MINING PLAN AND MINE CLOSURE PLAN FOR

SUBHADRA OPEN CAST COAL MINE
(Erstwhile GOPALPRASAD OCP)

Modified Mining Plan seeking approval under Rule 22E of MCR, 1960

Modification No-1

Coal Block Name: (1) Western Part of Gopalprasad West and (2) Utkal-A

Area: Western Part of Gopalprasad West – 664.71 Ha
Utkal-A - 480.19 Ha
Total - 1144.90 Ha

TALCHER COALFIELD, District – ANGUL, State – ODISHA

Applicant: GENERAL MANAGER, SUBHADRA AREA
MAHANADI COALFIELDS LIMITED
NEAR BIJU MAIDAN, ANGUL
ODISHA - 759122
Email - gmsubhadraarea@gmail.com
gm-subhadra.mcl@coalindia.in

Targeted Capacity:

(a) Rated capacity: 25.00 Million Tonne per Annum

(b) Peak capacity: Peak and rated capacities are same

Name of the Qualified Person (QP) / Accredited Mining Plan Preparing Agency:

CENTRAL MINE PLANNING & DESIGN INSTITUTE LIMITED
REGIONAL INSTITUTE-VII
Plot – E, 4; At – Samantapuri, P.O. – RRL; Bhubaneswar – 751013

18/1/22
देवाशीष रॉय
महाप्रबंधक (उत्खनन)

18/1/22
Project Officer
MCL, Subhadra

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Mty, MTY	-	Million metric tonne per year
MVA	-	Mega Volt Ampere
MW	-	Megawatt
MCL	-	Mahanadi Coalfields Limited
OC	-	Open Cast
OMC	-	Odisha Mining Corporation
P&M	-	Plant & Machinery
PR	-	Project Report
RF	-	Reduction Factor
RH	-	Relative Humidity
RITES	-	A Government of India Public limited Consulting Company
ROM	-	Run off Mines
SH	-	State Highway
t	-	Metric tonne
tph	-	tonne per hour
T	-	US TON
TAMDA	-	Talcher Angul Meramandali Development Authority
TCF	-	Talcher Coal Field
Yr	-	Year
UG	-	Under Ground
UHV	-	Useful Heat Value
V.M.%	-	Volatile Matter percentage

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LIST OF ABBREVIATIONS

A%	-	Ash percentage
CESCO	-	Central Electric Supply Company
cum	-	cubic meter
CMPDI	-	Central Mine Planning & Design Institute Limited
CMP	-	Comprehensive Master Plan
CPP	-	Captive Power Plant
CV	-	Calorific Value
dmmf	-	dry mineral matter free
E&M	-	Electrical & Mechanical
GCV	-	Gross Calorific Value
GR	-	Geological Report
Ha/HA	-	Hectares
HEMM	-	Heavy Earth Moving Machinery
HFL	-	High Flood Level
IDCO	-	Odisha Industrial Infrastructure Development Corporation
M%	-	Moisture percentage
m	-	Meter
Mcum	-	Million cubic meter
MECL	-	Mineral Exploration Corporation Limited
Max	-	Maximum
Min	-	Minimum
Mld	-	Million liter per day
MoC	-	Ministry of Coal
MoEF	-	Ministry of Environment & Forest
Mt	-	Million metric tonne

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CHECKLIST

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Chapter – 1: Project Information

	Parameters	*Details*
1.1	**INTRODUCTION**	
1.1.1	Name of Coal Block	1) Western part of Gopalprasad West 2) Utkal-A
1.1.2	Name of the Coalfield	Talcher Coalfield
1.1.3	Base date of Mining Plan	31st August, 2020
1.1.4	Linked End Use Plant	Basket linkage to consumers all over India
1.1.5	Distance of the end use plant from pit head of the project in "km"	No single end user, so not estimated
1.1.6	Mode of coal transport	Conveyor system-890m, rest rail
1.2	**Location, Topography & Communication**	
1.2.1	Location of coal deposit (District & State)	District Angul of Odisha State
1.2.2	Communication: PWD roads, railways, Air	• Rengali-Chhendipada-Angul metal road at south-west boundary • National Highway No.55 (Cuttack to Sambalpur) at 13km towards south-east • Angul rail station at 22km south of block on Talcher-Cuttack section of East Coast Railways
1.2.3	Availability of power supply, water	Power distribution system exists for domestic use. Sources of water are bore wells, dug wells, ponds and Singhada Jhor stream along north boundary.
1.2.4	Prominent physiographic features, drainage pattern, natural water courses, rainfall data, highest flood level	Surface topography is gently undulating, highest at south-west (maximum 167.50m AMSL) and lowest at north-east (107.50m AMSL). Average surface gradient is 1:120. Drainage of coal field is Brahmani River, 20km east of the block. Drainage of the block is to Singhada Jhor perennial stream at northern boundary, feeding to Brahmani River. One seasonal stream named Ghurudia traverses across the block. The mean annual precipitation is 1277mm of which 70% occurs during rainy season HFL has been interpolated from actual readings at two sites, one at 2.1km upstream and the other at 2.2km downstream. HFL lies between 125.04m and 111.16m within the stretch of the mining lease. Embankment has been designed accordingly with top 3.0m above HFL.
1.2.5	Important surface features within the project area and major diversion & shifting involved	Mostly agricultural land interspersed by forest plots, grazing land and habitations, scattered all over. Two PWD roads connect habituated areas. Cart roads are spread throughout the block. 1710m southern meandering part of Singhada Jhor River will be straightened for 1080m. Ghurudia stream of about 8.9km will be diverted by south and east of quarry for about 5.4km. About 1425 families need to be shifted. No other infrastructure runs across the property.
1.3	Details of the allotment agreement	Copy of Allotment Agreement is shown in Annexure-11
1.3.1	Name of allottee	Mahanadi Coalfields Limited
1.3.2	Details of allotment/vesting order	Copy of Allotment Order is shown in Annexure-1
1.3.3	Name and address of the applicant	**GENERAL MANAGER, SUBHADRA AREA** **MAHANADI COALFIELDS LIMITED** **Near Biju Maidan, Angul** **Angul – 759116 (ODISHA)** **Email - gmsubhadraarea@gmail.com** **gm-subhadra.mcl@coalindia.in**
1.3.4	Name of the previous allottee of the block	MJSJ Limited
1.3.5	Starting date of the mine as per CMDPA	As per approved Mining Plan January 2022

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1.3.6	Rated capacity as per CMDPA	As per approved Mining Plan January 2022
1.3.7	Production schedule as per opening permission (meeting provisions of CMDPA, if any)	As per approved Mining Plan January 2022
1.3.8	End use of coal as per allotment order, if any	As per approved Mining Plan January 2022
1.3.9	Cardinal points coordinates of the block boundary	Western part of Gopalprasad West

Pt. ID	Longitude	Latitude
1	84°59'45.97773"	20°56'07.35854"
2	84°59'44.77323"	20°56'07.34808"
3	84°59'42.32978"	20°56'07.26703"
4	84°59'37.04815"	20°56'07.17002"
5	84°59'35.56352"	20°56'07.16083"
6	84°59'33.84832"	20°56'07.11122"
7	84°59'30.03986"	20°56'07.04121"
8	84°59'26.23140"	20°56'06.97118"
9	84°59'22.42294"	20°56'06.90112"
10	84°59'22.03397"	20°56'30.62465"
11	84°59'20.28097"	20°57'50.14109"
12	84°59'19.61211"	20°58'22.37236"
13	84°59'19.32597"	20°58'46.57703"
14	84°59'20.08403"	20°58'45.91809"
15	84°59'21.02025"	20°58'45.76024"
16	84°59'21.46952"	20°58'45.64536"
17	84°59'21.86138"	20°58'45.63678"
18	84°59'22.17017"	20°58'45.59083"
19	84°59'22.56688"	20°58'45.54650"
20	84°59'22.96337"	20°58'45.51250"
21	84°59'23.28294"	20°58'45.47707"
22	84°59'23.61584"	20°58'45.49340"
23	84°59'24.01925"	20°58'45.49061"
24	84°59'24.41575"	20°58'45.45660"
25	84°59'24.70234"	20°58'45.42057"
26	84°59'25.05956"	20°58'45.38833"
27	84°59'25.57038"	20°58'45.36183"
28	84°59'25.60501"	20°58'45.36489"
29	84°59'25.67073"	20°58'45.37642"
30	84°59'25.88018"	20°58'45.34930"
31	84°59'26.22065"	20°58'45.36589"
32	84°59'26.62899"	20°58'45.29079"
33	84°59'26.84943"	20°58'45.26386"
34	84°59'27.60169"	20°58'45.21970"
35	84°59'27.92198"	20°58'45.15380"
36	84°59'28.28103"	20°58'45.06468"
37	84°59'28.62633"	20°58'45.02317"
38	84°59'28.90737"	20°58'45.00440"
39	84°59'29.20679"	20°58'45.02187"
40	84°59'29.57610"	20°58'45.05259"
41	84°59'30.02217"	20°58'45.07276"
42	84°59'30.39198"	20°58'45.07955"
43	84°59'30.86505"	20°58'45.02842"
44	84°59'31.03082"	20°58'45.03147"
45	84°59'31.14211"	20°58'45.02268"
46	84°59'31.55066"	20°58'44.93726"
47	84°59'31.92711"	20°58'44.80995"
48	84°59'32.11566"	20°58'44.73081"
49	84°59'32.19302"	20°58'44.71158"

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		50	84°59'32.28158"	20°58'44.68223"
		51	84°59'32.71620"	20°58'44.40110"
		52	84°59'32.92952"	20°58'44.18818"
		53	84°59'32.99718"	20°58'44.10682"
		54	84°59'33.17820"	20°58'43.84103"
		55	84°59'33.35170"	20°58'43.47329"
		56	84°59'33.43651"	20°58'43.07202"
		57	84°59'33.48175"	20°58'43.01090"
		58	84°59'33.55221"	20°58'42.79536"
		59	84°59'33.56492"	20°58'42.71299"
		60	84°59'33.68129"	20°58'42.34864"
		61	84°59'33.83103"	20°58'41.89672"
		62	84°59'34.00229"	20°58'41.63663"
		63	84°59'34.10878"	20°58'41.42322"
		64	84°59'34.21538"	20°58'41.04189"
		65	84°59'34.33345"	20°58'40.65169"
		66	84°59'34.47307"	20°58'40.28253"
		67	84°59'34.47457"	20°58'40.21028"
		68	84°59'34.48707"	20°58'40.13823"
		69	84°59'34.51055"	20°58'40.06639"
		70	84°59'34.57259"	20°58'39.72678"
		71	84°59'34.59844"	20°58'39.54140"
		72	84°59'34.62214"	20°58'39.45923"
		73	84°59'34.63592"	20°58'39.32525"
		74	84°59'34.67276"	20°58'39.14007"
		75	84°59'34.68762"	20°58'38.95449"
		76	84°59'34.69990"	20°58'38.89276"
		77	84°59'34.71798"	20°58'38.55235"
		78	84°59'34.73671"	20°58'38.18098"
		79	84°59'34.69856"	20°58'37.90149"
		80	84°59'34.69165"	20°58'37.70518"
		81	84°59'34.58044"	20°58'37.23849"
		82	84°59'34.54919"	20°58'37.15531"
		83	84°59'34.47743"	20°58'37.01041"
		84	84°59'34.28088"	20°58'36.64784"
		85	84°59'34.09633"	20°58'36.32139"
		86	84°59'33.96179"	20°58'36.04372"
		87	84°59'33.85275"	20°58'35.76652"
		88	84°59'33.78098"	20°58'35.53786"
		89	84°59'33.64494"	20°58'35.17685"
		90	84°59'33.52037"	20°58'34.82349"
		91	84°59'33.40722"	20°58'34.44970"
		92	84°59'33.25670"	20°58'34.01326"
		93	84°59'33.18667"	20°58'33.70088"
		94	84°59'33.09238"	20°58'33.32823"
		95	84°59'33.01089"	20°58'32.89359"
		96	84°59'33.01239"	20°58'32.82134"
		97	84°59'32.99428"	20°58'32.63515"
		98	84°59'32.95419"	20°58'32.44855"
		99	84°59'32.95180"	20°58'32.03549"
		100	84°59'32.92442"	20°58'31.76653"
		101	84°59'32.87722"	20°58'31.39394"
		102	84°59'32.87397"	20°58'31.02216"
		103	84°59'32.83753"	20°58'30.66010"
		104	84°59'32.85777"	20°58'30.21648"
		105	84°59'32.82005"	20°58'29.91634"
		106	84°59'32.88295"	20°58'29.53546"

देबाशीष राव 18/1/22
महाप्रबंधक (उत्खनन)
सी.एस.पी.डी.आई.एल., क्षेत्रीय संस्थान-7

18/1/22
प्रकल्प अधिकारी
Project Officer
MCL, Subhadra Area
एम. सि. एल. सुभद्रा क्षेत्र

107	84°59'32.90880"	20°58'29.35008"
108	84°59'32.96783"	20°58'29.15497"
109	84°59'33.00467"	20°58'28.96979"
110	84°59'33.17811"	20°58'28.55996"
111	84°59'33.28347"	20°58'28.25213"
112	84°59'33.44355"	20°58'27.95564"
113	84°59'33.56371"	20°58'27.65903"
114	84°59'33.73495"	20°58'27.39894"
115	84°59'33.82671"	20°58'27.28098"
116	84°59'33.92338"	20°58'27.08679"
117	84°59'34.12785"	20°58'26.77045"
118	84°59'34.17289"	20°58'26.71965"
119	84°59'34.24119"	20°58'26.60733"
120	84°59'34.45579"	20°58'26.33248"
121	84°59'34.56783"	20°58'26.23129"
122	84°59'34.79106"	20°58'26.07018"
123	84°59'34.98583"	20°58'25.69172"
124	84°59'35.22499"	20°58'25.29342"
125	84°59'35.56628"	20°58'24.74211"
126	84°59'35.66841"	20°58'24.58910"
127	84°59'35.75825"	20°58'24.49783"
128	84°59'35.98427"	20°58'24.20254"
129	84°59'36.31027"	20°58'23.85746"
130	84°59'36.47876"	20°58'23.68503"
131	84°59'36.60180"	20°58'23.58403"
132	84°59'36.66859"	20°58'23.54396"
133	84°59'36.85734"	20°58'23.45449"
134	84°59'37.01227"	20°58'23.40571"
135	84°59'37.40939"	20°58'23.34073"
136	84°59'37.64102"	20°58'23.30368"
137	84°59'38.20159"	20°58'23.33791"
138	84°59'38.52037"	20°58'23.34376"
139	84°59'38.71690"	20°58'23.37507"
140	84°59'39.22262"	20°58'23.37403"
141	84°59'39.44305"	20°58'23.34710"
142	84°59'39.65574"	20°58'23.34068"
143	84°59'40.02678"	20°58'23.28767"
144	84°59'40.38407"	20°58'23.28226"
145	84°59'40.65060"	20°58'23.34699"
146	84°59'41.02529"	20°58'23.38648"
147	84°59'41.15652"	20°58'23.41987"
148	84°59'41.55106"	20°58'23.47874"
149	84°59'41.94538"	20°58'23.54793"
150	84°59'42.11001"	20°58'23.56128"
151	84°59'42.45089"	20°58'23.55721"
152	84°59'42.64891"	20°58'23.55052"
153	84°59'42.85749"	20°58'23.56468"
154	84°59'43.05401"	20°58'23.63024"
155	84°59'43.33995"	20°58'23.62516"
156	84°59'43.60541"	20°58'23.54743"
157	84°59'43.99326"	20°58'23.39967"
158	84°59'44.18137"	20°58'23.34117"
159	84°59'44.63098"	20°58'23.24993"
160	84°59'44.82132"	20°58'23.22901"
161	84°59'45.21715"	20°58'23.22595"
162	84°59'45.61341"	20°58'23.20224"
163	84°59'45.81186"	20°58'23.17491"

18/01/22

देबाशीष रॉय
महाप्रबंधक (उत्खनन)
सी.एम.पी.डी.आई.एल., क्षेत्रीय संस्थान-7

18/1/22
प्रकल्प अधिकारी
Project Officer
MCL, Subhadra Area
एम. सि. एल. सुभद्रा क्षेत्र

		164	84°59'46.23160"	20°58'23.07936"	
		165	84°59'46.61794"	20°58'23.00384"	
		166	84°59'46.73883"	20°58'23.00606"	
		167	84°59'47.13315"	20°58'23.07525"	
		168	84°59'47.37470"	20°58'23.09001"	
		169	84°59'47.77139"	20°58'23.04566"	
		170	84°59'47.95885"	20°58'23.01813"	
		171	84°59'48.15687"	20°58'23.01143"	
		172	84°59'48.46607"	20°58'22.94483"	
		173	84°59'48.59058"	20°58'22.92852"	
		174	84°59'49.76374"	20°58'22.91768"	
		175	84°59'50.97944"	20°58'22.89199"	
		176	84°59'51.81742"	20°58'22.88281"	
		177	84°59'52.22935"	20°58'22.88432"	
		178	84°59'52.62555"	20°58'22.88579"	
		179	84°59'53.42826"	20°58'22.86467"	
		180	84°59'54.59330"	20°58'22.86197"	
		181	84°59'56.03520"	20°58'22.82859"	
		182	84°59'57.73272"	20°58'22.81147"	
		183	84°59'59.22972"	20°58'22.79092"	
		184	85°00'00.79736"	20°58'22.77177"	
		185	85°00'02.03045"	20°58'22.74619"	
		186	85°00'03.41599"	20°58'22.73549"	
		187	85°00'05.09548"	20°58'22.70615"	
		188	85°00'06.58848"	20°58'22.69759"	
		189	85°00'08.26699"	20°58'22.65615"	
		190	85°00'10.04980"	20°58'22.65271"	
		191	85°00'11.58494"	20°58'22.62084"	
		192	85°00'13.14487"	20°58'22.61342"	
		193	85°00'14.55790"	20°58'22.57950"	
		194	85°00'16.08302"	20°58'22.55893"	
		195	85°00'17.60054"	20°58'22.55082"	
		196	85°00'19.38392"	20°58'22.51127"	
		197	85°00'20.60038"	20°58'22.50925"	
		198	85°00'23.17896"	20°58'22.49678"	
		199	85°00'24.77417"	20°58'22.45417"	
		200	85°00'24.89282"	20°58'22.45259"	
		201	85°00'25.56536"	20°58'22.59176"	
		202	85°00'25.72891"	20°58'22.65670"	
		203	85°00'25.80584"	20°58'22.65811"	
		204	85°00'26.01271"	20°58'22.75482"	
		205	85°00'26.41675"	20°58'22.88611"	
		206	85°00'27.00589"	20°58'23.10339"	
		207	85°00'27.11514"	20°58'23.13636"	
		208	85°00'27.21383"	20°58'23.14849"	
		209	85°00'27.59611"	20°58'23.26906"	
		210	85°00'27.97880"	20°58'23.36899"	
		211	85°00'28.17597"	20°58'23.40356"	
		212	85°00'28.37250"	20°58'23.46911"	
		213	85°00'28.69111"	20°58'23.54108"	
		214	85°00'28.91961"	20°58'23.59269"	
		215	85°00'29.50012"	20°58'23.69623"	
		216	85°00'29.88410"	20°58'23.73422"	
		217	85°00'30.08127"	20°58'23.76880"	
		218	85°00'30.36550"	20°58'23.84627"	
		219	85°00'30.57408"	20°58'23.86041"	
		220	85°00'30.96862"	20°58'23.91925"	

