.943	2874.94	1016.51	325		1341.51
Y-24	1600	325	1066.943	2991.94	1245	325		1570
<i>Post Closure</i>								
MC 1	1600	325	1066.943	2991.94	1245	325		1570
MC 2	1600	325	1066.943	2991.94	1245	325		1570
MC 3	1600	325	1066.943	2991.94	1245	325		1570

Water Body/void – 355 ha

*Note- As on 01.04.2023, Mine has completed 10 years of the planned production & about 510.610 Ha has already been technically reclaimed in the internal dump.

Biological Reclamation - In opencast mining, the original vegetation is completely stripped off and the soil profile sequences may be disturbed. It is therefore necessary that utmost care be taken in handling the top soil so that they can be reused for revegetation of the area during reclamation. The purpose of biological reclamation is to bring back the vegetation and biodiversity that exist in pre-mining condition. After technical reclamation of OB dumps and redistribution of top soil over it, the dumps will be biologically reclaimed by plantation.

Table 3.7 f Biological Reclamation (ha)

Year	External Dump area available (in ha)	Internal dump area available (in ha)	Total Area (in ha) available for plantation	Total Plantation @2500 per ha
Y-1	130	8.08	138.08	120282
Y-2	130	8.08	138.08	137529
Y-3	32.5	15.61	48.11	345203
Y-4	32.5	22.51	55.01	345203
Y-5	0	30.55	30.55	76369
Y-6	0	30.47	30.47	76181
Y-7	0	37.84	37.84	94595
Y-8	0	50.24	50.24	125606
Y-9	0	50.37	50.37	125926
Y-10	0	50.44	50.44	126096
Y-11*	0	50.48	50.48	126209
Y-12	0	50.63	50.63	126585

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Year	External Dump area available (in ha)	Internal dump area available (in ha)	Total Area (in ha) available for plantation	Total Plantation @2500 per ha
Y-13	0	50.63	50.63	126585
Y-14	0	50.66	50.66	126661
Y-15	0	50.69	50.69	126717
Y-16	0	50.69	50.69	126717
Y-17	0	50.94	50.94	127357
Y-18	0	51.42	51.42	128543
Y-19	0	51.42	51.42	128543
Y-20	0	51.46	51.46	128638
Y-21	0	51.46	51.46	128656
Y-22	0	51.33	51.33	128318
Y-23	0	51.14	51.14	127847
Y-24	0	28.85	28.85	72133
MC-1	0	83	83	207500
MC-2	0	83	83	207500
MC-3	0	83	83	207500
TOTAL	325	1245	1570	3925000

*Note- As on 01.04.2023, Mine has completed 10 years of the planned production & about 203 Ha has already been biologically reclaimed in the internal dump.

Table 3.7 g – Stage wise Land use & Reclamation area (ha)

S. No.	Land use Category	10th Year	20th Year	24th Year (end of mine life)
1	Backfilled Area (Reclaimed with plantation)	380.24	1016.51	1245
2	Excavated Area (Not reclaimed) /Void	569.76	466.49	355
3	External OB dump Reclaimed with plantation	325	325	325
4	Reclaimed Top Soil Dump (internal dump)	380.24	1016.51	1245
5	Green Built Area	10	10	10
6	Undisturbed area (brought under plantation)	153	153	153
7	Roads (avenue plantation)	10	10	10
8	Area around buildings and Infrastructure	470.25	470.25	470.25
9	Others/future mining	1073.693	540.693	423.693
Total		2991.943	2991.943	2991.943

*Note- As on 01.04.2023, Mine has completed 10 years of the planned production & about 203 Ha has already been biologically reclaimed in the internal dump.

TOP SOIL MANAGEMENT

The surface mining activities remove topsoil which is maintained for the plant growth materials and save it for a later use in a manner conducive to protecting the primary root medium from contamination and erosion, and enhance its productivity.

Topsoil removal

The topsoil is removed before any drilling, blasting, mining, or other surface disturbances take place.