देबाशीष रॉय 18/01/22
महाप्रबंधक (उत्खनन)
सा.एम.पी.डी.आई.एल., क्षेत्रीय संस्थान-7

19/1/22
प्रकल्प अधिकारी
Project Officer
MCL, Subhadra Area
एम. सि. एल. सुभद्रा क्षेत्र

221	85°00'31.37352"	20°58'24.00925"
222	85°00'31.57069"	20°58'24.04383"
223	85°00'31.68058"	20°58'24.04583"
224	85°00'32.04258"	20°58'24.08342"
225	85°00'32.60304"	20°58'24.09366"
226	85°00'32.80042"	20°58'24.11792"
227	85°00'33.20745"	20°58'24.10471"
228	85°00'33.58130"	20°58'24.10121"
229	85°00'33.84590"	20°58'24.06474"
230	85°00'34.20898"	20°58'24.05072"
231	85°00'34.47422"	20°58'23.98329"
232	85°00'34.88275"	20°58'23.89782"
233	85°00'35.31368"	20°58'23.79211"
234	85°00'35.50114"	20°58'23.76456"
235	85°00'35.71122"	20°58'23.70645"
236	85°00'36.09927"	20°58'23.54833"
237	85°00'36.22164"	20°58'23.47828"
238	85°00'36.40025"	20°58'23.34731"
239	85°00'36.52241"	20°58'23.28759"
240	85°00'36.85423"	20°58'23.19040"
241	85°00'37.25177"	20°58'23.10473"
242	85°00'37.67150"	20°58'23.00914"
243	85°00'37.91390"	20°58'22.98259"
244	85°00'38.31059"	20°58'22.93820"
245	85°00'38.71741"	20°58'22.93531"
246	85°00'39.50821"	20°58'22.97040"
247	85°00'39.69460"	20°58'22.99445"
248	85°00'40.05746"	20°58'22.99075"
249	85°00'40.49489"	20°58'23.10199"
250	85°00'40.83720"	20°58'23.20396"
251	85°00'41.13793"	20°58'23.37186"
252	85°00'41.32282"	20°58'23.46817"
253	85°00'41.43208"	20°58'23.50114"
254	85°00'41.81328"	20°58'23.67330"
255	85°00'41.94323"	20°58'23.76860"
256	85°00'42.33436"	20°58'23.99258"
257	85°00'42.55223"	20°58'24.08948"
258	85°00'42.77052"	20°58'24.16574"
259	85°00'43.09614"	20°58'24.36787"
260	85°00'43.29182"	20°58'24.47470"
261	85°00'43.67153"	20°58'24.71911"
262	85°00'44.03919"	20°58'25.01493"
263	85°00'44.44025"	20°58'25.29072"
264	85°00'44.65747"	20°58'25.41858"
265	85°00'45.03676"	20°58'25.68364"
266	85°00'45.42640"	20°58'25.97986"
267	85°00'45.80441"	20°58'26.30685"
268	85°00'46.02100"	20°58'26.46568"
269	85°00'46.43368"	20°58'26.71070"
270	85°00'46.82375"	20°58'26.98628"
271	85°00'47.00758"	20°58'27.13419"
272	85°00'47.33299"	20°58'27.34663"
273	85°00'47.72370"	20°58'27.59125"
274	85°00'48.11420"	20°58'27.84618"
275	85°00'48.29824"	20°58'27.98377"
276	85°00'48.52625"	20°58'28.12216"
277	85°00'48.75468"	20°58'28.23990"

18/1/22

19/1/22

देबाशीष रॉय
महाप्रबंधक (उत्खनन)
सी.एम.पी.डी.आई.एल., क्षेत्रीय कार्यालय-7

प्रकल्प अधिकारी
Project Officer
MCL, Subhadra Area
एम. सी. एल. सुभद्रा क्षेत्र

278	85°00'48.99431"	20°58'28.34753"
279	85°00'49.39665"	20°58'28.56138"
280	85°00'49.76624"	20°58'28.76430"
281	85°00'50.15994"	20°58'28.86441"
282	85°00'50.35668"	20°58'28.91963"
283	85°00'50.47633"	20°58'28.93872"
284	85°00'50.89256"	20°58'29.00515"
285	85°00'46.59978"	20°58'19.77251"
286	85°00'41.13199"	20°58'08.02186"
287	85°00'35.62155"	20°57'56.16627"
288	85°00'30.10296"	20°57'44.36421"
289	85°00'24.50115"	20°57'32.27861"
290	85°00'19.41661"	20°57'21.40395"
291	85°00'13.46319"	20°57'13.06015"
292	85°00'07.01224"	20°57'04.14472"
293	85°00'00.10791"	20°56'54.54571"
294	84°59'53.45701"	20°56'45.20357"
295	84°59'47.37762"	20°56'36.66811"
296	84°59'46.92762"	20°56'23.52351"
297	84°59'46.50473"	20°56'11.70787"

Utkal-A

Pt. ID	Longitude	Latitude
1	84°59' 19.326" E	20°58' 46.577" N
2	84°59' 19.612" E	20°58' 22.372" N
3	84°59' 20.281" E	20°57' 50.141" N
4	84°59' 22.034" E	20°56' 30.625" N
5	84°59' 22.423" E	20°56' 6.901" N
6	84°59' 22.491" E	20°56' 3.464" N
7	84°59' 22.559" E	20°56' 0.027" N
8	84°59' 22.627" E	20°55' 56.590" N
9	84°59' 18.661" E	20°55' 56.517" N
10	84°59' 14.694" E	20°55' 56.444" N
11	84°59' 10.728" E	20°55' 56.371" N
12	84°59' 6.762" E	20°55' 56.298" N
13	84°59' 2.796" E	20°55' 56.225" N
14	84°59' 1.619" E	20°56' 10.082" N
15	84°58' 58.433" E	20°56' 14.783" N
16	84°58' 56.143" E	20°56' 17.932" N
17	84°58' 49.010" E	20°56' 24.727" N
18	84°58' 47.537" E	20°56' 31.420" N
19	84°58' 47.763" E	20°56' 35.533" N
20	84°58' 47.379" E	20°56' 44.366" N
21	84°58' 45.578" E	20°56' 48.886" N
22	84°58' 44.528" E	20°56' 51.077" N
23	84°58' 44.537" E	20°56' 52.404" N
24	84°58' 44.542" E	20°56' 52.861" N
25	84°58' 44.464" E	20°56' 56.548" N
26	84°58' 44.328" E	20°57' 0.608" N
27	84°58' 44.201" E	20°57' 2.748" N
28	84°58' 44.135" E	20°57' 7.299" N
29	84°58' 44.068" E	20°57' 9.849" N
30	84°58' 44.016" E	20°57' 12.525" N
31	84°58' 43.982" E	20°57' 14.905" N

देबाशीष राय 18/01/22
महाप्रबंधक (उत्खनन)
सा.एम.पी.डी.आई.एल., क्षेत्रीय संस्थान-1

18/1/22
प्रकल्प अधिकारी
Project Officer
MCL, Subhadra Area
एम. सि. एल. सुभद्रा क्षेत्र

32	84°58' 43.899" E	20°57' 16.493" N
33	84°58' 43.831" E	20°57' 21.405" N
34	84°58' 43.786" E	20°57' 23.706" N
35	84°58' 43.716" E	20°57' 26.801" N
36	84°58' 43.715" E	20°57' 29.119" N
37	84°58' 43.630" E	20°57' 30.528" N
38	84°58' 43.522" E	20°57' 35.329" N
39	84°58' 43.475" E	20°57' 36.607" N
40	84°58' 43.444" E	20°57' 39.975" N
41	84°58' 43.373" E	20°57' 42.692" N
42	84°58' 43.338" E	20°57' 44.579" N
43	84°58' 43.255" E	20°57' 48.819" N
44	84°58' 43.136" E	20°57' 50.208" N
45	84°58' 43.098" E	20°57' 54.059" N
46	84°58' 43.029" E	20°57' 55.535" N
47	84°58' 42.970" E	20°57' 59.099" N
48	84°58' 42.897" E	20°58' 1.330" N
49	84°58' 42.844" E	20°58' 4.347" N
50	84°58' 42.761" E	20°58' 7.250" N
51	84°58' 42.717" E	20°58' 10.936" N
52	84°58' 42.668" E	20°58' 13.448" N
53	84°58' 42.607" E	20°58' 16.733" N
54	84°58' 42.547" E	20°58' 18.587" N
55	84°58' 42.525" E	20°58' 20.183" N
56	84°58' 42.490" E	20°58' 23.078" N
57	84°58' 42.437" E	20°58' 24.998" N
58	84°58' 42.422" E	20°58' 26.620" N
59	84°58' 42.383" E	20°58' 28.001" N
60	84°58' 42.392" E	20°58' 28.784" N
61	84°58' 42.440" E	20°58' 28.767" N
62	84°58' 44.544" E	20°58' 29.693" N
63	84°58' 47.389" E	20°58' 30.656" N
64	84°58' 49.790" E	20°58' 31.923" N
65	84°58' 51.923" E	20°58' 32.723" N
66	84°58' 55.261" E	20°58' 33.795" N
67	84°58' 57.893" E	20°58' 34.187" N
68	84°59' 0.531" E	20°58' 34.167" N
69	84°59' 3.068" E	20°58' 33.526" N
70	84°59' 3.735" E	20°58' 32.966" N
71	84°59' 4.959" E	20°58' 31.845" N
72	84°59' 6.293" E	20°58' 30.673" N
73	84°59' 7.732" E	20°58' 29.916" N
74	84°59' 9.602" E	20°58' 29.835" N
75	84°59' 11.026" E	20°58' 30.213" N
76	84°59' 12.878" E	20°58' 31.422" N
77	84°59' 14.232" E	20°58' 32.884" N
78	84°59' 14.487" E	20°58' 34.383" N
79	84°59' 14.304" E	20°58' 35.775" N
80	84°59' 13.018" E	20°58' 37.411" N
81	84°59' 11.462" E	20°58' 38.683" N
82	84°59' 11.173" E	20°58' 39.712" N
83	84°59' 11.433" E	20°58' 40.799" N

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		84	84°59' 12.725" E	20°58' 42.329" N
		85	84°59' 14.837" E	20°58' 44.540" N
		86	84°59' 16.222" E	20°58' 45.919" N
		87	84°59' 17.098" E	20°58' 46.646" N
		88	84°59' 17.961" E	20°58' 47.180" N
		89	84°59' 19.267" E	20°58' 47.344" N

1.4	**DETAILS OF THE PREVIOUS APPROVAL OF MINING PLAN**	
1.4.1	Date of approval	23rd April, 2009
1.4.2	Conditions, if any	i) The mining company should take all necessary precautions regarding safety of mine workings, persons deployed therein. ii) Approval of the mining plan is without prejudice to the requirement of approvals from competent/prescribed authority under relevant rules/regulations etc.
1.4.3	Scheduled year of start of production	OB removal from Yr-2 and coal production from Yr-3
1.4.4	Proposed year of achieving the targeted production	Yr-7 including construction period of 2 years
1.4.5	Date of actual commencement of mining operations, if operations already started	Mining operation has not commenced
1.4.6	Likely date of mining operations, if operations not yet started and reasons for non-commencement of operations	Blocks de-allocated, Allottee modified, Capacity increased, previously approved mining plan is no more followed.
1.4.7	Planned production and actual levels achieved in last 3 years (coal-Mt, OB-Mcum, S.R.-cum/t)	Assuming coal production would have started from 2018-19, Planned production would be- Yr-1 2018-19 3.00 Mt Yr-2 2019-20 6.00 Mt Yr-3 2020-21 9.00 Mt Mining operation has not commenced
1.4.8	Statutory obligations vis-à-vis compliance status in a tabular form	(see table below)
1.4.9	Reasons for difference in planned and actual production levels	Mining operation has not commenced

Sl. No.	Statutory Obligation	Compliance Required	Status
01	Commencement Plan	Commencement plan was required to be prepared within one month of issuance of allotment order i.e. 8.11.2021	Prepared and submitted to the Nominated Authority, MoC, on Dtd.17.12.2021.
02	Upfront Amount	Submission of first installment i.e. Rs 82,49,060.28.50 prior to issue of allotment order.	Required Amount deposited on Dtd. 09.07.2021, Vide- NEFT Transaction ID. ICICR22021070000010151 Payment reference no. CMS2016328971.
03	Performance security	Deposition of BG for Rs 554,40,00,000 prior to issue of allotment order.	Deposited vide BG No.0774921BG0000008 on Ddt. 09.07.2021.
04	Deposition of Fixed amount	Deposited with MoC for Rs. 24,33,20220 prior to issue of allotment order.	Amount deposited on Dtd. 22.07.2021. Vide-NEFT Transaction ID.ICICR22C2107220000365 9 Payment Reference No. CMS 2037654335.

1.5	**PARAMETERS OF APPROVED MINING PLAN vis-a-vis PROPOSED MINING PLAN**		
		Approved Mining plan	Proposed Mining Plan
1.5.1	Block area in "ha"	1140.66	1144.90
1.5.2	Block area projectized "ha"	1016.08	1111.85
1.5.3	Lease area "ha"	1025.93	1111.85
1.5.4	Project area "ha"	1289.93	1111.85

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1.5.5	Life of the project "yrs"	52	36
1.5.6	Minimum and Maximum depths of working "m"	23 215	23 215
1.5.7	Net Geological Block "Ha"		
1.5.8	Production target "MTPA"	15.00	25.00
1.5.9	Seams available as per G.R.	22	22
1.5.10	Seams not considered for mining with reasons	Seams I Top, I Middle, IIA, IIB, IIC, VIB I Top, I Middle, IIB & VIB were not considered in GR due to thinness and insignificant quantities. Seams IIA & IIC were not considered for mining due to thinness and irregular occurrences. Mineable thickness is attained near north boundary which is below final slope.	Seams I Top, I Middle, IIA, IIB, IIC, VIB I Top, I Middle, IIB & VIB were not considered in GR due to thinness and insignificant quantities. Seams IIA & IIC were not considered for mining due to thinness and irregular occurrences. Mineable thickness is attained near north boundary which is below final slope.
1.5.11	Gross Geological Reserve "Mt"	1096.19 Deduced by adding 10% loss considered in G.R.	1142.67 As computed for new block boundary with GCV
1.5.12	Net Geological Reserve "Mt"	986.57	1108.39
1.5.13	Blocked Reserve "Mt"	271.45	317.35
1.5.14	Mineable Reserve "Mt"	715.12	791.04
1.5.15	Extractable Reserve "Mt"	673.09	768.83
1.5.16	% of extraction/recovery	94.12	97.19
1.5.17	Reserve depleted (till base date) "Mt"	NIL	NIL
1.5.18	Balance Extractable Reserve "Mt"	673.09	768.83
1.5.19	Average Grade	UHV based Grades-C, D & E 4.5% Grade-F 30.7% Grade-G 64.8% Wt. Av. G-13	GCV based Up to G-11 17.2% G-12 25.5% G-13 34.3% G-14 & below 23% Wt. Av. G-13
1.5.20	OB in Mcum	In-situ: 644.28 Re-handling: 110.73 Total: 755.01	In-situ: 613.18 Re-handling: 103.72 Total: 716.90
1.5.21	Stripping ratio (cum/t)	Only In-situ: 0.96 With Re-handling: 1.12	Only In-situ: 0.80 With Re-handling: 0.93
1.5.22	Mining Technology	Open cast technology Coal-Surface Miner OB-Shovel & Dumper	Open cast technology Coal-Surface Miner OB-Shovel & Dumper
1.5.23	Coal beneficiation envisaged	NO	NO
1.5.24	Handling of Rejects	Not applicable	Not applicable
1.5.25	Land use pattern "Ha"		
1	Excavation area	908.12	881.28
2	Top soil dump	Not available	8.97
3	External dump	Nil	Nil
4	Safety zone	Not available	11.79
5	Other use	57.19 incl. barriers, nala diversion, embankment & roads	Road: 15.72 Nala Diversion: 6.40 Embankment: 11.19 River/nala diversion: 10.18 Explosive magazine: 5.58 Coal Stockyard: 9.76 Settling pond: 1.52 Total: 60.35
6	Infrastructure area	60.62	102.44
7	Green belt	Not available	53.12
	Total	1025.93	1111.85

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1.5.26	Reasons for Revision		1. Change in annual target 2. Change in lease boundary 3. Change in ownership 4. Change in extractable reserve

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Chapter – 2

EXPLORATION, GEOLOGY, SEAM SEQUENCE, COAL QUALITY AND RESERVE

2.1 DETAILS OF THE BLOCK

	Parameters	Details	
2.1.1	Particulars of adjacent blocks: North, South, East, West	North: Balabhara; Balabhadra West Extension South:None	East: Gopalprasad East & Eastern part of Gopalprasad west West: Utkal-B1; Utkal-C
2.1.2	Location of the Block District/State	District Angul of Odisha State	
2.1.3	Area of the Block "Ha"	1144.90	
2.1.4	Area of the geological block projectized "in Ha" (Area of the geological block considered for liquidation of coal reserve)	879.12	
2.1.5	Balance area yet to be projectized "Ha"	29.30 (North meandering Singhada Jhor)	
2.1.6	Likely Reserve in the area yet to be projectized "Mte"	73.42	
2.1.7	Cardinal Point Co-ordinates of the non-coal/lignite bearing area/**existing mining lease** outside the allotted Geological Coal/Lignite block (Duly certified in line with para 1.9 of the Guideline, if fresh mining lease required) **Cardinal points Co-ordinates of the proposed area outside the non-coal bearing area outside the allotted Geological Coal/Lignite block**	**Not applicable as proposed lease Boundary is contained within Block Boundary**	
2.1.8	Certificate of **Qualified person/Accredited Mining Plan preparing agency (MPPA)** if the project area is confined within the vested/ allotted block boundary/ **existing mining lease** Project area is same as Lease area. Mining Lease Area: 1111.85 Ha Geological Block Area: 1144.90 Ha	**Project boundary does not extend beyond the allotted geological block boundary.** **Cardinal points Co-ordinates of the proposed Lease Area considered in the Mining Plan** Mining Lease is inside Block Boundary towards south. At all other places, lease boundary is same as block boundary. Boundary of Mining Lease which is not same as Block Boundary is shown in Annexure-9 and coordinates of those ML points are given below	