Table-3.7 h

Area (Ha.)	Quantity (M.Cu.m.)
Quarry	Quarry
1600	4.80

Topsoil storage

The stock piling of topsoil will be as follows:

- a) The top soil and other materials removed shall be stock-piled only when it is impractical to promptly redistribute such materials on regraded areas.
- b) The stock-piled materials shall be selectively placed on a stable area, undisturbed, and protected from wind and water erosion, unnecessary compaction, and contaminants which reduce the capability of the soil to support vegetation when redistributed.

Top soil / soil amendment application

The top soil will be piled up at the demarcated site of 3 Ha area. The management of top soil will be done in such a way that there is a rotation of topsoil in view of its removal and re-application above the dump surface. In the process top soil will be suitably amended during stock piling to maintain its nutritional values.

Topsoil redistribution

After the final grading the topsoil would be redistributed in a manner that achieves an approximate uniform stable thickness consistent with the post mining land uses, contours, and surface water drainage system.

The objectives of Top Soil Management are:

- Maintain a topsoil balance that achieves rehabilitation objectives during the life of Mine.
- Ensure effective topsoil removal techniques are employed to maximise volumes of suitable topsoil removed and minimise wastage.
- Maintain topsoil viability during stripping, spreading, and stockpiling, through best practices, effective stockpile design and treatment.

- In accordance with the objectives the following strategies will be adopted in providing sufficient stable soil material for rehabilitation.

Stripping:

Prior to the commencement of stripping, area will be cleared of vegetation. Soil stripping will be undertaken by dozers and hydraulic backhoe excavators to maximise the preservation of the quality of the soil. The HEMM operators and supervisors should be trained and made aware for the same. This will ensure that the entire topsoil is salvaged and the quality of topsoil is not reduced through contamination with unsuitable excavated material.

Stock piling:

Wherever possible, the stripped topsoil will be spread directly onto areas being rehabilitated. Wherever this is not possible, the topsoil will be stored in stockpiles. Stock piles will be dumped at places where they would not be disturbed by future mining. Sediment fences or other barriers can be used wherever necessary to retain sediment. Stockpiles will be located on the dip side of the proposed mine boundary. The proposed site will be marked in the land use plan and will be updated accordingly. The height of stock piling should not be higher than 1.20m (without amendments) and 3.0m (with amendments). The overall topography for the graded surface should be designed to minimize the uncontrolled flow of runoff. Dispersed sheet flow should be broken up by terraces or benches along the slope that also follow topographic contours. On a fine scale the ground surface can be roughened by the tracks of a bulldozer perpendicular to the slope. Construction of stockpiles with a "rough" surface condition will reduce erosion hazard, improve drainage and promote revegetation.

Stockpile preservation:

- Stockpiling topsoil may result in disruption and loss of beneficial soil microorganisms and nutritional values, hence needs the following amendments during preservation: -
- Re-vegetation of the stockpile will be done as scheduled below to protect the soil from erosion, discourage weeds and maintain active populations of beneficial soil microbes.
- Temporary Seeding: within 30 days after the formation of the stockpile.
- Permanent Vegetation: If stockpiles will not be used within 12 months they will be stabilized with permanent vegetation to control erosion and weeds like

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green panic, Japanese millet (spring sowing), Oats (winter sowing), Dryland Lucerne, Seaton park sub-clover. Topsoil can be mixed with organic material or manufactured soil amendments to improve the growing capability.

- To the extent practicable, above ground vegetation, including tree litter should be mixed or otherwise incorporated into the topsoil.
- Application of Fertilizers: Stockpiled topsoil needs significant fertilizer application for the establishment and maintenance of vegetation. However, N application should not exceed 168 kg/Ha to avoid suppression of legumes but not less than 85 kg/Ha to support grass establishment. Phosphorus and K application should not exceed 300 and 125 kg/ha, respectively.
- Soil amendments: Soil amendments should be applied before seeding or planting. Common soil amendments used are bio-solids, compost, manure, lime and coal combustion by-products.