ID	Latitude	Longitude
ML-1	84° 58' 47.537" E	20° 56' 31.420" N
ML-2	84° 58' 49.638" E	20° 56' 31.423" N
ML-3	84° 58' 49.813" E	20° 56' 29.780" N
ML-4	84° 58' 52.893" E	20° 56' 27.104" N
ML-5	84° 58' 56.917" E	20° 56' 23.252" N
ML-6	84° 59' 3.553" E	20° 56' 17.414" N

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		ML-7	84° 59' 11.112" E	20° 56' 9.060" N
		ML-8	84° 59' 13.183" E	20° 56' 5.796" N
		ML-9	84° 59' 13.301" E	20° 56' 4.648" N
		ML-10	84° 59' 13.303" E	20° 56' 0.886" N
		ML-11	84° 59' 17.827" E	20° 55' 58.933" N
		ML-12	84° 59' 18.245" E	20° 55' 59.281" N
		ML-13	84° 59' 19.876" E	20° 56' 0.065" N
		ML-14	84° 59' 22.539" E	20° 56' 1.023" N
		ML-15	84° 59' 22.423" E	20° 56' 6.901" N
		ML-16	84° 59' 26.616" E	20° 56' 6.978" N
		ML-17	84° 59' 27.059" E	20° 56' 7.957" N
		ML-18	84° 59' 29.355" E	20° 56' 10.012" N
		ML-19	84° 59' 32.649" E	20° 56' 13.335" N
		ML-20	84° 59' 34.199" E	20° 56' 14.626" N
		ML-21	84° 59' 36.935" E	20° 56' 16.516" N
		ML-22	84° 59' 38.331" E	20° 56' 17.305" N
		ML-23	84° 59' 38.486" E	20° 56' 17.523" N
		ML-24	84° 59' 46.681" E	20° 56' 16.637" N
2.1.9	KML file of the proposed lease area, project Area and geological block	**Note:** Printed copy of the KML file superimposed in the recent (not older than one year from the base date) dated satellite Image duly certified by Accredited Agency should also be attached. **Shown in Annexure-XII** Note: The soft copy of the KML file shall also be part of the Soft copy of the mining plan		
2.1.10	Whether the proposed project area is confined within the allotted block boundary, if not, the reason for deviation from allotted block boundary, may be given.	Yes.		
2.1.11	If the project area extends outside the allotted block boundary/**existing mining lease**, confirmation about non-occurrence of coal/lignite in the area under reference needs to be furnished.	Project area lies within block boundary		
2.1.12	Type of the project (Operating/under Implementation) and year of starting	Under implementation. Probable year of starting is 2022		

2.2 EXOPLORATION, GEOLOGCY AND ASSESSMENT OF RESERVE

2.2.1 Regional geological set up of the area, local geology, structure, stratigraphic sequence, characteristics of the litho-logical units (coal seams /parting/ overburden)

Utkal-A & West of Gopalprasad West block is located in south-central part of the Talcher coalfield. The coalfield forms the south-easternmost part of the Lower Gondwana basins restricted within northwest-southeast trending Son-Mahanadi master basin belt. The coalfield spans over an area of about 1800 sq.km with coal bearing area of about 1000 sq.km. The basin is almost rectangular in shape,

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measuring almost 80 km along the strike length (East-West) and about 26 km along the dip direction (North-South). The sedimentary strata of Talcher coalfield comprises of Talchir, Karharbari, Barakar, Barren Measures and Kamthi Formations. There is extensive mining activity of Karharbari as well as Barakar coal seams in south-eastern part of the coalfield.

Generalized Stratigraphic succession of Talcher Coalfield

Group	Age	Formation	Thickness (m)		Lithology
			From	To	
	Quaternary	Quaternary deposits	-	40+	Colluvial fills, sand, silt deposits and clay of older alluvium, older and younger floodplain deposits, channel fills etc.
	Cenozoic	Laterite	-	-	Laterites, lateritised detrital pebble bed.
GONDWANA SUPER GROUP	Upper Permian to Lower Triassic	Undifferentiated Kamthi Formation	-	575+	Fine to medium grained light grey to reddish sandstone and shale at the base and pale greenish sandstone with rare shale and pink clay bands, ferruginous coarse grained to pebbly sandstone at top.
	Unconformity				
	Upper Permian	Barren Measures	-	50+	Greenish grey to buff coloured pebbly, coarse to medium grained highly ferruginous sandstone with variable proportions of fresh K-feldspar.
	Lower Permian	Barakar Formation	-	500+	Medium to coarse grained greyish feldspathic sandstone, grey to dark grey shale and coal seams.
	Lower Permian	Karharbari Formation	-	270+	Pale brownish yellow coloured massive medium to coarse grained sandstone containing clasts of Talchir shale and coal seams.
	Upper Carboni-ferous to Lower Permian	Talchir Formation	-	110+	Diamictite, sandstone, needle shale, turbidite, rhythmites and varves.
Unconformity					
	Archae-an(?) to Lower Protero-zoic	Pre-Cambrian Metamorphics			Granites, gneisses and associated supracrustals.

2.2.2 Local geology, Structure, Stratigraphic sequence, Characteristics of the litho-logical units (coal seams partings/ overburden)

GEOLOGICAL SUCCESSION OF THE BLOCK

Considering the information available through sub-surface exploration and the information collected from neighboring blocks including geological mapping to

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the extent possible, it is confirmed that all the formations established to occur in south-central part of the Talcher coalfield are preserved in referenced block area.

STRIKE AND DIP

Within the Utkal-A & West of Gopalprasad West block the strike is generally East-West varying to ENE-WSW. The beds have low northerly dip which varies from 3° to 8° within the block. Local variations in dip and strike have been observed at places.

DESCRIPTION OF FAULTS

Twelve faults have been interpreted within the block as per nature of stratum contours or direct intersection in boreholes. The faults are generally trending east-west with both northerly and southerly dips. Details of faults are given below.

Details of faults

Fault No.	Extent	Trend	Throw	
			Direction	Amount (m)
F1A-F1A	1400 meters continues from Utkal-B1	NW-SE	South-west	0 -7
F1-F1	1150 meters continues in the east	WNW-ESE	North-East	0-10
F4-F4	1200 meters continues in the east	SW-NE swings to E-W	South	0 -42
F17-F17	650 meters abuts with F4-F4 in the west & continues in the east	ESE-WNW	South	0-5
F17A-F17A	1350 meters continues in the west & dies out at the south-central part.	E-W	North	0-20
F4A-F4A	1109 meters continues from Utkal-B1	E-W	South	0-8
F8-F8	1000 meters continues from eastern part of Gopalprasad West	E-W	North	0-28
F15-F15	2500 meters continues from Utkal-B1 & abuts with F8-F8.	WNW-ESE	South	12-16
F13-F13	1400 meters continues from Gopalprasad West	WNW-ESE	North	0-4
F16-F16	1000 meters continues from Gopalprasad West and abuts with F13-F13.	SW-NE	South	5-10
F10-F10	3300 meters continues both in Gopalprasad West & Utkal B1	E-W	South	5-25
F12-F12	2800 meters continues from Gopalprasad West	ENE-WSW	South	0-25

COAL SEAMS

In Utkal-A & West of Gopalprasad West block, Barakar Formations contains seams II A to XI in different splits. Altogether, 20 nos. of seams / split seams are reported in Barakar Formation in this block. Among these, seam IX is the most potential coal horizon in this block.

SEQUENCE OF COAL SEAMS

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The sequence of coal seams, their thicknesses and intervening parting in descending order as intersected in the boreholes drilled within the block is given below.

Sequence of coal seams with full thickness and parting intersected in boreholes

Seams / Parting	ROOF DEPTH		FLOOR DEPTH		THICKNESS		RRL		FRL		Nos. of Bh
	MIN (M)	MAX (M)	MIN (M)	MAX (M)	MIN (M)	MAX (M)	MIN (M)	MAX (M)	MIN (M)	MAX (M)	
SOIL	0	0	0	17	0	17					139
	CMTU-029	CMTU-029	CMTU-075	CMTU-036	CMTU-075	CMTU-036					
WM	0	17	2.3	29.35	0	20.55					139
	CMTU-075	CMTU-036	DMTU-032	CMTU-166	CMTU-187	CMTU-177					
OB ABOVE XI	0	0	3	75.9	3	75.9					19
	CMTU-099	CMTU-099	DMTU-178	DMTU-202	DMTU-178	DMTU-202					
XI	9.71	75.9	25.94	92.49	12.97	16.76	114.3	45.91	99.39	29.32	13
	DMTU-179	DMTU-202	DMTU-179	DMTU-202	DMTU-032	DMTU-210	CMTU-105	DMTU-202	CMTU-105	DMTU-202	
PARTING	8.92	92.49	12.06	101.6	2.24	9.11					18
	DMTU-178	DMTU-202	DMTU-178	DMTU-202	CMTU-188	DMTU-202					
X	9.61	101.6	14.88	108.64	2.64	7.52	119.06	20.21	115.05	13.17	21
	DMTU-028	DMTU-202	CMTU-167	DMTU-202	DMTU-035	DMTU-210	CMTU-167	DMTU-202	CMTU-167	DMTU-202	
PARTING	7.77	108.64	15.91	109.28	0.64	25.86					23
	DMTU-177	DMTU-202	DMTU-177	DMTU-202	DMTU-202	CMTU-184					
VIII+IX	31.71	79.3	75.94	126.02	42.3	46.72	102.21	44.9	57.98	-1.82	9
	UT-009	UT-015	UT-009	UT-015	CMTU-054	UT-015	UT-009	UT-015	UT-009	UT-015	
IX	8.89	109.28	39.54	142.4	20.47	35.26	116.05	12.53	89.05	-20.59	28
	DMTU-100	DMTU-202	DMTU-031	DMTU-202	DMTU-031	DMTU-210	CMTU-177	DMTU-202	CMTU-177	DMTU-202	
PARTING	7.51	142.4	13.21	144.26	0.38	7.19					57
	DMTU-069	DMTU-202	DMTU-069	DMTU-202	DMTU-198	DMTU-027					
VIII	5.37	144.26	15.54	156.71	4.36	14.36	115.09	-22.45	110.02	-34.9	59
	DMTU-180	DMTU-202	DMTU-180	DMTU-202	CMTU-121	DMTU-179	CMTU-191	DMTU-202	CMTU-121	DMTU-202	
PARTING	5.57	156.71	26.65	160.04	3.33	30.03					72
	DMTU-121	DMTU-202	CMTU-185	DMTU-202	DMTU-202	DMTU-182					
VII B	13.56	160.04	14.21	166.51	0.28	7.03	117.49	-38.23	115.57	-44.7	81
	DMTU-212	DMTU-202	DMTU-092	DMTU-202	DMTU-092	DMTU-212	DMTU-173	DMTU-202	DMTU-173	DMTU-202	
PARTING	14.21	166.51	26.61	174.35	7	18.59					78
	DMTU-092	DMTU-202	DMTU-092	DMTU-202	UT-009	DMTU-121					
VII A	10.78	174.35	11.17	175.53	0.25	4.6	120.75	-52.54	120.37	-53.72	85
	DMTU-151	DMTU-202	DMTU-151	DMTU-202	DMTU-044	UT-004	DMTU-209	DMTU-202	DMTU-209	DMTU-202	
PARTING	11.17	175.53	14.8	181.29	1.24	17.87					83
	DMTU-151	DMTU-202	DMTU-151	DMTU-202	DMTU-121	DMTU-209					
VI B	13.15	181.29	13.6	181.98	0.13	5.15	120.29	-59.48	119.84	-60.17	91
	CMTU-210	DMTU-202	CMTU-210	DMTU-202	CMTG-003	CMTU-180	CMTU-210	DMTU-202	CMTU-210	DMTU-202	
PARTING	13.6	181.98	21.96	187.11	1.49	13.65					91
	CMTU-210	DMTU-202	CMTU-190	DMTU-202	DMTU-114	DMTU-014					
V (A+B)	68.76	147.03	77.45	156.11	7.21	12.51	57.21	-17.56	48.52	-26.64	19
	DMTU-175	CMTU-102	DMTU-175	CMTU-102	DMTU-027	DMTU-063	DMTU-175	CMTU-102	DMTU-175	CMTU-102	
V B	21.96	187.11	25.08	193.81	0.49	7.29	120.03	-65.3	118.91	-72	75
	CMTU-190	DMTU-202	DMTU-132	DMTU-202	CMTU-124	DMTU-214	DMTU-132	DMTU-202	DMTU-132	DMTU-202	
PARTING	13.15	193.81	20.09	195.45	0.69	8.08					78
	CMTU-029	DMTU-202	CMTU-029	DMTU-202	DMTU-129	DMTU-025					
V A	10.81	195.45	12.11	196.95	0.49	4.94	129.77	-73.64	128.47	-75.14	79
	DMTU-126	DMTU-202	DMTU-126	DMTU-202	CMTU-125	DMTU-072	DMTU-126	DMTU-202	DMTU-126	DMTU-202	
PARTING	9.77	196.95	14	201.53	1.4	10.09					99
	CMTU-201	DMTU-202	CMTU-201	DMTU-202	DMTU-212	DMTU-208					
IV B	10.68	201.53	11.74	207.68	0.95	8.62	126.5	-79.72	124.5	-85.87	103
	DMTU-105	DMTU-202	DMTU-105	DMTU-202	DMTU-031	DMTU-179	CMTU-206	DMTU-202	CMTU-206	DMTU-202	
PARTING	8.5	207.68	14.22	213.81	2.14	15.18					105
	CMTU-205	DMTU-202	CMTU-205	DMTU-202	UT-009	DMTU-206					
III (A+D+E)	92.48	213.81	113.25	241.42	16.49	27.61	33.49	-92	12.72	-119.61	21
	DMTU-175	DMTU-202	DMTU-175	DMTU-202	CMTU-173	DMTU-202	DMTU-175	DMTU-202	DMTU-175	DMTU-202	

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Seams / Parting	ROOF DEPTH		FLOOR DEPTH		THICKNESS		RRL		FRL		Nos. of Bh
	MIN (M)	MAX (M)	MIN (M)	MAX (M)	MIN (M)	MAX (M)	MIN (M)	MAX (M)	MIN (M)	MAX (M)	
III (D+E)	47.48	104.27	62	118.95	12.35	15.15	87	26.87	72.48	12.19	12
	CMTU-190	CMTU-181	CMTU-190	CMTU-181	DMTU-111	DMTU-212	CMTU-190	CMTU-181	CMTU-190	CMTU-181	
III E	13.8	155.1	15.02	161.86	0.65	10.06	123.87	-37.41	122.65	-47.33	30
	DMTU-134	DMTU-035	DMTU-134	DMTU-035	CMTU-196	DMTU-214	DMTU-134	DMTU-178	DMTU-134	DMTU-178	
III E TOP	14.22	178.07	16.29	181.1	0.32	3.03	124.88	-53.87	122.81	-56.9	42
	CMTU-205	UT-015	CMTU-205	UT-015	CMTU-127	UT-015	CMTU-205	UT-015	CMTU-205	UT-015	
PARTING	9.66	181.1	11.1	182.39	0.45	3.16					44
	CMTU-208	UT-015	CMTU-208	UT-015	CMTU-187	CMTU-206					
III (AT+D+EB)	116.6	182.39	130.95	198	12.85	17.18	12.72	-58.19	-1.93	-73.6	18
	CMTU-180	UT-015	CMTU-180	UT-015	CMTU-112	CMTU-105	CMTU-036	UT-015	CMTU-180	UT-015	
III (D+EB)	24.76	115.55	33.74	127.22	7.43	15.26	114.29	19.38	105.31	6.36	21
	CMTU-206	CMTU-050	CMTU-206	CMTU-050	CMTU-191	CMTU-182	CMTU-206	CMTU-050	CMTU-206	CMTU-182	
III E BOT	11.1	44.82	13.86	47.65	1.54	3.16	93.93	129.29	91.1	126.53	5
	CMTU-208	CMTU-125	CMTU-208	CMTU-125	CMTU-205	CMTU-192	CMTU-125	CMTU-208	CMTU-125	CMTU-208	
PARTING	9.29	161.86	10.6	167.88	0.93	6.14					37
	CMTU-123	DMTU-035	CMTU-123	DMTU-035	DMTU-207	DMTU-135					
III (A+D)	106.11	162.25	119.15	176.53	8.15	16.36	9.9	-49.53	-3.14	-63.81	10
	DMTU-180	DMTU-178	DMTU-180	DMTU-178	DMTU-069	DMTU-072	DMTU-180	DMTU-178	DMTU-180	DMTU-178	
III D	10.6	167.88	12.39	175.03	0.63	8.36	128.02	-49.86	127.21	-57.01	28
	CMTU-123	DMTU-035	DMTU-133	DMTU-035	CMTU-196	DMTU-121	CMTU-122	DMTU-035	DMTU-133	DMTU-035	
PARTING	8.99	175.03	16.57	178.2	0.4	13.51					65
	CMTU-204	DMTU-035	CMTU-204	DMTU-035	CMTU-182	DMTU-134					
III A	20.87	178.2	21.45	180.2	0.28	7.54	123	-60.18	122.55	-62.18	41
	DMTU-133	DMTU-035	DMTU-133	DMTU-035	DMTU-134	DMTU-101	DMTU-130	DMTU-035	DMTU-130	DMTU-035	
III A TOP	14.24	117.6	15.08	118.85	0.15	3.29	128.86	13.17	128.02	11.92	25
	CMTU-197	CMTU-179	CMTU-197	CMTU-179	CMTU-037	CMTU-191	CMTU-197	CMTU-179	CMTU-197	CMTU-179	
PARTING	15.08	118.85	16.82	121.75	0.81	3.4					25
	CMTU-197	CMTU-179	CMTU-197	CMTU-179	CMTU-210	CMTU-037					
III A BOT	12.27	199.63	12.41	203.87	0.13	4.24	132.43	-75.43	132.29	-79.67	44
	CMTU-203	UT-015	CMTU-203	UT-015	CMTU-204	UT-015	CMTU-203	UT-015	CMTU-203	UT-015	
PARTING	12.41	241.42	21.42	253.17	2.78	21.48					116
	CMTU-203	DMTU-202	CMTU-203	DMTU-202	CMTU-208	DMTU-092					
II (D+E)	90.41	253.17	99.03	268.04	2.35	16.14	40.97	-131.36	32.35	-146.23	56
	CMTU-195	DMTU-202	CMTU-195	DMTU-202	DMTU-111	DMTU-195	CMTU-195	DMTU-202	CMTU-195	DMTU-202	
II E	14.45	176.9	14.65	182.23	0.2	7.96	137.61	-48.49	137.41	-54.79	67
	CMTU-077	CMTU-109	CMTU-077	CMTU-109	CMTU-077	DMTU-151	CMTU-077	DMTU-198	CMTU-077	DMTU-198	
PARTING	31.87	182.23	39.15	184.69	0.17	7.7					52
	CMTU-037	CMTU-109	CMTU-037	CMTU-109	CMTU-206	CMTU-123					
II D	39.15	184.69	39.21	188.8	0.06	5.47	107.4	-56.86	107.34	-60.3	52
	CMTU-037	CMTU-109	CMTU-037	CMTU-109	CMTU-037	DMTU-147	CMTU-037	DMTU-198	CMTU-037	CMTU-109	
PARTING	39.21	268.04	57.42	275.08	2.66	29.54					58
	CMTU-037	DMTU-202	DMTU-134	DMTU-202	DMTU-063	CMTU-127					
II C	47.42	275.08	47.54	282.96	0.99	7.88	107.03	-153.27	106.91	-161.15	59
	DMTU-131	DMTU-202	DMTU-131	DMTU-202	CMTU-127	DMTU-202	DMTU-131	DMTU-202	DMTU-131	DMTU-202	
PARTING	47.54	282.96	75.96	293.67	5.89	46.58					55
	DMTU-131	DMTU-202	DMTU-131	DMTU-202	DMTU-179	DMTU-105					
II (A+B)	75.96	293.67	76.56	296.5	0.28	4.46	78.49	-171.86	77.89	-174.69	68
	DMTU-131	DMTU-202	DMTU-131	DMTU-202	DMTU-129	CMTG-001	DMTU-131	DMTU-202	DMTU-131	DMTU-202	
II B	46.6	219.42	46.75	220.5	0.09	1.49	113.53	-90.92	113.38	-92	20
	CMTU-075	CMTU-109	CMTU-075	CMTU-109	CMTU-037	CMTU-029	CMTU-075	CMTU-109	CMTU-075	CMTU-109	
PARTING	21.25	220.5	49.35	221.61	0.86	58.2					21
	CMTU-080	CMTU-109	CMTU-075	CMTU-109	CMTU-035	CMTU-080					
II A	49.35	221.61	49.85	223.1	0.12	2.12	110.78	-93.11	110.28	-94.6	24
	CMTU-075	CMTU-109	CMTU-075	CMTU-109	CMTU-082	CMTU-166	CMTU-075	CMTU-109	CMTU-075	CMTU-109	