Prior to the placement, the top 0.30 cm of stockpile material should be mixed with the remainder of stockpile to ensure that living organisms are distributed throughout the topsoil material at the time of final placement. In case, the material has been stockpiled for over nine-month period, use of microorganisms inoculates may be necessary to re-establish microorganisms in the topsoil material. The quantity should be 200 ml for one Hectare area in case of Azatobactor and Rhizobium.

Site Preparation:

Before spreading topsoil, establish erosion and sedimentation control structures such as diversions, berms, dikes, waterways and sediment basins. Adjust grades and elevations for receipt of topsoil. Roughening - Immediately prior to spreading the topsoil, loosen the subgrade to a depth of at least 100 millimetres to ensure bonding of the topsoil and subsoil. Soil horizons will be replaced in the same order that they were removed. Top soil will be uniformly distributed to pre-mining thickness. If sufficient top soil is available, it is suggested that a minimum compacted depth of a half metre on 3:1 slopes and one metre on flatter slopes. Topsoil will not be spread while it is frozen or muddy. The topsoil will be compacted to ensure good contact with the underlying soil, but excessive compaction will be avoided, as it increases runoff and inhibits seed germination. Light compaction with roller will be done where turf is to be established.

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- On slopes and areas that will not be mowed, the surface will be left rough after spreading topsoil.

Monitoring:

Specific team / manpower is to be deployed for this most important step of topsoil management. The team will monitor the area and quantum of top soil management with the authorities of mine on quarterly basis and regularly monitor the given points of significant importance:

- **Monitoring Erosion Control:** This step is necessary during stock piling as well as reclamation stage of topsoil management. Take corrective measure in areas showing evidence of erosion, sedimentation or slope failure. This is a serious problem, because erosion causes fertile farmland to lose nutrients and water retention ability. Because the first thing to go is precious topsoil, the soil removed by erosion contains about three times more nutrients and 1.5 to five times more organic matter than that which remains behind.
- **Soil fertility maintenance:** Organic or inorganic fertilizer should be applied periodically if vegetation growth is poor.

Regular monitoring of top soil management should be done until vegetation is demonstrated to be successfully established.

Table 3.7 i – Top Soil Management

YEAR	QUARRY AREA OF EXCAVATION, HA	TOP SOIL REMOVED, MCUM	TOP SOIL REMOVED CUMMULATIVE, MCUM	TOP SOIL SPREADED, MCUM			TOP SOIL STACKED CUMMULATIVE, MCUM	REMARKS
				EXTERNAL DUMP	INTERNAL DUMP	TOTAL		
0	950.00	2.85	2.85	0.99	1.16	2.16	0.69	
11	64.82	0.19	3.04	0.00	0.19	0.19	0.69	MAXIMUM AREA REQUIRED FOR STACKING TOP SOIL IS 23.3 HA IN THE YEAR 15
12	64.82	0.19	3.24	0.00	0.19	0.19	0.70	
13	64.82	0.19	3.43	0.00	0.19	0.19	0.70	
14	64.82	0.19	3.63	0.00	0.19	0.19	0.70	
15	64.82	0.19	3.82	0.00	0.19	0.19	0.70	
16	41.78	0.13	3.95	0.00	0.20	0.20	0.63	
17	41.78	0.13	4.07	0.00	0.20	0.20	0.56	
18	41.78	0.13	4.20	0.00	0.20	0.20	0.49	
19	41.78	0.13	4.32	0.00	0.20	0.20	0.42	
20	41.78	0.13	4.45	0.00	0.20	0.20	0.35	
21	29.25	0.09	4.54	0.00	0.17	0.17	0.26	

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22	29.25	0.09	4.62	0.00	0.17	0.17	0.17
23	29.25	0.09	4.71	0.00	0.17	0.17	0.09
24	29.25	0.09	4.80	0.00	0.17	0.17	0.00
Total	1600.00	4.80		0.99	3.81	4.80	

Once, the external dumping is completed, the spoil will be graded and landscaped in harmony with surrounding topography and biological reclamation carried out. The final void at the end of mining operations in the mine can be converted into a water reservoir. It is also possible that with dynamics of input costs and coal prices, prevailing in future, mining operations can be extended considerably towards the south and west of Kusmunda OC in which case will be available only after exhaustion of coal upto metamorphic and possibly after 50 years.