2.2.3	Geological Block Area "Ha"	1144.90
2.2.4	Status of Exploration of the block	Fully explored

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2.2.5	Area covered by 'detailed' exploration within the block (sq.km)	10.83
2.2.6	Whether entire lease area has been covered by 'detailed' exploration	No, by the definition of influence of 200m of bore hole, 1082.57 Ha is covered under "Proved" category
2.2.7	No. of boreholes drilled within the block	140
2.2.8	Whether any further exploration/study is required or suggested and time frame in which it is to be completed	Washability test may be carried out if washing is proposed in future. Time frame is not decided yet.
2.2.9	Year wise future programme of exploration	None
2.2.10	Overall borehole density within the block (no./sq.km) approx.	12.34
2.2.11	No of seams available as per GR (Geological Report)	20, including splits
2.2.12	Seams not considered for Mining with Reasons	VIB, IIC, IIB & IIA VIB, IIC, IIB & IIA are not developed within working area of the quarry, attains >1m thickness only below northern quarry slope and barrier
2.213	Dip of seam	3.48^0 (1 in 16.44) average
2.2.14	Seam wise thickness, depth and reserve	
	Parameters	**Details**

Seam	Thickness Range "m"	Floor Depth range "m"	Net geological Res "Mt"	Blocked Reserve below					Min Res "Mte"		Mining losses
				High wall section	Avoid Meandering of Singhada Jhor River	Barrier	Un-economic	Total blocked	UG	OC	
Soil	0.00-17.00	0.00-17.00									
W.M.	0.00-20.55	2.30-29.35									
OB	3.00-75.90	3.00-75.90									
Seam XI	12.97-16.76	25.94-92.49	41.09	3.69	9.56	3.94		17.19	--	23.9	0.71
P	2.24-9.11	12.06-101.60									
Seam X	2.64-7.52	14.88-108.64	23.66	2.09	4.25	2.05		8.39	--	15.27	0.45
P	0.64-25.86	15.91-109.28									
Seam VIII+IX	42.30-46.72	75.94-126.02	71.49	16.04	1.57	3.83		21.44	--	50.05	1.5
Seam IX	20.47-35.26	39.54-142.40	188.14	10.91	16.06	7.9		34.87	--	153.27	4.6
P	0.38-7.19	13.21-144.26									
Seam VIII	4.36-14.36	15.54-156.71	95.44	6.39	6.61	3.39		16.39	--	79.05	2.38
P	3.33-30.03	26.65-160.04									
Seam VIIB	0.28-7.03	14.21-166.51	44.87	5.29	3.38	1.87		10.54	--	34.33	1.02
P	7.00-18.59	26.61-174.35									
VIIA	0.25-4.60	11.17-175.53	6.51	1.07	0.24	0.39		1.7	--	4.81	0.14
P	1.24-17.87	14.80-181.29									
VIB	0.13-5.15	13.60-181.98	0	0	0	0		0	--	0	0
P	1.49-13.65	21.96-187.11									
V(A+B)	7.21-12.51	77.45-156.11	31.44	4.63	0.04	0.75		5.42	--	26.02	0.76
VB	0.49-7.29	25.08-193.81	45.94	5.8	3.23	2.24		11.27	--	34.67	1.03
P	0.69-8.08	20.09-195.45									
VA	0.49-4.94	12.11-196.95	21.51	3.28	1.1	1.08		5.46	--	16.05	0.48
P	1.40-10.09	14.00-204.53									
IVB	0.95-8.62	11.74-207.68	79.08	12.56	3.81	3.59		19.96	--	59.12	1.77
P	2.14-15.18	14.22-213.81									
III(A+D+E)	16.49-27.61	113.25-241.42	81.26	11.5	12.82	1.98		26.3	--	54.96	1.64
III(D+E)	12.35-15.15	62.00-118.95	24.17	0.2	0	0		0.2	--	23.97	0.73
IIIE	0.65-10.06	15.02-161.86	29.06	6.11	0	2.54	0.16	8.81	--	20.25	0.6
IIIE TOP	0.32-3.03	16.29-181.10	9.55	1.99	0.04	0.24	0.18	2.45	--	7.1	0.21
P	0.45-3.16	11.10-182.39									
III (ATOP+ D+EBOT)	12.85-17.18	130.95-198.00	38.43	11.98	0.19	1.25		13.42	--	25.01	0.74
IIID+EBOT)	7.43-15.26	33.74-127.22	20.91	1.74	0	0.08		1.82	--	19.09	0.57
III EBOT	1.54-3.16	13.86-47.65	1.66	0.02	0	0		0.02	--	1.64	0.05
P	0.93-6.14	10.60-167.88									
IIIA+D)	8.15-16.36	119.15-176.53	24.92	7.28	0	2.3		9.58	--	15.34	0.45

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IIID	0.63-8.36	12.39-175.03	16.11	1.4	0	0.73	0.46	2.59	--	13.52	0.4
P	0.40-13.51	16.57-178.20									
IIIA	0.28-7.54	21.45-180.20	17.79	2.13	0	0.72	0.05	2.9	--	14.89	0.44
IIIATOP	0.15-3.29	15.08-118.85	1.38	0.06	0	0		0.06	--	1.32	0.04
P	0.81-3.40	16.82-121.75									
IIIABOT	0.13-4.24	12.41-203.87	4.53	1.72	0.02	0.22		1.96	--	2.57	0.08
P	2.78-21.48	21.42-253.17									
II(D+E)	2.35-16.14	99.03-268.04	98.71	29.88	6.31	3.67		39.86	--	58.85	1.76
IIE	0.20-7.96	14.65-182.23	31.28	2.87	0	0.66	0.85	4.38	--	26.9	0.81
P	0.17-7.70	39.15-184.69									
IID	0.06-5.47	39.21-188.80	9.34	0.29	0	0.05		0.34	--	9	0.27
P	2.66-29.54	57.42-275.08									
IIC	0.06-7.88	47.54-282.96	14.35	5.06	2.83	1.21	5.25	14.35	--	0	N.A.
P	5.89-46.58	75.96-293.67									
II(A+B)	0.28-4.46	76.56-296.50	33.91	9.02	1.36	1.44	22.09	33.91	--	0	N.A.
IIB	0.09-1.49	46.75-220.50	0	0	0	0		0	--	0	
P	0.86-58.20	49.35-221.61									
IIA	0.12-2.12	49.85-223.10	1.86	0.62	0	0.03	1.21	1.86	--	0	N.A.
Total			**1108.39**	**165.62**	**73.42**	**48.15**	**30.25**	**317.44**	**--**	**790.95**	**23.65**

Note: The figure of 790.95 has been arrived by deducting "Blocked Coal" from "Vertical Block boundary" and lower unworkable seams. While working in MINEX software, the reserve was separately estimated for "Quarry" only within mine model where this figure was reported as 792.54 Mt. All estimates are based on 792.54 Mt.

*Quantity shown under head "**Avoid Meandering of Singhada Jhor River**" is for preservation of coal. The area is narrow. Attempt to mine from this project will cause loss of all coal below seam VIIB (about 32 Mt). Total coal will be attempted from Balaibadra Block (under MCL) by straightening Singhada Jhor River later.*

Seam	Ext. Res Mte			As on base date "Mte"							Reason not considered for mining
				Depletion of Reserve			Balance Reserve				
	UG	OC	High wall	UG	OC	High wall	UG	OC	High wall	Total	
Seam XI	--	23.60	--	--	--	--	--	23.60	--	23.60	
Seam X	--	15.01	--	--	--	--	--	15.01	--	15.01	
VIII+IX	--	48.88	--	--	--	--	--	48.88	--	48.88	
IX	--	148.89	--	--	--	--	--	148.89	--	148.89	
VIII	--	76.88	--	--	--	--	--	76.88	--	76.88	
VIIB	--	33.31	--	--	--	--	--	33.31	--	33.31	
VIIA	--	4.66	--	--	--	--	--	4.66	--	4.66	
VIB	--	--	--	--	--	--	--	--	--	--	No calculable quantity
VB	--	25.29	--	--	--	--	--	25.29	--	25.29	
VA	--	33.62	--	--	--	--	--	33.62	--	33.62	
IVB	--	15.59	--	--	--	--	--	15.59	--	15.59	
III(A+D+E)	--	57.49	--	--	--	--	--	57.49	--	57.49	
III(D+E)	--	53.64	--	--	--	--	--	53.64	--	53.64	
IIIE	--	23.19	--	--	--	--	--	23.19	--	23.19	
IIIE TOP	--	19.69	--	--	--	--	--	19.69	--	19.69	
III (ATOP+ D+EBOT)	--	6.83	--	--	--	--	--	6.83	--	6.83	
III(D+EBOT)	--	18.49	--	--	--	--	--	18.49	--	18.49	
III EBOT	--	24.31	--	--	--	--	--	24.31	--	24.31	
III(A+D)	--	1.58	--	--	--	--	--	1.58	--	1.58	
IIID	--	14.93	--	--	--	--	--	14.93	--	14.93	
IIIA	--	13.12	--	--	--	--	--	13.12	--	13.12	
IIIATOP	--	14.43	--	--	--	--	--	14.43	--	14.43	
II(D+E)	--	57.18	--	--	--	--	--	57.18	--	57.18	
IIE	--	25.87	--	--	--	--	--	25.87	--	25.87	
IID	--	8.61	--	--	--	--	--	8.61	--	8.61	
IIC	--		--	--	--	--	--		--		Not developed within working area of the quarry, attains >1m thickness only below northern quarry slope and barrier
II(A+B)	--	--	--	--	--	--	--	--	--	--	
IIB	--	--	--	--	--	--	--	--	--	--	No calculable quantity
IIA	--	--	--	--	--	--	--	--	--	--	Not developed within working area of the quarry, attains >1m thickness only below northern quarry slope and barrier
TOTAL	--	768.83	--	--	--	--	--	768.83	--	768.83	

Note: The above figure of 768.83 has been arrived in MINEX software, when reserve was separately estimated for "Quarry" only within mine model. Applying 3% Mining Loss on 'Mineable Reserve' of previous table (790.95), the figure would have been 767.30. All further calculations are based on 768.83 Mt.

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2.2.15 Methodology of reserves estimation (also mention if any software package has been used)

Bore hole data were interpreted from proximate analysis (I_{100}) and floor/roof of seams were finalized. Coal seams were then correlated. Band thicknesses were deleted from seam thickness to arrive at effective thickness. Both spatial and interpreted seam data were entered into MINEX software database.

With software interface and manual interpretation, deposit structure with faults and incrops were established.

Through MINEX software, volumes of each seam and parting/OB above the seam are found out in tabular form through 'Detailed Resource Reporting' menu. Band volume is added to OB above seam through built-in process.

Different specific gravities are assigned to different grades of GCV as below.

GCV WISE AND GRADE/BAND-WISE SPECIFIC GRAVITY OF COAL CONSIDERED

SL	GCV RANGE/BAND	GRADE NAME	SPECIFIC GRAVITY
1	Exceeding 7000	G-1	1.37
2	Exceeding 6700 and not exceeding 7000	G-2	1.41
3	Exceeding 6400 and not exceeding 6700	G-3	1.43
4	Exceeding 6100 and not exceeding 6400	G-4	1.47
5	Exceeding 5800 and not exceeding 6100	G-5	1.5
6	Exceeding 5500 and not exceeding 5800	G-6	1.53
7	Exceeding 5200 and not exceeding 5500	G-7	1.57
8	Exceeding 4900 and not exceeding 5200	G-8	1.6
9	Exceeding 4600 and not exceeding 4900	G-9	1.62
10	Exceeding 4300 and not exceeding 4600	G-10	1.66
11	Exceeding 4000 and not exceeding 4300	G-11	1.7
12	Exceeding 3700 and not exceeding 4000	G-12	1.72
13	Exceeding 3400 and not exceeding 3700	G-13	1.75
14	Exceeding 3100 and not exceeding 3400	G-14	1.78
15	Exceeding 2800 and not exceeding 3100	G-15	1.82
16	Exceeding 2500 and not exceeding 2800	G-16	1.86
17	Exceeding 2200 and not exceeding 2500	G-17	1.88

The following formula is considered for high moisture non-coking coal, by taking average ash% for each grade: Sp. Gr. = 1.29 + 0.01 x Ash%

Mining pits (final and stages) were designed through MINEX software. The mining pit is a sub-set of geological model where extractable reserves were found

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out for the stages. A scheduling was also performed with strips and blocks to optimize mine advance and temporary dump formation.

Coal blocked in barriers, batters and for other factors were also estimated similarly in the area concerned.

BASIC ASSUMPTIONS FOR RESOURCE ESTIMATION:

1. Quantitative and qualitative assessment of seam is based on the effective thickness of seam. All dirt bands 1m and above in thickness and thin coal/shaly coal bands sandwiched in thick dirt bands with cumulative thickness of 1m and above have been excluded from the total thickness of coal seams.
2. Since the original Geological report was based on UHV method of grading system, calculated GCV wherever determined GCV is not available has been considered for grade-wise reserve estimation in GCV system.
3. Grade-wise specific gravity has been considered for converting volume of coal into tonnage.
4. Reserve has not been calculated from the areas where seam thickness is less than 1m.
5. A deduction of 3% has been made for unforeseen geological uncertainty to obtain the net geological reserve of the seam.
6. Geovia Minex software has been used for estimation of reserve and overburden as per standard practice.
7. Average Mining Loss considered is 3% over Mineable Reserve within quarry

LIMITATIONS

1. Ash plus Moisture values considered for different categories of coal and other lithotypes are: Coal: (Ash+Moisture) upto 40 %; Shaly coal: (Ash + Moisture) > 40% upto 55 %; Carbonaceous Shale: (Ash + Moisture) > 55 % upto 75 %; Shale: (Ash+ Moisture) above 75%. High Carbonaceous Shale i.e. (Ash+Moisture) >65% upto 75% has not been taken into consideration while preparing this report.
2. Calculated GCV has been considered wherever determined GCV is not available.

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3. Original correlation as available in referenced Geological report, has been modified in some cases in order to avoid isolated zone of development with less no. of boreholes and to make proper zone of seam development and for modeling purpose in Minex software.

2.2.16	Average GCV "Kcal/kg"	3690, G-13
2.2.17	Gross Geological Reserve of the block "Mte"	1142.67
2.2.18	Net Geological Reserve of the block "Mte"	1108.46
2.2.19	Mineable Reserve of the block "Mte"	790.95
3.2.20	Blocked Reserve "Mte"	317.51
3.2.21	Corresponding extractable reserve of the block "Mte"	768.83
3.2.22	Percentage of Extraction	67.28 (Extractable upon Gross)
3.2.23	Reserve already depleted (base date of Mining Plan)	Nil
3.2.24	Balance Reserve (as on Base Date)	768.83 Mt

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Chapter - 3

MINING

3.1 MINING METHOD

3.1.1 Existing Method of Mining if the mine is under operation

Mine is not under operation.

3.1.2 Proposed method of mining with justification on suitability of method of mining

Seams to be worked

Seam Name	Splits	Combinations
XI	None	None
X	None	None
IX	None	With VIII
VIII	None	With IX
VII	VIIB & VIIA	None
V	VB & VA	Combined at some places
IVB	None	None
III	III E Top, III E Bottom, III D, III A Top, III A Bottom	A+D+E, D+E, E, A Top+D+E Bottom, D+E Bottom, A+D
II	IIE & IID	D+E

Choice of Mining Method

Open cast Mining with full mechanization by deploying high capacity shovels, drills, surface miners, loaders and matching dumpers.

Justification for Optimization of targeted capacity

Coal is to be transported by rail/ ship to various power plants all over India as part of overall Coal India Limited. After estimating overall demand from this coalfield, evacuation & carrying capacity of existing and proposed rail infrastructure and technical feasibility of annual face advance of mine working, the rated capacity was decided to be 25 Mt.