3.7.7 LEAD FOR OB AND COAL

The lead for OB & Coal has been calculated as 3.5 Km & 2.5 km respectively on weighted averages, which have been used for calculating the no. of dumpers.

3.7.8 PROJECTED COAL QUALITY

With reference to letter no. SECL/BSP/QC/Grade (2023-24), 16/232 dated 30.03.2023 of DT (O) SECL, the declared grade of coal of Kusmunda OCP are as given below:

SL. NO.	Name of Seam	Grade of Coal
1	Upper Kusmunda	G11
2	Lower Kusmunda	G11

3.7.9 PUMPING & DRAINAGE

At present, two independent pumping station is in operation. In the proposed 15-50 Mty expansion, main pumps will be provided at the dip most point of the quarry. Peak pumping requirement have been calculated (based on open excavation area, area beyond excavation, backfilled areas, runoff co-efficients, seepage of strata water, maximum rainfall in a day, sump capacity, water lying outside the sump, 18 hours dewatering time for water lying outside the sump etc) .

The existing pumps which are operating on 3.3kV/415V will meet the requirements upto next 4th year. After 4th year 225 lps 200/250/330 m head 700/850/1200 kW.

Slurry pumps of small capacity have been envisaged for pumping the silts settled in the sump due to the OB material washed away during rainy season.

3.7.10 COAL EVACUATION INFRASTRUCTURE

It is proposed to despatch ROM coal to the miscellaneous customers by road / by rail.

Kusmunda mine has following facility installed for despatch of coal –

S.No.	Particulars	Details
1.	Transport from face to Inpit Conveyor belt / Surface belt receiving Station	a) At present by trucks/dumper (Inside mine only) b) By truck/dumper to Inpit conveyor belt at feeding (Work Awarded for a cost of Rs 544.59 Cr on 18.01.2021. Construction is under progress – 67% upto 30.06.2023. Likely completion by Dec' 2023)
2.	Surface to Siding/silos	a) By tipper to sidings b) Conveyor belt to silos (4 nos. of silos (4000 te capacity of each silo with 2 pre-weigh hopper. Capacity to dispatch 58 MTPA)
3.	Surface/Siding to Consumer	a) Dedicated closed conveyor system for annual dispatch capacity of 11 MT to dispatch of coal for CSPGCL West Bank power plant. b) Train wagons loading through Railway siding and silos. c) By Tarpaulin covered truck to local and marginal consumer.

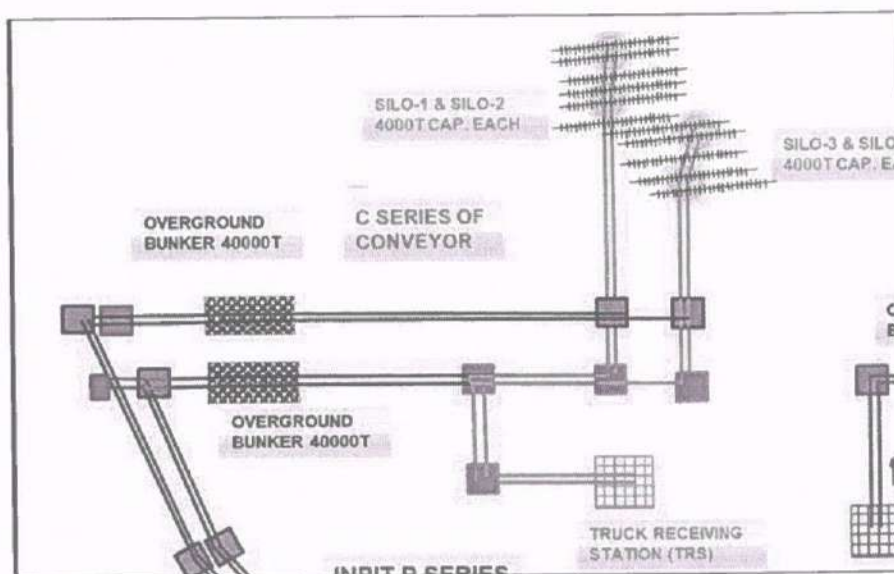


Figure 1 – Schematic Diagram of existing dispatch system in Kusmunda OCP

3.7.11 WORKSHOP AND STORES

Kusmunda OC Expansion Project will be provided with unit workshop for repair and maintenance of excavation and E&M equipment and unit store. Two tier facility has been envisaged.

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- (i) Project workshop for daily maintenance, scheduled maintenance.
- (ii) Central workshop for capital repair and major over hauling.

3.7.12 POWER SUPPLY, ILLUMINATION AND COMMUNICATION

Kusmunda Opencast project is located in the Kusmunda Area of SECL. Presently Kusmunda Opencast Project is receiving power at 132kV from CSEB Chhuri Substation through two numbers of 132kV overhead transmission lines.

132kV Substation

Presently One No 2X 40/50MVA, 132kV/33kV Substation is supplying power to 33kV substations of the mine. At present substation contract demand and recorded maximum demand is **15 MVA** and **12.44 MVA** respectively. However, the total Load based on 50 MTY PR provisions yet have to come in near future and above recorded maximum demand may be increased by 3 to 4 times.

The 2X40/50 MVA, 132/33kV Substation consists of 16 nos. of 33 kV Outgoing bay out of which 10 nos. are kept spare for future loads. The details of all 33kV feeders are as tabulated below.

S.No.	Description	No. of feeders
1	3 nos. 33kV Substations at Kusmunda	6
2	Spare	10
TOTAL		16

33kV Substations and Installed Transformer Capacities

Presently 3 nos. new 33kV substations, 2 nos. 33 kV old substations and 1 no. 33 kV Township Substation (Barpali Substation) catering the existing load of Kusmunda OCP. The details of 33kV substations are as tabulated below.

The main source of 132 kV power for Kusmunda OCP Expansion Project has been envisaged from CSEB Churi or other CSEB Substation. Provision for 15 Km double ckt incoming overhead line has been kept for this purpose which may vary depending on source substation. A Central substation of 2 x 40/50 MVA, 132/33 kV has been proposed to feed quarry input and CHP loads.

The specific energy is estimated at 4.58 kWh/t .

3.7.13 R & R Details

In the project area of Expansion project, there are ten (10 no.) villages (or part villages) namely Jatraj, Pali, Padania, Risdi, Sonpuri, Khodri, Churail, Amgaon, Khairbhavana and Gevra . These villages are to be shifted and properly rehabilitated to a suitable R&R site. SECL should take appropriate action for early rehabilitation. The land-use plan, details of land break up, land already acquired & to be possessed and R&R details are tentative and may change at a later stage of implementation.

3.7.14 MANPOWER & PRODUCTIVITY

The requirement of manpower at the rated capacity of 50.0 Mty has been estimated as 4130 for 330 working days. While estimating the total manpower an additional provision of 15.5% has been made for leave and sick.