Sequence of mining

Considering proper conservation of coal, economy of the project and maximum backfilling, excavation will begin in two quarries. It is observed that thick partings lie between seams V and VIIA, seams VIIA and VIIB to VIII. Other partings in

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between lower seams are also thick towards rise side. Attempt to start only from south side will face very high requirement of overburden removal in the beginning and will not be economically optimum. Seams VIII and IX are thick with low stripping ratio. Extraction of only upper seams will surely earn high return but will render lower seams towards rise side uneconomical. Extraction up to lowest workable seam starting near incrop of seam VIII was also studied but backfilling starts very late and requirement of outside dump is very high. If lower and upper seams are extracted in such combination such that stripping ratio can be maintained at sustainable level, the objectives of preservation, economy and maximize backfilling are fulfilled. Extraction of upper seams (named UPPER QUARRY) will start from incrop of seam VIII whereas extraction of lower seams (named MAIN QUARRY) will commence from final southern boundary as proposed.

With improvement in stripping ratio for lower seams towards dip side, production from Main Quarry will be increased with consequent reduction from Upper Quarry, ultimately merging them in Yr. P-9. Coal extracted from Upper Quarry is 47.59 Mt at stripping ratio of 0.55 cum/t. During this period, coal extracted from Main Quarry is 173.52 Mt at stripping ratio of 1.47 cum/t. Main Quarry will continue towards dip direction.

Production scheduling

First two years are proposed for construction activities after getting 'Consent to Establish'. Mine is planned to achieve its target capacity in five years from start of coal production. So, out of 34 years of production, 4 years are built-up, 28 years are for rated production and 2 years are of tapering.

Equipment configuration

For better management and higher capacity utilization, larger size excavators have been proposed. The compressive strength of overburden lies generally within 250-350 kg/cm2 which can be easily drilled and blasted. There is no adverse report of boulder formation in neighboring mines. Hydraulic shovels of high capacities are available from various manufacturers. When compared with rope shovels, they are better in maneuverability and have lesser cycle time. Their modular design guarantees higher availability. They are also most useful for

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selective mining of bands and for wide variations in strata thicknesses from 1 m to more than 30m.

Two sizes of hydraulic excavators have been proposed in OB. 10-11 cum face shovel/backhoe having 900-1000 HP (rated) will work with 100 T rear dumper. 6-7 cum hydraulic shovel will work with 60T rear dumpers. Electrical version is proposed for 10.5cum shovel as electricity is cheaper and causes less pollution. Surface Miner of 3.5-4m wide drum fitted with 900-1000 HP engine in windrowing method is proposed for coal cutting. Loose coal will be heaped and loaded by FELs with bucket size of 6.5-6.7cum onto 60T rear dumpers. Provision has been kept for 5% coal to be drilled and blasted at ramps created by surface miner. Drilled & blasted coal will be handled by FELs.

Two types of drills have been proposed. These are 250 mm and 160 mm categories. 250 mm drills will be deployed for benches of 7-14 m, 160 mm drills are for benches up to 7m. Electric version is proposed for 250mm drill.

Dozers of 850 HP with rippers in two machines and 410 HP have been provided. At places ripping-dozing and loading by front-end-loaders have to done for seams/partings around 1-2 m thick. Other supporting equipment like graders, cranes, tyre-handler etc, of appropriate sizes have been provided.

For "MDO" variant, the mine operator may have some flexibility in selecting equipment configuration and minimum sizes may be prescribed by the mine owner at the time of tendering.

Brief description of all operations

Winning

Surface Miner of 3.5-4m wide drum fitted with 900-1000 HP engine in windrowing method is proposed for coal cutting. Loose coal will be heaped loaded by FELs with bucket size of 6.5-6.7cum onto 60T rear dumpers. Provision has been kept for 5% coal to be drilled and blasted at ramps created by surface miner. Drilled & blasted coal will be handled by FELs.

Transport

The 500 KV DC power line cannot be dismantled or relocated. There is no possibility of liquidating the eastern batter and barrier. So, the eastern quarry slope will be filled progressively as the mine advances towards north. Flank roads are proposed on eastern slope for hauling OB to internal dump. The flank roads

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are at 30m vertical intervals matching with levels of internal dump tiers. Dumpers carrying OB will travel along benches towards east to meet the flank roads. Temporary ramps may be required to reach the nearest levels of flank roads.

There is possibility of liquidating the western batter and barrier in consultation with owners of adjacent western blocks. So, floor haul road is proposed along the western floor boundary of the quarry.

Coal will be carried to level roads on western slope by dumpers and to surface through western flank roads, then through floor haul road up to receiving hoppers, near to quarry mouth. From there, series of conveyors will carry coal up to two over-ground bunkers. Another series of conveyors will transport coal to sets of surge bins for loading onto rail wagons. Provision has been kept for Feeder Breaker of 1.25 Mt annual capacity to handle drilled and blasted coal at surface near mine entry.

Due to repeated faulting of the geological structure, the floor haul road will need filling and cutting required to maintain constant gradient of 1 in 16. Major uses floor haul road are transport, installation and maintenance of main pumps at sump.

OB from Upper Quarry will be kept in temporary external dump. Roads are proposed near both east and west boundaries. The eastern road will be used to carry back re-handled dump OB to void of Main Quarry. Part of OB from Main Quarry during initial years will also be kept in temporary external dump towards north. Transport of this OB is proposed by eastern boundary.

Blasting

Soil and 75% of weathered mantle will not require drilling and blasting. Re-handled OB is also not considered for blasting. Hard OB will be drilled for blasting. Thick partings and OB of more than 7m will be drilled by 250mm electric drills and thinner partings of 3-7m height will be drilled by 160 mm diesel drills. Drilling and blasting parameters are to be arrived after conducting a series of trial blasts. Following blasting pattern is tentatively suggested based on the average powder factors of mines of Talcher Coalfield as 2.46 cum of OB per kg of explosive as in 2017.

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Blasting pattern

Description	Bench height	Blasting pattern
Overburden	13-15m	9.5m x 7.5m
Overburden	11-13m	8.5m x 6.5m
Overburden	9-11m	7.5m x 5.5m
Overburden	3-9m	6.5m x 5m

Sight-mix-slurry explosives will be used for better contact inside blast hole. Explosives may be outsourced but blasting will be done mandatorily under supervision of owner's competent persons.

Overburden removal and disposal

Soil and 75% of weathered mantle will not require drilling and blasting. Re-handled OB is also not considered for blasting. Hard OB will be drilled for blasting. Thick partings and OB of more than 7m will be drilled by 250mm electric drills and thinner partings of 3-7m height will be drilled by 160 mm diesel drills.

Hydraulic shovels of 10-11cum bucket are proposed for thick partings while hydraulic shovels with 6-7cum bucket are proposed for thin partings.

OB from 'Upper Quarry' will be stored at temporary dump on surface within future excavation area, which will run for 9 years. Backfilling in 'Main Quarry' will start in 2nd year of production but can accommodate part of OB removal only. So, simultaneous backfilling with temporary storage on surface will continue till 11th production year.

From 12th production year, OB from temporary dump on surface will be brought back into mine void and simultaneously, all fresh OB removed will also be backfilled completely.

All dumps will be made in tiers of 30m height with 30m berm in between. Overall slope angle will not be more than 28^0. Top of dump will be maintained with gentle slope to drain off rain water.

Life of the mine furnishing the assumptions made and the detailed computations

Life of the mine: 36 years, including two construction years without coal or OB removal.

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Assumptions made:

Within two years' of construction period,

- MCRL will lay rail corridor
- CHP and other infrastructure will be complete
- Work order for MDO will be issued
- Consent to operate is obtained. It proceeds approval of Project Report, Mining Plan, EMP, Forest clearance, NPV payment, tree felling etc.
- Required land for year wise operation is under physical possession
- Mine will produce coal as per planned program

Location of Mine Opening

Access trench & selection of site thereof

The reasons for two quarries have been explained above. Both the quarries will start simultaneously. They will have separate access trenches. Locations of access trenches were decided based on seam thicknesses, initial depth, alignment of haul road inside mine, planning of internal dump and minimum obstruction from surface features.

Access trench for Main Quarry is proposed towards west, as haul road will be aligned along western boundary. The initial quarry depth is lowest here. Attention has been given to avoid forest land near mine entry as much as possible.

Access trench for Upper Quarry is proposed centrally to strike width. Though eastern side is more suitable because Main Quarry will take longer time to reach this part, but anticipating longer time taken for rehabilitation of displaced village towards east, access near village has been avoided. It is estimated that access trench for Upper Quarry can continue up to Yr.-11 before excavation by Main Quarry merges with Upper Quarry. By this time, link between Upper and Main Quarries can be established by excavating about 12 m of top overburden along western boundary.

Mining system (geometry and bench parameters

Benches will be aligned along general strike. Bench floor should follow own seam floor/roof or that of adjacent seam. Main bench parameters for above mentioned equipment are:

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Maximum bench height:

10.5 cum Hydraulic Shovel: 14 m

6.5 cum Hydraulic Shovel: 9.5m

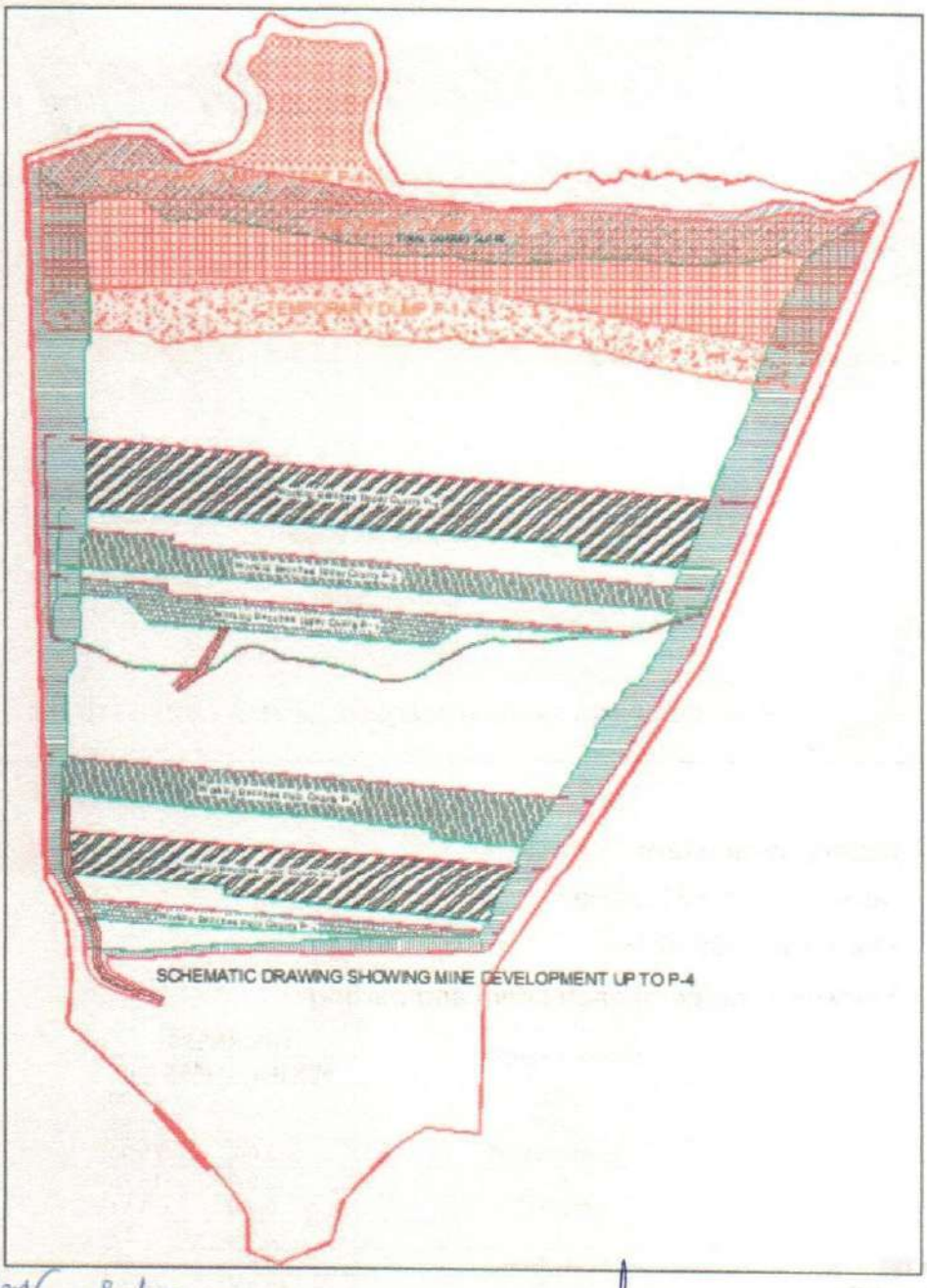
Bench width in overburden

10.5 cum hydraulic shovel: 42/22 m (working/non-working)

6.5 cum hydraulic shovel: 36/20 m (working/non-working)

Working angle: 70^0 for individual OB bench and 64^0 for surface miner in coal

Sequence of development along with a drawing



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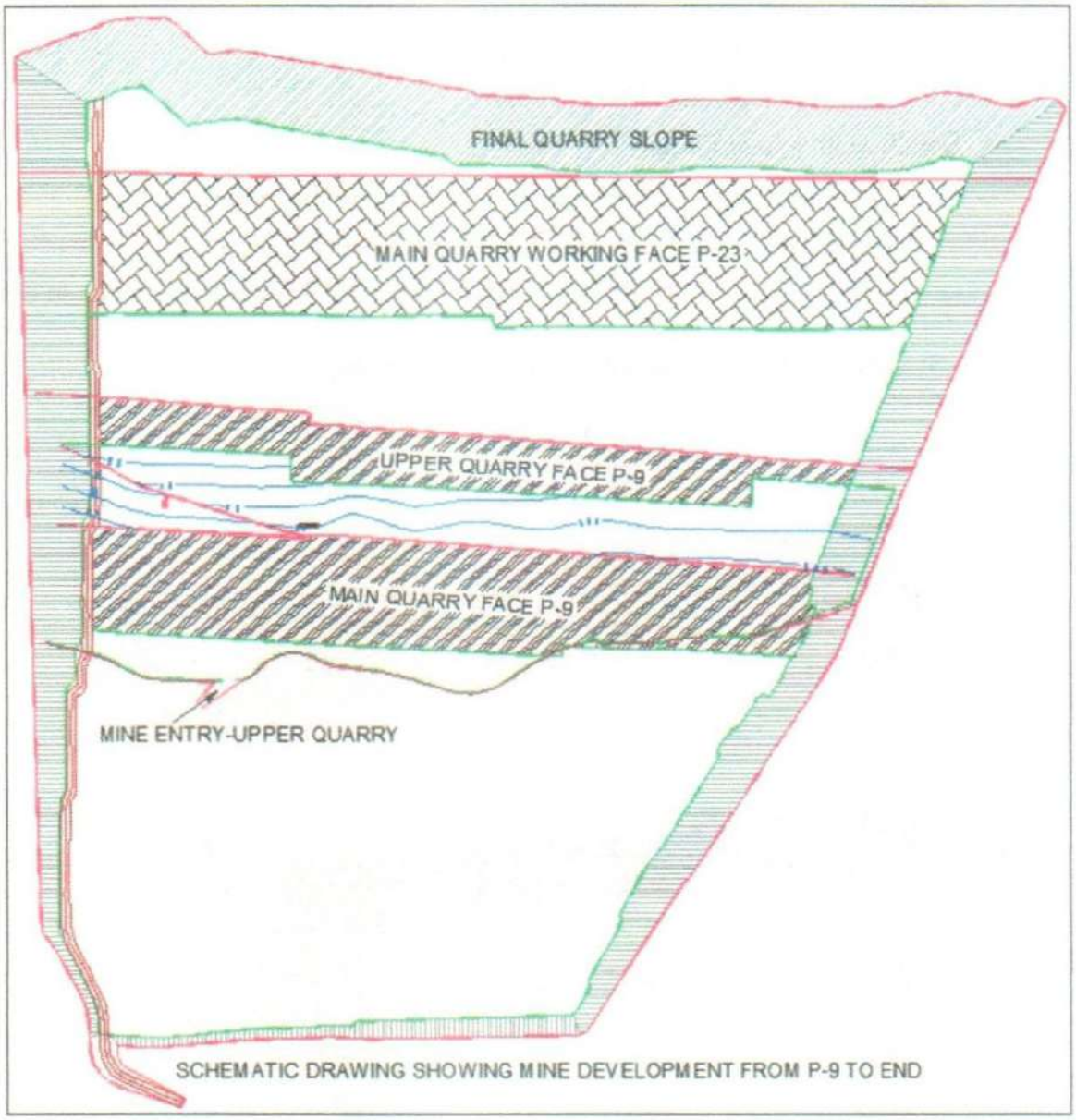

Quarry parameters

Surface area: 881.28 Ha

Floor area: 686.97 Ha

Thickness range of each seam and parting

Seams / Parting	THICKNESS	
	MIN (m)	MAX (m)
SOIL		17.00
WM		20.55
OB ABOVE XI	3.00	75.90
XI	12.97	16.76
PARTING	2.24	9.11
X	2.64	7.52
PARTING	0.64	25.86
VIII+IX	42.30	46.72

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Seams / Parting	THICKNESS	
	MIN (m)	MAX (m)
IX	20.47	35.26
PARTING	0.38	7.19
VIII	4.36	14.36
PARTING	3.33	30.03
VII B	0.28	7.03
PARTING	7.00	18.59
VII A	0.25	4.60
PARTING	1.24	17.87
VI B	0.13	5.15
PARTING	1.49	13.65
V (A+B)	7.21	12.51
V B	0.49	7.29
PARTING	0.69	8.08
V A	0.49	4.94
PARTING	1.40	10.09
IV B	0.95	8.62
PARTING	2.14	15.18
III (A+D+E)	16.49	27.61
III (D+E)	12.35	15.15
III E	0.65	10.06
III E TOP	0.32	3.03
PARTING	0.45	3.16
III (AT+D+EB)	12.85	17.18
III (D+EB)	7.43	15.26
III E BOT	1.54	3.16
PARTING	0.93	6.14
III (A+D)	8.15	16.36
III D	0.63	8.36
PARTING	0.40	13.51
III A	0.28	7.54
III A TOP	0.15	3.29
PARTING	0.81	3.40
III A BOT	0.13	4.24
PARTING	2.78	21.48
II (D+E)	2.35	16.14
II E	0.20	7.96
PARTING	0.17	7.70
II D	0.06	5.47

Minimum and maximum depth: 23m and 215m respectively

Volume of excavation

Coal: 477.90 Mcum

Waste: 613.18 Mcum (in-situ)

Total: 1091.08 Mcum

Re-handling: 103.72 Mcum

Stripping ratio: 0.93 cum/t

Volume of internal and external dump, areas & heights

Temporary External Dump			Internal Dump		
Volume (Mcum)	Area (Ha)	Height (m)	Volume (Mcum)	Area (Ha)	Max.Height (m)
103.72	238.09	Max. 88m	613.18	723.66	184.50

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Seam wise calendar programme of excavation

YR/SEAM	XI	X	IX	VIII	VIIB	VIIA	VB	VA	IVB	IIIET	IIIEB	IIID	IIIAT	IIIAB	IIE	IID	TOTAL
P-1	0.00	0.00	0.54	2.48	0.00	0.00	0.01	0.01	0.09	0.10	0.16	0.40	0.01	0.01	0.19	0.00	4.00
P-2	0.00	0.00	2.51	3.47	0.00	0.00	0.06	0.06	0.38	0.40	0.65	1.58	0.05	0.06	0.78	0.00	10.00
P-3	0.00	0.00	2.79	3.22	0.00	0.01	0.33	0.16	0.95	0.88	1.41	3.29	0.11	0.15	1.66	0.04	15.00
P-4	0.00	0.00	2.78	3.21	0.04	0.07	1.95	0.56	2.14	1.27	1.97	2.92	0.30	0.43	1.98	0.38	20.00
P-5	0.00	0.00	3.44	2.56	0.06	0.09	2.65	0.75	2.91	1.72	2.67	3.98	0.40	0.57	2.69	0.51	25.00
P-6	0.00	0.00	3.46	2.55	1.38	0.38	2.29	0.98	2.52	1.33	2.14	3.41	0.73	0.62	2.56	0.65	25.00
P-7	0.00	0.00	3.44	2.57	1.47	0.40	2.26	0.99	2.50	1.30	2.12	3.38	0.75	0.61	2.55	0.66	25.00
P-8	0.00	0.00	1.72	1.27	1.72	0.45	2.61	1.14	2.83	1.52	2.43	3.86	0.90	0.76	2.97	0.82	25.00
P-9	0.00	0.00	3.21	2.39	1.62	0.36	2.24	0.97	2.30	1.34	2.09	3.21	0.84	0.81	2.64	0.98	25.00
P-10	0.00	0.00	0.00	0.00	2.07	0.47	2.89	1.25	2.96	1.74	2.69	4.14	1.09	1.04	3.40	1.26	25.00
P-11	0.00	0.02	0.98	0.38	1.98	0.44	2.71	1.20	2.81	1.62	2.53	3.90	1.02	0.99	3.21	1.21	25.00
P-12	0.03	0.15	8.47	3.32	1.20	0.15	1.43	0.78	1.62	0.81	1.28	1.94	0.54	0.62	1.77	0.89	25.00
P-13	0.03	0.15	8.49	3.31	1.21	0.15	1.42	0.78	1.63	0.82	1.28	1.94	0.54	0.61	1.76	0.88	25.00
P-14	0.03	0.15	8.49	3.31	1.20	0.15	1.42	0.78	1.63	0.81	1.29	1.94	0.54	0.62	1.76	0.88	25.00
P-15	0.03	0.15	8.48	3.31	1.20	0.16	1.42	0.78	1.62	0.81	1.28	1.95	0.54	0.62	1.76	0.89	25.00
P-16	0.03	0.15	8.49	3.31	1.21	0.15	1.42	0.78	1.63	0.81	1.28	1.94	0.54	0.61	1.77	0.88	25.00
P-17	0.03	0.15	8.49	3.32	1.20	0.15	1.42	0.78	1.62	0.81	1.28	1.94	0.54	0.62	1.76	0.89	25.00
P-18	0.03	0.15	8.49	3.31	1.20	0.15	1.42	0.78	1.63	0.81	1.29	1.95	0.54	0.61	1.76	0.88	25.00
P-19	0.03	0.15	8.48	3.31	1.21	0.15	1.42	0.78	1.63	0.81	1.28	1.94	0.54	0.62	1.76	0.89	25.00
P-20	1.37	0.87	7.90	3.04	1.05	0.12	1.29	0.65	1.59	0.77	1.15	1.81	0.46	0.49	1.61	0.83	25.00
P-21	1.81	1.09	7.67	2.95	1.01	0.11	1.24	0.60	1.59	0.76	1.12	1.78	0.44	0.46	1.55	0.82	25.00
P-22	1.80	1.09	7.70	2.97	1.01	0.10	1.24	0.60	1.58	0.75	1.12	1.78	0.44	0.45	1.56	0.81	25.00
P-23	1.80	1.10	7.69	2.96	1.01	0.11	1.24	0.61	1.59	0.75	1.11	1.77	0.44	0.45	1.55	0.82	25.00
P-24	1.80	1.09	7.68	2.95	1.01	0.11	1.24	0.60	1.59	0.76	1.12	1.78	0.44	0.45	1.56	0.82	25.00
P-25	1.81	1.09	7.69	2.97	1.01	0.11	1.24	0.60	1.58	0.75	1.11	1.77	0.44	0.46	1.55	0.82	25.00
P-26	1.80	1.09	7.69	2.96	1.01	0.10	1.24	0.60	1.59	0.76	1.12	1.78	0.44	0.45	1.56	0.81	25.00
P-27	1.80	1.10	7.66	2.97	1.01	0.11	1.24	0.61	1.59	0.75	1.12	1.78	0.44	0.45	1.55	0.82	25.00
P-28	1.80	1.09	7.71	2.96	1.01	0.11	1.24	0.60	1.58	0.75	1.11	1.77	0.44	0.45	1.56	0.82	25.00
P-29	2.02	1.05	6.97	2.81	0.99	0.08	1.27	0.61	1.60	0.79	1.21	1.96	0.47	0.50	1.78	0.89	25.00
P-30	2.52	0.94	5.34	2.49	0.96	0.04	1.32	0.63	1.61	0.85	1.41	2.37	0.54	0.61	2.32	1.05	25.00
P-31	2.52	0.95	5.35	2.48	0.95	0.03	1.33	0.64	1.61	0.85	1.41	2.37	0.54	0.60	2.32	1.05	25.00
P-32	2.01	0.76	4.27	1.99	0.77	0.03	1.06	0.50	1.29	0.68	1.13	1.90	0.43	0.48	1.86	0.84	20.00
P-33	1.51	0.57	3.20	1.49	0.57	0.03	0.79	0.38	0.97	0.51	0.85	1.42	0.33	0.36	1.39	0.63	15.00
P-34	0.99	0.37	2.11	0.98	0.38	0.01	0.52	0.25	0.63	0.33	0.55	0.94	0.21	0.24	0.91	0.41	9.83

P denotes Production Year which starts after two years of construction period

Timeframe for commencement of Backfilling & justification thereof

Southern part of the block is narrow. North-south stretch below proposed quarry limit is around 1000 m and width is about 1500m. Out of this 1500 m by 1000 m land, appreciable area is forest. Permanent infrastructure is not proposed within 300m of quarry limit. Provision has been made for infrastructure avoiding forest area as much as possible. Requirement of external dumping was estimated 103.72 Mcum. North & west are restricted by Singhada Jhor and private mining block respectively. Hingula OCP in adjacent east has been planned for expansion and land scarcity is also acute for that project. Forest land stretches further east and dumping space is not available anywhere towards south and east within 5 km.

It was also found that seam thicknesses rapidly increase from central part towards north with commensurate decrease in parting thicknesses. The split

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sections of many seams also combine. This geological change improves stripping ratio drastically towards north.

Taking advantage of reduced stripping ratio from production year-12, the overburden required to be kept in external dump can be kept temporarily towards northern side within block boundary can be re-handled back to quarry void simultaneously with in-situ OB generation. In Departmental Variant, the excess capacity of HEMM due to reduction in stripping ratio have been utilized for re-handling, spanning from Year P-13 up to Year P-25 at average rate of 8.99 Mcum per year.

Top level of this dump is 200 m AMSL, formed in three tiers, each with a maximum height of 30 m. Individual tiers will be maintained at 37^0 with overall angle lying between 27^0 and 28^0. It is advised to conduct slope stability studies for prediction of safe overall slope angle. Slope failure prediction radars have been provided for full time online monitoring.

A safety distance of 100m has been kept between toe of temporary external dump and surface excavation of operating quarry. Schedule has been made in such a manner that quarry advance and re-handling of temporary external dump are synchronized, not to be interfered by each other.

By the end of Year P-25, when re-handling of external dump is completed, the internal dump is required to be filled up to 160m level above MSL. With further reduction in stripping ratio, OB of internal dump in tier 130-160m can be pushed inside quarry void towards north-east up to surface level. As the surrounding surface level is about 130m, the backfilled and reclaimed quarry can be handed over to the State Government or original owners for agricultural purpose. Quantity of OB in internal dump tier 130-160m is 61.65 Mcum in-situ equivalent and will be handled in 5 years starting on Year P-34 to finish on 2nd year of post-closure.

The swell factor considered for OB of the dumps is 1.15 considering long term compaction. All figures given here are in-situ equivalent. Year wise schedule of dumping to different locations is given in table below.

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Year-wise Dump Schedule (values in Mcum, in-situ equivalent)

Year	Upper Quarry to Temp. Ext. Dump	Main Quarry to Temp. Ext. Dump	Total OB to Temp. Ext. Dump	Upper Quarry to Embankment	Main Quarry to Internal Dump	Temp. Ext. Dump to Internal Dump	Total OB to Internal Dump
Yr-3	4.28	6.13	10.41		0.24		0.24
Yr -4	4.34	9.51	13.85		4.66		4.66
Yr -5	2.95	8.23	11.18	0.19	10.79		10.79
Yr -6	2.89	7.91	10.80		17.09		17.09
Yr -7	3.13	7.52	10.65		20.72		20.72
Yr -8	2.77	7.88	10.65		20.65		20.65
Yr -9	2.51	8.14	10.65		20.38		20.38
Yr -10	1.11	9.54	10.65		20.21		20.21
Yr -11	2.08	6.03	8.11		22.80		22.80
Yr -12		4.27	4.27		20.30		20.30
Yr -13		2.50	2.50		21.20		24.28
Yr -14					20.81	6.58	29.80
Yr -15					17.16	6.58	26.15
Yr -16					17.17	9.87	26.16
Yr -17					17.20	9.87	26.19
Yr -18					14.98	9.87	23.97
Yr -19					17.18	9.87	26.17
Yr -20					17.16	9.87	26.15
Yr -21					17.12	9.87	26.11
Yr -22					17.10	9.87	26.09
Yr -23					17.08	9.87	26.07
Yr -24					13.39	6.58	22.38
Yr -25					13.39	5.02	15.14
Yr -26					13.39		13.39
Yr -27					13.39		13.39
Yr -28					13.34		13.34
Yr -29					12.65		12.65
Yr -30					12.60		12.60
Yr -31					12.63		12.63
Yr -32					12.71		12.71
Yr -33					10.86		10.86
Yr -34					11.02		11.02
Yr -35					9.08		9.08
Yr -36					8.82		8.82
Total	**26.06**	**77.66**	**103.72**	**0.19**	**509.46**	**103.72**	**612.99**

Total in-situ OB is placed at two locations, 'embankment' (0.19) & 'internal dump' (612.99) totaling 613.18 Mcum

It is necessary to raise internal dump top level to 160m AMSL, which is about 30m above adjacent ground level. In order to convert the OB dump are to agricultural land post mining, a proposal is placed to re-handle OB above adjacent ground level as given in table below.

Year	Re-handling OB above ground level in Internal Dump to mine void
Yr -34	7.23
Yr -35	7.14
Yr -36	9.62
PC-1	12.56
PC-2	12.55
PC-3	12.55
Total	**61.65**

'P' for Production year; 'PC' for Post-Closure year

3.1.3 Coal production capacity proposed "Mtpa": 25.00

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3.1.4 Justification for optimization Coal production capacity (In Maximum 500 words)

Coal is to be transported by rail/ ship to various power plants all over India as part of overall Coal India Limited. After estimating overall demand from this coalfield, evacuation & carrying capacity of existing and proposed rail infrastructure and technical feasibility of annual face advance of mine working, the rated capacity was decided to be 25 Mt.

3.1.5 Calendar year from which the production will start: 2024

3.1.6 Year of Achieving rated production: 5th year from start of production

3.1.7 Tentative Coal production Plan "MT" for the entire life of the mine

Year		Coal Production Schedule				
Year of Operation	Calendar Year	UG	OC	Total	OB "MM³"	SR
Up to 31.03.2022		Nil	Nil	Nil	Nil	NA
Y-1 / Cons-1	2022-23	Nil	Nil	Nil	Nil	NA
Y-2 / Cons-2	2023-24	Nil	Nil	Nil	Nil	NA
Y-3 / Prod-1	2024-25	Nil	4.00	4.00	10.65	2.60
Y-4 / Prod-2	2025-26	Nil	10.00	10.00	18.51	1.79
Y-5 / Prod-3	2026-27	Nil	15.00	15.00	22.16	1.39
Y-6 / Prod-4	2027-28	Nil	20.00	20.00	27.89	1.43
Y-7 / Prod-5	2028-29	Nil	25.00	25.00	31.37	1.25
Y-8 / Prod-6	2029-30	Nil	25.00	25.00	31.30	1.24
Y-9 / Prod-7	2030-31	Nil	25.00	25.00	31.03	1.22
Y-10 / Prod-8	2031-32	Nil	25.00	25.00	30.86	1.22
Y-11 / Prod-9	2032-33	Nil	25.00	25.00	30.91	1.23
Y-12 / Prod-10	2033-34	Nil	25.00	25.00	24.57	1.01
Y-13 / Prod-11	2034-35	Nil	25.00	25.00	26.78	1.01
Y-14 / Prod-12	2035-36	Nil	25.00	25.00	29.80	1.05
Y-15 / Prod-13	2036-37	Nil	25.00	25.00	26.15	1.05
Y-16 / Prod-14	2037-38	Nil	25.00	25.00	26.16	1.06
Y-17 / Prod-15	2038-39	Nil	25.00	25.00	26.19	1.06
Y-18 / Prod-16	2039-40	Nil	25.00	25.00	23.97	1.06
Y-19 / Prod-17	2040-41	Nil	25.00	25.00	26.17	1.06
Y-20 / Prod-18	2041-42	Nil	25.00	25.00	26.15	1.06
Y-21 / Prod-19	2042-43	Nil	25.00	25.00	26.11	1.06
Y-22 / Prod-20	2043-44	Nil	25.00	25.00	26.09	0.94
Y-23 / Prod-21	2044-45	Nil	25.00	25.00	26.07	0.94
Y-24 / Prod-22	2045-46	Nil	25.00	25.00	22.38	0.81
Y-25 / Prod-23	2046-47	Nil	25.00	25.00	15.14	0.75
Y-26 / Prod-24	2047-48	Nil	25.00	25.00	13.39	0.55
Y-27 / Prod-25	2048-49	Nil	25.00	25.00	13.39	0.55
Y-28 / Prod-26	2049-50	Nil	25.00	25.00	13.34	0.55
Y-29 / Prod-27	2050-51	Nil	25.00	25.00	12.65	0.55
Y-30 / Prod-28	2051-52	Nil	25.00	25.00	12.60	0.54
Y-31 / Prod-29	2052-53	Nil	25.00	25.00	12.63	0.54
Y-32 / Prod-30	2053-54	Nil	25.00	25.00	12.71	0.54
Y-33 / Prod-31	2054-55	Nil	25.00	25.00	10.86	0.54
Y-34 / Prod-32	2055-56	Nil	20.00	20.00	11.02	0.54
Y-35 / Prod-33	2056-57	Nil	15.00	15.00	9.08	0.60
Y-36 / Prod-34	2057-58	Nil	9.83	9.83	8.82	0.76

Start year is tentatively assumed based on present state of preparation.

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3.1.8 Rate Capacity "Mtpa"

By OC: 25.00
By UG: Nil
Overall: 25.00

3.1.10 Whether the proposed external OB dump site is coal/lignite bearing: If so, whether coal/lignite below waste disposal area is extractable

No land is required for permanent external dump.

Due to non-availability of land nearby, OB otherwise required to be taken to external dump, will be kept within future excavation area towards north. This OB will be re-handled into mine void in future.

3.1.11 Whether negative proving for coal/lignite in the proposed site for OB dump/infrastructure has been done

No. There will not be any permanent external dump.

Stripping ratio lines and start of lowest coal seam in infrastructure area are shown below.

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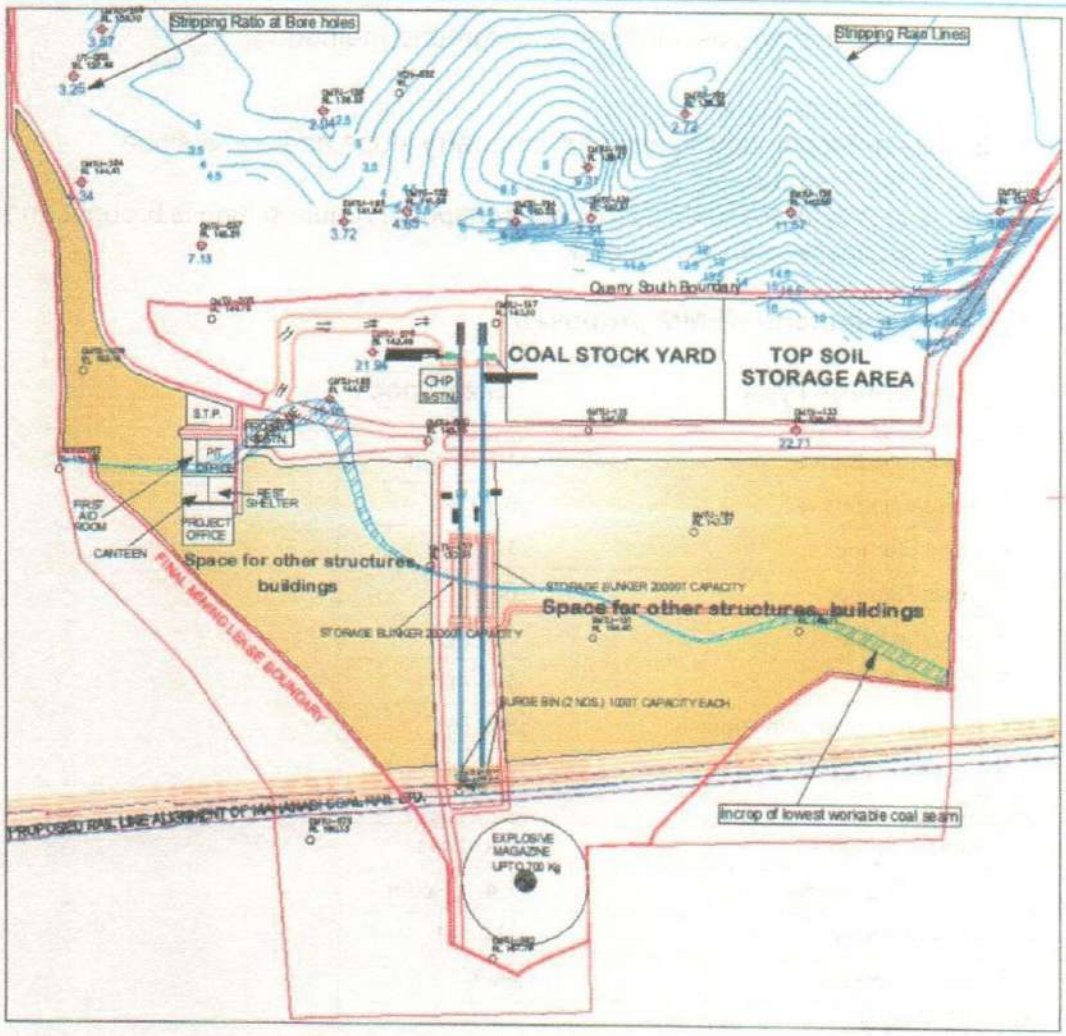

Data is available in two bore holes in area south of proposed quarry. Stripping ratios are 21.94 and 22.71. From trend of stripping ratio lines, it is evident that south of proposed quarry area is uneconomical. However, if in future, part of this area becomes economical, receiving hoppers, coal stock yard and top soil storage area will be re-located for whatever coal can be extracted.