The group-wise break-up of total manpower is given below:-

Sl.No.	Particulars	Nos.	% of total Manpower
1	Workers	3173	76.83
2	Monthly paid staff	717	17.36
3	Executives	240	5.81
	Total	4130	100.00

To produce additional coal and additional OB removal some additional supervision manpower will be required. Some additional manpower for blasting and transportation related operational manpower will be required. The details of additional manpower is as given below:

SL NO	PARTICULARS	CATEGORY /SCALE	MANPOWER
	OB MANPOWER		
1	PITMAN/DUMPMAN/TRIPMAN	GRADE E	4
2	MINING SIRDAR/SHORTFIRER/OVERMAN	GRADE B/C	10
3	MAZDOOR INCLUDING BLASTING	I/II	8
	SUB-TOTAL		22
	COAL MANPOWER		
a.	COAL DIRECT MANPOWER		
1	PITMAN/TRIPMAN	GRADE E	4
2	MINING SIRDAR	GRADE C	10
3	MAZDOOR	I/II	8
	SUB-TOTAL		22
b.	CHP FOR COAL TRANSPORT		

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SL NO	PARTICULARS	CATEGORY /SCALE	MANPOWER
1	ASST MANAGER (E& M)	E3	5
2	MECHANICAL FITTER	GRADE C	3
3	ELECTRICAL FITTER	GRADE C	3
4	HELPERS FOR FITTERS	I	4
5	CONVEYOR / FEEDER OPERATOR	II/II	10
6	MAZDOORS / BELT CLEANERS	I	10
SUB-TOTAL			35
n.	EMP & REHABILITATION		
1	RECLAMATION SUPERVISOR	GRADE B	2
2	MINING SIRDAR	GRADE D	2
3	MAZDOOR	I/II	2
SUB-TOTAL			6
GRAND-TOTAL			85

3.7.15 PROJECT IMPLEMENTATION SCHEDULE

It is well known fact that for timely implementation of a project, it is essential that all the activities related with project construction are properly planned, closely monitored and effectively supervised.

All implementing departments should have their own implementation manuals which are followed for monitoring and construction of the project, so that, man, materials and money are made available to the project in time as spelt in the project report, with a view to prevent cost and time over-run.

Responsibility, power for each executive to be included in the implementation manual to prevent overlapping of operational areas. Sufficient administrative and financial power to be defined for key executive to take timely and effective decisions for the implementation of the project. Time estimates are broad and indicative only, necessary modifications to suit local site conditions are to be incorporated subsequently.

3.7.16 CRITICAL ACTIVITY

Physical possession of land and R&R of villages would be required. The completion of in-pit belt conveyor installation by December 2023 is required to enhance the production capacity of the mine.

4.0 ENVIRONMENT MANAGEMENT

It is as per the EIA / EMP report of Kusmunda OC Expansion (50.0-62.50 Mty).

5.0 MINE CLOSURE PLAN**5.1 CLOSURE PLANNING DETAILS OF MINE:**

Kusmunda OCP is an operating mine under Kusmunda Area, SECL and comprises a total land of 2991.943 Ha, out of which mostly tenancy & govt. land. The project has EC of 62.50 Mty.

5.2 LAND USE

Present land use of the project as mentioned in prevailing EC is given below:

Pre Mining Land Use**Table 5. 2. a**

Sl.No	Land use	Within ML area (Ha)	Outside ML (Ha)	Total
1	Agriculture land	2110.32	-	2110.32
2	Forest land	249.903	-	249.903
3	Waste land	20.567	-	20.567
4	Grazing land	456.247	-	456.247
5	Surface water Bodies	83.377	-	83.377
6	Settlements	0	-	0
7	Other (Roads, Safety Zone etc)	71.529	-	71.529
Total		2991.943	-	2991.943

Land-Use During Mining**Table 5.2 b**

S. N.	Purpose	Land in ha
1	Area to be excavated	1600
2	Storage for Top soil	3
3	Overburden/Dumps	325
4	Mineral storage	0
5	Infrastructure (W/Shop, Admin. Building)	300
6	Roads	10
7	Green Belt	10
8	Rehabilitation Site(outside mine)	130
9	Colony(outside mine)	40.25
10	Safety Zone	153
11	Other specific (future mining)	420.693
	TOTAL	2991.943

Post-Mining

Table 5.2 c

Sl. No	Land use during Mining	Land use (Ha)				
		Plantation	Water body	Public use	Undisturbed	Total
1	External OB dump	325	0	0	0	325
2	Top soil dump	0	0	0		0
3	Excavation	1245	355			1600
4	Roads	0	0	10	0	10
5	Built up areas			470.25		470.25
6	Safety Zone				166	166
7	Undisturbed Area				420.693	420.693
	Total	1570	355	480.25	586.693	2991.943

5.3 MINE CLOSURE COST

5.3.1 Existing Mine Closure Cost as per approved MCP

As per the guidelines of the MoC, the cost of the mine closure is to be computed on the basis of the project area involved in the project.

Kusmunda OC is a running Mine with an already approved MCP by SECL Board in its 217th meeting held on 28.10.2013. Kusmunda OC has EC Production capacity of 62.5 Mty. The Mine is having active Escrow account in Union Bank of India, Bilaspur C.G, with A/c no 423803800001352 As on 31.03.2023 the Balance amount in the Escrow A/c is Rs 8593.636 Lakhs.

As per the revised Mine Closure Plan, total Corpus amount comes to Rs33220.203 Lakh and balance amount to be deposited 61828.282 Lakh after compounding @ 5% per annum. The estimated balance life of the Mine as on 01/04/2023 is 14 years.

5.3.2 Mine Closure Cost for OC mine

Mine closure cost will cover the following activities for which a corpus escrow account @ Rs. 9.0 lakhs per Ha. for OCP & @ Rs. 1.5 lakh per Ha for UG mine of the project area shall be opened with the coal controller organization. In case of mines having acid mine drainage, post closure acid mine drainage management cost shall also be included in the total closure cost.

The amount that has to be deposited in Escrow account acts as a security against the mine activities to be carried out for the closure of the mine is based on the project area.

Mining Plan for Kusmunda OCP (50.0-62.50 Mty)

The total Mining lease Area as per the proposed EC is 2991.943Ha

As per the latest guidelines of MOC, the amount to be deposited in Escrow account is evaluated as per detailed below:

TABLE-5.3a: EVALUATION OF REVISED MINE CLOSURE AMOUNT

WPI as on	Apr-19	121.1
WPI as on base date	May-23	149.4
Escalation rate of closure cost		5%
Base rate of closure cost "Rs. Lakhs/Ha"		9.00
Present rate of closure cost "Rs. Lakhs/Ha"		11.1032
Total project area in Ha		2991.943
TOTAL CORPUS "Rs. In Lakhs		33220.203
Deposit in Escrow Account "Rs. In Lakhs" as on 31.03.2023		8593.636
Net Corpus to be deposited into Escrow Account "Rs. In Lakhs		24626.567
Balance life of the mine in years as on 01.04.2023		14
Annual Closure Cost "Rs. In Lakhs"		1759.040
Total Amount to be deposited into Escrow Account after compounding @ of 5% "Rs. in Lakhs"		61828.282

TABLE-5.3b: REVISED MINE CLOSURE SCHEDULE AS PER MCP

Year	Year No	Fund Schedule in Lakh Rs	Fund to be Reimbursed (Maximum) in lakh Rs
DEPOSITED AS PER EXISTING MCP			
2020-21	1	790.27	Nil
2021-22	2	829.79	Nil
2022-23	3	871.28	Nil
2023-24	4	1759.040	Nil
2024-25	5	1846.993	Nil
Progressive	Phase-1	3606.033	50% of deposit amount at the end of phase I
2025-26	6	1939.342	Nil
2026-27	7	2036.309	Nil
2027-28	8	2138.125	Nil
2028-29	9	2245.031	Nil
2029-30	10	2357.282	Nil
Progressive	Phase-2	10716.090	50% of deposit amount at the end of phase II
2030-31	11	2475.147	Nil
2031-32	12	2598.904	Nil
2032-33	13	2728.849	Nil
2033-34	14	2865.292	Nil