3.1.12 Results of any investigation carried out for scientific mining, conservation of minerals and protection of environment: future proposals

Investigations carries out:

1. Remodeling geological structure and re-assessment of coal resource as per GCV, which has increased coal resource
2. Reduction in geological loss, which has increased mineable reserve
3. Social Impact Assessment Study by Rural Development & Management Studies (IRDMS), Bhubaneswar
4. Wild Life Conservation Plan
5. Study of hydrological impact due to proposed diversion of Singhada Jhor and Ghurudia Nala

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6. Alternative mining possibility by underground method

Future proposals:
1. Empirical Slope stability analysis for quarry slope and dump slope
2. Washability study
3. In-pit conveyor applicability for coal transport if required land is brought under physical possession well ahead

3.1.13 Type of Equipment/ HEMM proposed

	Equipment Type	Size/Specs
A:	***OVERBURDEN***	
1.	Hydraulic Shovel	10-11 cum
2.	Hydraulic Shovel	6-7 cum
3.	Rear Dumper	100 T
4.	Rear Dumper	60 T
5.	Electric Drill	250 mm
6.	Diesel Drill	160 mm
7.	Crawler Dozer with Ripper	850 HP
8.	Crawler Dozer	410 HP
B.	***COAL***	
1.	Surface Miner	50t Class
2.	Front End Loader	7.4-7.7 cum
3.	Wheel Dozer	450 HP
4.	Rear Dumper	60 T
C.	***COMMON***	
1.	Rough Terrain Crane	75 T
2.	Tyre Mounted Telescopic Crane	25 T
3.	Pick-n-Carry Crane	10 T
4.	Fork Lift Truck	5 T
5.	Water Sprinkler	28 KL
6.	Diesel Hyd. Backhoe	1.5 cum
7.	Truck Mounted Mobile Canon/Atomizer	
8.	Tyre Handler for up to 100T Dumper	
9.	Vibratory Compactor	10t
10.	Motor Grader	280 HP
11.	Fire Tender	14 KL
12.	Fuel Bowser	20 KL

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Chapter – 4

SAFETY MANAGEMENT

4.1.1 SAFETY MANAGEMENT

Major risks and uncertainties

INNUNDATION

Singhada Jhor River flows along the northern boundary. It is perennial in nature though remains almost dry in summer season. Width of the river is about 30m and depth is about 5m.

HFL is available at a road bridge at about 3km upstream and at northern boundary of adjacent Hingula working open cast mine at about 2km downstream. HFL has been interpolated from these two available figures for this OCP.

Embankment has been proposed 3m above HFL along Singhada Jhor with side slope at 1:2 (1vertical: 2 horizontal) and top width of 10m. Necessary steps will be taken to make it stable for long time. Watchman will be posted during heavy down pour to monitor water level. Temporary OB dump is placed south of this embankment which surely will prevent any inrush of water for 23 years.

Ghurudia nala flowing across the property from south west to north east will be diverted along eastern boundary. Catchment area has been studied and flow estimated. Section of diversion will be capable of handling one and half times of historical maximum rainfall.

ADJACENT WORKING

Surface barrier of 15m will be maintained at western boundary between adjacent mines. Barrier width is 45m at eastern boundary from 500KV DC power line. Equal barrier has been kept from adjacent Hingula mine also.

GEO-MINING DISTURBANCES

No threat is perceived from geo-mining disturbances. This area is also not prone to earthquake.

SLOPE STABILITY

Quarry slope design is shown in the next drawing. Quarry depth at this drawing is 120m. Average slope will be about 40^0 for depth up to 50m and may be about 35^0 for depth of about 200m.

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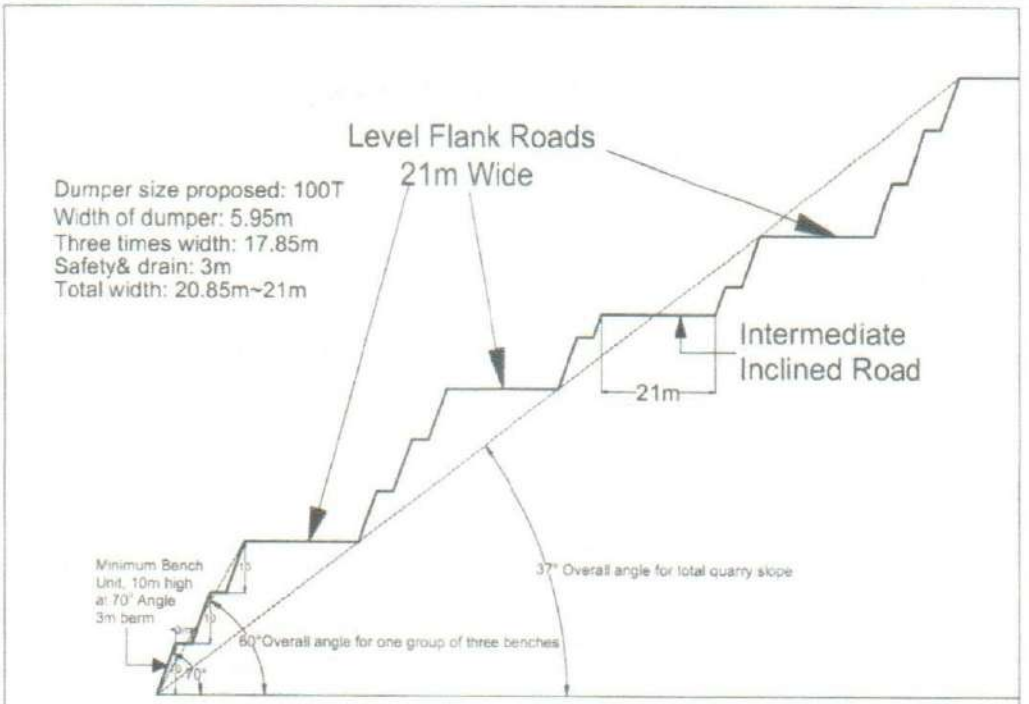

Standard Quarry Slope Profile

For OB dumps, tires will be maintained with height of 30m each and maximum 90m above ground level. Intermediate berms will be 30m wide. Overall slope angle will be 26-28 degrees.

The Project Proponent commits to undertake empirical slope stability study before mine starts and filed data based study during mining at regular intervals.

FIRE

Use of surface miner reduces chance of crack formation in coal strata and chance of spontaneous fire is greatly reduced.

Total coal handling system is mechanized with rapid loading system on rail. Coal at stock will remain for very short period. Fire-fighting truck and fog canons have been proposed as mitigating measures.

DISASTER MANAGEMENT

It will be taken care at three levels. At level-1, proper planning will be done to reduce accidents. At level-2, monitoring and awareness campaign will be carried out. Even after that any accident happens, damages to workers will be taken care by mine's safety department, rescue department and at Central Hospital about 20km away.

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4.1.2 **A Commitment from the Company Board** that entire mining operation will be carried out as per the Statutory provision given under Mines Act 1952, Coal Mine Regulation 2017 and wherever specific permission will be required the company will approach the concerned authorities.

Declaration of Commitment is attached as Annexure-VI.

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Chapter – 5

INFRASTRUCTURE FACILITIES

5.1 MINE INFRASTRUCTURE REQUIRED

ELECTRICAL

- In-coming 33 kV power line
- Project sub-station
  - 6.6 kV to electrical HEMM
  - 3.3 kV & 415V to mine pumps
  - 11 kV/415v/230V to mine illumination
  - 11 kV/230V to buildings
  - All power distribution network
- CHP sub-station
- Control rooms
- Electrical Repair Workshop & Store

MECHANICAL

- Coal receiving hoppers 20 numbers, 100t each and access road Feeder breaker and conveyors with transfer points
- Ground bunkers for temporary storage, 2 numbers, 20,000 t each
- Surge bins 2 numbers with pre-weigh hoppers
- Rail sidings 4 numbers with shunt-back system
- Repair workshop and store

COMMON

- Project Office, Pit Office, Rest Shelter, First-aid Center, Canteen, wash room
- Sewage Treatment Plant, Effluent Treatment Plant
- Approach road, roads to infrastructure, roads for maintenance
- Water supply arrangement to mobile sprinklers, fixed sprinklers, workshops, offices, workers' quarters (if any)
-

6.2 Power Supply and Illumination

Incoming arrangement: Through one number of 33kV double circuit overhead transmission line drawn from the 120 MVA, 132KV/33KV Nandira sub-station of MCL for length of 15 km.

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Project Sub-station

- 3X10 MVA, 33/6.6 kV
- Two numbers of transformers each of 33/6.6 kV, 10 MVA capacity

The major functional components at the proposed project substation are comprised of:

- Outdoor installations
- Indoor installations
- 6.6 kV Outdoor Type Switch Board
- 160 kVA 33 kV/415v Station Transformer
- 63 kVA 33 kV / 230v (L-L) Lighting Transformer

Protection of Substation

Control

Vacuum Circuit Breakers conforming to IS: 2516 (current) will be used for incoming feeder control and primary control of the 10 MVA transformers. The secondary of 10 MVA transformers will be grounded through suitably rated resistor for restricted earth neutral system and will be provided with relays for protection from earth fault.

Protection against lightning

Station class lightning arrestors conforming to IS: 3070 and IS: 15086 will be provided on 33 kV side and 6.6 kV side in the substation outdoor switch yard for protection against lightning and will be connected to separate earth pits. Shield wires will be provided over the outdoor yard equipment and will be connected to separate earth pits for protection against direct lightning strokes.

Earthing

In order to maintain the earth resistance of the substation below 1 ohm, sufficient numbers of earth pits will be provided in the substation premises. All these earth pits will be interconnected. Substation earthing will conform to IS: 3043 (current).

Outdoor switchyard will have mat earthing system. The earth pits shall be constructed as per Indian Standard.

Fire fighting Protection for 33/6.6 KV 10 MVA Power Transformers

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The automatic nitrogen injection firefighting system has been proposed for the 10 MVA transformers including the conservation tanks, the bushings and the bottom area.

POWER FACTOR IMPROVEMENT

In order to maintain a high system power factor of around 0.98, three sets of 6.6 kV capacitor banks each having a capacity of 2600 kVAR at project substation will be provided in the 6.6 kV switch boards.

QUARRY POWER SUPPLY DISTRIBUTION

Separate 6.6 kV overhead lines with ACSR 'DOG/ wolf' conductors will be drawn for feeding power to HEMMs (shovels & drills), pump houses, quarry lighting, workshop and colony etc. At required locations power will be tapped by providing pole mounted Isolator and cables to feed power to corresponding HEMM equipment through field switch.

Three numbers of 3-panel 6.6 kV outdoor type switchboard, five numbers of 4-panel 6.6 kV outdoor type switchboard and three numbers of 5-panel 6.6 kV outdoor type switchboard provided near main pump houses.

For power supply to face pumps and other LT pumps, one number of 100 kVA 6.6/0.415 kV and two numbers of 350 kVA 6.6/0.415 kV unitized substations have been provided.

ILLUMINATION

Quarry illumination: 200/180W LED flood/street light mounted on fixed supports.
Permanent Illumination inside the quarry: 200/180W LED flood/street light fittings.
The haul roads for trucks and dumpers: 150 W LED flood/street light fittings.

13 nos. of 20 meters high mast lighting tower with control panel for quarry lighting consisting of 8 numbers of 300 W LED flood/street light fittings for working zones.

18 nos. of 18 m height self-supporting trolley mounted, steel wheel telescopic tilting tower cum search light consisting of 8 numbers of 300 W LED flood/street light fittings for illumination of quarry lighting and spoil dump illumination at strategic locations.

13 nos. of portable Inflatable light & generator set with tower height 4 m to 5 m and generator motor 1.2 kVA, tank capacity 5 liters, 220V, 400 W light brightness 40000 lumen, engine 4 stroke with inbuilt trolley & telescopic support has been provided for quarry lighting.

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6.3 Drainage & pumping

Make of water and pump specification

Based on continuous rainfall of 155mm and with proper back filling, the make of water has been assessed. Five days pumping time has been envisaged to dewater the backlog due to heavy downpour as stipulated above.

Requirement of pump has been shown in the table below:

Sl. No.	Particulars	Total Required
1	Centrifugal pump cap-120 lps, head-150 m , power-300 kw with electrical , 6.6 kV	5
2	Centrifugal pump cap-180 lps, head-200 m , power-490 kw with electrical , 6.6 kV	5
3	Centrifugal pump cap-225 lps, head-250 m , power-900 kw with electrical , 6.6 kV	8
4	Slurry pump cap-70lps. head-54 m , power-75kw, with electrical at 415 V	2
5	Slurry pump capacity 16 lps. head-35 m,power-30kW, with electrical 415 V	2
6	Centrifugal face pump cap-38 lps. head-30 m, power-15kw with electrical 415 V	4
7	Diesel pump, capacity 80 lps, head 120m	2

Selection of pumps

The different additional pumps has been provided as below:

Main pumps

Main pumps will handle the quantity of water inflow during a day of peak rainfall in monsoon in excess of the capacity of the sump.

The additional main pump selected for is as under:

Discharge	120 lps	Head	150 m
Power	300 kW	Voltage	6.6 kV
Population	5 (4+1)		

These pumps will work as main pump during initial period. In later stage it will be utilised as stage pumping to feed main sump.

The other additional main pump selected as is under: -

a)	Discharge	180 lps
	Head	200 m
	Power	490kW
	Voltage	6.6kV
	Population	5 (4+1)

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The final stage main pump selected as is under:

Discharge	225 lps
Head	250 m
Power	900kW
Voltage	6.6 V
Population	8 (6+2)

These pumps will work as main pump during the entire life of the project. These pumps will be installed in the main sump.

Face pumps

Water stagnated on the haul roads, near the working faces and from undesirable water pockets, will be handled by the face pumps of the following specifications.

Discharge	38 lps
Head	30 m
Power	15 kW
Voltage	415 V
Population	4

Other pumps

During rainfall, the water inflow into the sump will contain clay & silt. To handle slurry water, four numbers of slurry water pumps of 70 lps capacity, 54 m head & power 75 kW and 16 lps capacity, 35 m head & power 30 kW have been provided in the quarries.

5.4 Coal handling arrangement

The coal handling arrangement shall have the following provisions:

- 25 Mty of coal produced will be carried by tipping trucks / dumpers and unloaded into any of the 20 nos. over ground truck receipt hoppers of 100 t capacity each situated at two different places and very small amount of coal produced by feeder breaker (2 nos.) of capacity 400t.
- For the dispatch of 25 Mty coal, series of Belt conveyors have been installed.

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- Two nos. of over ground bunker of 20000t capacity each and dispatching through the Rapid loading system (RLS). The coal dispatch system will be done through 2 nos. of rapid loading system.
- Necessary Dust suppression and firefighting system with other ancillary has also been proposed.

The surface layout plan has shown mine entries, truck receiving hopper complex, belt conveyors, over ground bunker, Rapid loading system etc. The quality of coal is Grade G-13 (GCV).

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Chapter – 6

LAND REQUIREMENT

6.1 LAND REQUIREMENT

6.1.1 Total land requirement for the mine in "Ha"

Land Type		Area
Tenancy	Agricultural	661.70
	Township	0.000
	Grazing	0.000
	Barren	0.000
	Water Bodies	6.280
	Road	0.250
	Community/other use	28.27
Govt. Non Forest	Agricultural	138.80
	Township	0.000
	Grazing	58.67
	Barren/other use	92.64
Forest	Reserve	0.75
	Protected	0.00
	Revenue	124.49
Mining Lease Area		1111.85

Source: Signed table of above information by SO (L&R), SO (Survey) & P.O. of the project sent via email dated 30-09-2020.

6.1.2 'During Mining' Land Use Details

Type	Land use (Proposed)	Land Use (End of Life)	Land Use (Post Closure)						
			Agricultural land	Plantation	Water Body	Public/ Company Use	Forest Land (Returned)	Unplanted	Total
Excavation Area	881.28	881.28							
Backfilled Area	715.24	715.24	532.72	182.52					715.24
Excavated Void Without plantation	130.68	130.68						130.68	130.68
Water harvesting	35.36	35.36			35.36				35.36
Top Soil Dump	8.97	8.97	8.97						8.97
Coal Stock Yard	9.76	9.76	9.76						9.76
External Dump	24.17	24.17	24.17						24.17
Safety Zone	11.79	11.79		11.79					11.79
Haul Road between quarries	Nil	Nil							0.00
Road diversion	Nil	Nil							0.00
Nala Diversion & Settling pond	8.42	8.42				8.42			8.42
Roads, buildings & infrastructure Sub-total	Road: 15.72	Road: 15.72				15.72			143.50
	Township: 25.86	Township: 25.86				25.86			
	Infra: 101.92	Infra: 101.92	101.92						
	143.50	143.50							
Rationalization area	Shown in green belt	Shown in green belt							0.00
Garland drains	Negligible	Negligible							0.00
Embankment	11.49	11.49				11.49			11.49

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Type	Land use (Proposed)	Land Use (End of Life)	Land Use (Post Closure)						
			Agricultural land	Plantation	Water Body	Public/ Company Use	Forest Land (Returned)	Unplanted	Total
Green Belt	6.89	6.89		6.89					6.89
Water Reservoir near pit	Nil	Nil							0.00
UG entry	None	None							0.00
Undisturbed/ ~~mining right for UG~~	Nil	Nil							0.00
Explosive Magazine	5.58	5.58		5.58					5.58
Pit head power plant	Nil	Nil							0.00
Agricultural land	Nil	Nil							0.00
Total	1111.85	1111.85	667.54	206.78	35.36	61.49	0.00	130.68	1111.85

6.1.3	Surface features over the block area	Mostly agricultural land interspersed by forest plots, grazing land and habitations, scattered all over. Two PWD roads connect habituated areas. Cart roads are spread throughout the block.
6.1.4	No. of villages/House to be shifted	9 villages
6.1.5	Population to be affected by the project	1870 families
6.1.6	Proposed Rehabilitation program	R&R program is attached as Annexure-X
6.2	**DETAILS OF LEASE**	
6.2.1	Status of Lease	Acquired under CBA (A&D) Act-1957 in the year 2007 & 2013
6.2.2	Existing Lease Area "Ha"	1111.85 Ha
6.2.3	Period for which Mining Lease has been granted/is to be renewed/is to be applied for	40 years
6.2.4	Date of expiry of earlier Mining Lease, if any	Not applicable
6.2.5	Whether the lease boundary/required boundary / required boundary is same as mentioned in the allotment order	Lease boundary proposed is same as Project boundary and is within allotted block boundary
6.2.6	Lease Area (applied/ required) as per the Mining Plan under consideration (Ha)	1111.85
6.2.7	Whether the applied lease area falls within the allotted block	Yes
6.2.8	Area (Ha) of lease which falls outside the delineated Block Boundary/ Existing Mining Lease	Not applicable
6.2.9	Details of outside area:	
	• Whether forms part of any other coal block	Not applicable
	• Whether it contains any coal/lignite reserves	Not applicable
	• Purpose for which it is required, e.g. roads/ OB dumps/ service buildings/ colony/ safety zone/ others (specify)	Not applicable

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6.2.10	**Whether some part(s) of the allotted block has not been applied for mining lease**	Yes
	- Total area in Ha of such part(s)	33.05
	- Total reserves in such part(s), (Mt)	Not estimated as are is non-coal bearing.
	- Brief reasoning for leaving such part(s)	14.20 Ha lies in Durgapur Reserve Forest area, non-coal bearing and not required for mining purpose. 11.33 Ha is in non-coal bearing area, small part of large village Balichandrapur, which will not be acquired and not required for mining use. 7.52 Ha comes under State Highway-63 & area south of it, which is non-coal bearing and not envisaged for use at present.

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Chapter – 7

ENVIRONMENTAL MANAGEMENT

7.1 ENVIRONMENTAL AMANAGEMENT

	Parameters	Details
7.1	**Commitment from the project proponent that the company will comply Environment and Forest condition stipulated in the respective clearance**	Declaration by GM Subhadra Area has given written commitment that the company will comply Environment and Forest conditions stipulated in the respective clearances. The same is attached as Annexure-VI

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Chapter – 8

PROGRESSIVE & FINAL MINE CLOSURE PLAN

8.1 LAND DEGRADATION AND RESTORATION SCHEDULE

8.1.1 Tentative Land Degradation and Technical Reclamation (Cumulative Area "Ha")

Year/Stage (Life of the mine plus post closure period)		Land Degraded				Technically Reclaimed Area			
		Excavation	Dump (Extn. + Top soil)	Infra/ others	Total	Backfill	Dump (Extn. + Top soil)	Others	Total
Up to Base Year*		Nil	Nil	Nil	Nil	Nil	Nil	Nil	Nil
Y-1, Cons-1	2022-23	0.00	8.97	102.75	111.72	0.00	0.00	0.00	0.00
Y-3, Prod-1	2024-25	79.89	63.01	212.82	355.72	0.00	0.00	0.00	0.00
Y-5, Prod-3	2026-27	192.15	200.62	210.99	603.76	0.00	9.49	0.00	9.49
Y-10, Prod-8	2031-32	467.25	255.04	209.16	931.45	80.13	238.09	0.00	318.22
Y15, Prod-13	2036-37	560.80	247.48	207.36	1015.64	169.55	238.09	0.00	407.64
Y-20, Prod-18	2041-42	648.93	241.32	205.49	1094.75	276.93	206.07	0.00	483.00
Y-25, Prod-23	2046-47	768.83	121.42	205.49	1095.74	380.56	27.19	0.00	407.75
Y-30, Prod-28	2051-52	865.06	25.19	205.49	1095.74	587.42	27.19	0.00	614.61
Y-36, Prod-34	2057-58	881.28	8.97	205.49	1095.74	687.48	27.19	0.00	714.67
Post closure									
Y-39, PC-3	2060-61	881.28	8.97	205.49	1095.74	723.66	36.16	123.29	883.11

Total lease: 1111.85 ha. Area not degraded includes area for explosive magazine with safety, parts of residential colony and areas in-between lease and quarry boundaries.

8.1.2 Tentative Biological Reclamation (Cumulative in "Ha")

Year/Stage (Life of the mine plus post closure period)		Biologically Reclaimed Area					Forest land (Return)	Undisturbed to be left for public/ com use	Total
		Agriculture	Plantation	Water Body	Public/ Company Use	Total			
Up to Base Year*		Nil	Nil	Nil	Nil	Nil	Nil	Nil	Nil
Y-1, Cons-1	2022-23	Nil	19.13	0.00	0.00	19.13	Nil	Nil	19.13
Y-3, Prod-1	2024-25	Nil	28.69	2.00	0.00	30.69	Nil	Nil	30.69
Y-5, Prod-3	2026-27	Nil	47.82	2.40	17.07	67.29	Nil	Nil	67.29
Y-10, Prod-8	2031-32	Nil	111.64	2.88	17.07	131.59	Nil	Nil	131.59
Y15, Prod-13	2036-37	Nil	175.44	3.46	17.07	195.97	Nil	Nil	195.97
Y-20, Prod-18	2041-42	Nil	229.68	4.15	17.07	250.90	Nil	Nil	250.90
Y-25, Prod-23	2046-47	Nil	274.36	4.98	17.07	296.41	Nil	Nil	296.41
Y-30, Prod-28	2051-52	Nil	346.23	5.97	17.07	369.27	Nil	Nil	369.27
Y-36, Prod-34	2057-58	Nil	390.91	7.17	17.07	415.15	Nil	Nil	415.15
Post closure									
Y-39, PC-3	2060-61	621.09	223.93	32.37	75.22	952.61	Nil	Nil	952.61

Areas not degraded will be heavily planted and biologically reclaimed.

8.2 Existing water bodies

Singhada Jhor River flows west to east along northern boundary. The southern meandering encroaches quite large area and it is proposed to straighten that part for more coal extraction.

Ghurudia nala flows across the property and meets Singhada Jhor near north-east. This is seasonal and is proposed to be diverted by south and then by east. As it comes through adjacent Utkal-C and Utkal-B1 blocks, it is expected that this nala will be diverted at further upstream by owners of adjacent blocks.

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Other small streams entering into the property from east are proposed to be diverted by Hingula Expansion OCP.

There are ponds and wells all around the property. One small reservoir towards south is shown in topographical map used for irrigation. With resettlement of villages, these will not be required anymore.

Water coming from outside property will be diverted without using to original destination, Singhada Jhor River. Settling pond is proposed just before release of water into the river.

8.3 Post Closure Water Quality Management

The development of the open pits, stockpiles, waste rock dumps, CHP and infrastructure often interrupt some of the natural drainage paths. Interference with drainage patterns may result in deprivation of water to drainage systems downstream of the mining developments or localised shadowing effects on some vegetation which may be reliant on intermittent flows. Furthermore, chemical reactions in waste rock have the potential to be detrimental to plant growth and to result in contamination of both surface and groundwater. In addition, mining and processing operations, transport, store and use a range of hazardous materials including fuels, process reagents, lubricants, detergents, explosives, solvents and paints. If these materials are not properly managed, they may have the potential to cause atmospheric, soil or water contamination and could potentially pose ongoing risks to human health and the environment.

In proposed project, Singada Jhor and other seasonal stream are flowing through mine boundary. It is therefore necessary to take proper diversion of stream during the operation so the downstream users may not be affected.

At the time of mine closure all the activity must have been stopped and hence chances of contamination are very less but it is again necessary to monitor the ground water quality and river water quality so that any change in quality can be detected.

8.3.1 Drainage arrangement for external OB dump

- **Catch Drain**

An open drain of appropriate size is provided on all terraces at the foot of next bench to receive the storm water from upper benches. This is then discharge to the lower benches through masonry chute, thus minimizing gully formation in the slope of external dump.

- **Foot Drain**

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A foot drain of proper size is provided around the external OB dump (portion exposed to outside only). This drain collects run-off from dump and direct it to settling tank/sedimentation pond before discharge to nearby natural watercourses.

8.3.2 Drainage arrangement for internal OB dump

- During working stage, the run-off is collected from internal dump by foot drain for diverting to mine sump for pumping.
- In the post-mining period, the drainage pattern of the reclaimed area will be such that the run-off will be diverted to final void of the quarry as a measure for water harvesting.

8.3.3 Post Closure Air Quality Management

Legislative Framework

Air quality is managed through a framework established under Environmental Protection Act 1986. There are two notification under which air quality standards are governed in coal mining area:

- Notification No. GSR 742(E), Dt: 25th September 2000 also known as coal mine standards
- Notification No. GSR 826(E), Dt: 16th November 2009 also known as National Ambient Air Quality Standard.

Since at the time of closure of mine, no mining activity is taking place, so, coal mine standard is not applicable and only NAAQS-2009 is applicable. In relation to the coal mine projects the key contaminant of concern is particulate matter. Relevant air quality objective in relation to particulate matter at sensitive receptor is PM_{10}<100 µg/m^3. $PM_{2.5}$<60 µg/m^3 respectively. Loose soil through wind erosion may only be the source of particulate matter at the time of closure. To deal with wind erosion problem, technical reclamation and biological reclamation of overburden (OB) is the best way. In biological reclamation of external OB dumps and internal OB dumps they are stabilized by covering and planting of native plants and grasses. The area must be regularly monitored at least monthly once to check the status of air quality in initial period of closure.

8.4 Waste Management (Figures in Mcum) (Tentative)

Year/Stage (Life of the mine plus post closure period)		OB Removal (Cumulative)			External Dump (Cumulative)		Internal Backfilling (Cumulative)		Embankment (Cumulative)	
		Top soil	OB	Total	Top soil	OB	Top soil	OB	Top soil	OB
Up to Base Year*		Nil	Nil	Nil	Nil	Nil	Nil	Nil	Nil	Nil
Y-1, Cons-1	2022-23	Nil	Nil	Nil	Nil	Nil	Nil	Nil	Nil	Nil

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Year/Stage (Life of the mine plus post closure period)		OB Removal (Cumulative)			External Dump (Cumulative)		Internal Backfilling (Cumulative)		Embankment (Cumulative)	
		Top soil	OB	Total	Top soil	OB	Top soil	OB	Top soil	OB
Y-3, Prod-1	2024-25	0.84	9.81	10.65	0.84	9.57	Nil	0.24	Nil	Nil
Y-5, Prod-3	2026-27	1.56	49.76	51.32	1.52	33.92	Nil	15.88	0.04	0.15
Y-10, Prod-8	2031-32	1.61	202.16	203.77	1.35	87.49	0.22	114.71	0.04	0.15
Y15, Prod-13	2036-37	2.90	318.02	320.92	2.43	88.13	0.43	237.83	0.04	0.15
Y-20, Prod-18	2041-42	3.07	401.54	404.61	2.38	38.83	0.65	366.25	0.04	0.15
Y-25, Prod-23	2046-47	3.08	479.61	482.69	0.25	0.00	2.79	479.90	0.04	0.15
Y-30, Prod-28	2051-52	3.11	544.95	548.06	0.25	0.00	2.85	545.21	0.04	0.15
Y-36, Prod-34	2057-58	3.14	610.04	613.18	0.25	0.00	2.85	609.89	0.04	0.15
Post closure										
Y-39, PC-3	2060-61	3.14	610.04	613.18	0.00	0.00	3.10	609.89	0.04	0.15

8.5 Top Soil Management (Including Action plan for Top Soil Management) (Tentative):

(All Figures are cumulative and in MM^3)

Year/Stage (Life of the mine plus post closure period)		Top soil removal plan	Top Soil Used				
			Spreading over embankment	Spreading over backfill area	Spreading over external OB dump area	Used in Green Belt area	Total utilized
Up to Base Year*		Nil	Nil	Nil	Nil	Nil	Nil
Y-1, Cons-1	2022-23	0.00	0.00	0.00	0.00	0	0.00
Y-3, Prod-1	2024-25	0.84	0.00	0.00	0.00	0.00	0.00
Y-5, Prod-3	2026-27	1.56	0.04	0.00	1.07	0.00	1.11
Y-10, Prod-8	2031-32	1.61	0.04	0.22	0.90	0.00	1.16
Y15, Prod-13	2036-37	2.90	0.04	0.51	1.90	0.00	2.45
Y-20, Prod-18	2041-42	3.07	0.04	0.83	1.75	0.00	2.62
Y-25, Prod-23	2046-47	3.08	0.04	0.86	0.15	0.00	2.63
Y-30, Prod-28	2051-52	3.11	0.04	1.08	0.00	0.00	2.66
Y-36, Prod-34	2057-58	3.14	0.04	1.29	0.00	0.00	2.69
Post closure							
Y-39, PC-3	2060-61	3.14	0.04	2.15	0.00	0.00	3.14

No permanent external dump is proposed and temporary surface dump will be re-handled from Yr-13. Running stock of top soil at stock yard is 0.45 Mcum.

8.6 Management of Coal Rejects

There may be rejects from coal seams while extracting with surface miner. Quantity has not been estimated but percentage of such reject generated in adjacent Hingula mine is 8-9%. Such reject will be dumped in specified area within internal dump. Height of such reject stack will not be more than 10m. Such reject area will be quickly covered with other non-combustible OB material. Such stacks will not be continued more than 50m in the direction of backfilling advance. After filling with non-combustible OB for 100m, a new stack may be formed. Objectives of such operation are –

1. Prevent spontaneous combustion by not allowing such rejects to come in contact of air for long time
2. Prevent dump slope failure by not causing slippage plane to form

8.7 Restoration of Land used for Infrastructure

Sl	Type of infrastructure	Status post final closure
1	Rail corridor of MCRL	This will be owned and maintained by separate companies and will continue to serve coal blocks at south-west area of the Talcher coal field. The siding lines will be dismantled.
2	Coal handling Plant	To be dismantled totally

Sl	Type of infrastructure	Status post final closure
3	Workshops & Stores	To be dismantled totally
4	Surface Roads	To be handed over to State Government in good condition who is supposed to maintain also.
5	Offices & ancillary buildings	As life of buildings are considered 60 years, these will be in useable condition. These may be handed over to any organization interested with acceptance of renovation and maintenance at their own expense
6	Electric poles, cables, sub-stations	These will be used by other nearby projects of MCL if suitable. Rest will be disposed of as per extant rules of the company.
7	Workers' quarters	As life of buildings are considered 60 years, these will be in useable condition. These may be handed over to any organization interested with acceptance of renovation and maintenance at their own expense

8.8 Disposal of Mining Machinery

Disposal will be as per rules laid down by the holding company Coal India Limited, whose one subsidiary is MCL, who is owner of the mine.

8.9 Safety & Security

Measures to be implemented to prevent access to surface opening for underground working, excavation, etc.

8.10 Abandonment Cost and Financial Assurance

8.10.1 Abandonment Cost: Cost of Activities to be taken up for closure of the mine

	Head	Unit	Quantity	Rate Rs/unit	Amount "Rs Cr"
Progressive Closure	Drinking Water Quality Management for life of 36 years	No/Yr	36	9295	[illegible]
	Surface Water Quality Management	No/Yr	8	9551	[illegible]
	Effluent Water Quality Management	No/Yr	48	2387	[illegible]
	Water Quality Management Total				1.89
	Air Quality Management	No/Yr	96	37592	12.99
	Waste Management	Rs/cum	Regular activity, so not considered		
	Barbed Wire fencing around dump	Rs/m	Not proposed		
	Barbed wire fencing around the pit	Rs/m	13000	700	0.91
	Filling of void – Re-handling of crown dump	Rs/cum	23.99 Mcum	77	184.72
	Top soil management	Rs/cum	3.14 Mum	5.00	3.14
	Technical & Biological reclamation of mined out of land and OB dump	Rs/Ha	470.69	500000	23.53
	Plantation over virgin area including green belt	Rs/Ha	109.97	340000	3.74
	Manpower cost and supervision	Persns/Yr	11	400000	15.84
	Toe wall around the dump	Rs/m	9252	3300	3.05
	Garland drain	Rs/m	17464	4000	6.99
	Garland drain around the dump	Rs/m	9252	4000	3.70
	Any other activity - River & Nala Diversion	Rs/m	6172	38577	23.81
Dismantling of infrastructure & disposal /rehabilitation	Dismantling of workshop	Rs/sqm	504401	630	32.20
	Rehabilitation of the dismantled facilities	To be sold as scrap			
	Dismantling of pumps and pipes / other facilities	Rs/sqm	3500	630	0.22

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	Head	Unit	Quantity	Rate Rs/unit	Amount "Rs Cr"
	Dismantling of stowing bunker, provisioning of pumps for bore well pumping arrangement		Not Required		
	Dismantling of UG equipment		Not Required		
	Rearranging water pipeline to dump top, park/agricultural land	LS	LS	LS	0.25
Safety & security	Barbed wire fencing around dump	Rs/m	Not proposed		
	Barbed wire fencing around the pit	0.91 crs as given above			
	Barbed wire fencing with masonry pillars	Rs/m	Not proposed		
	Concrete wall with masonry pillars around the pit	Rs/m	3867	3700	1.43
	Securing air shaft and bore well pump		Not Required		
	Securing of incline		Not Required		
	Concrete wall fencing around the water body		Not Required		
	Boundary wall around the water body		Not Required		
	Stabilization (viz benching, pitching etc) of side walls of the water body		Not Required		
	Toe wall around the dump	3.05 crs as given above			
	Garland drain	0.40 crs as give above			
	Garland drain around the dump	4.06 crs as given above			
	Drainage channel from main OB dump	Rs/m	500	4000	0.20
Technical & biological reclamation of mined out land and OB dump	Filling of void	No proposal to bring OB from outside			
	Top soil management	Rs.38.00 crs as given above			
	OB re-handling for backfilling	Rs.474.71 crs as given above			
	Terracing, blanketing with soil and vegetation of external dump	LS			2.75
	Peripheral road, gates, view point, cemented steps on bank	LS			5.00
	Expenditure on development of agricultural land	LS			5.00
	Landscaping and plantation	Rs/ha	300	500000	15.00
Post closure management and supervision	Power cost	Rs/kW/Yr	300	26000	2.34
	Post mining Surface water quality management	No/Yr	8	9551	0.02
	Post mining Effluent water quality management	No/Yr	48	2387	0.03
	Total of water quality management				0.05
	Post mining air quality management	No/Yr	96	37592	1.08
	Subsidence monitoring for 5 years		Not Required		
	Waste management (levelling, grading, plantation)	Rs/ha	300	1500000	45.00
	Filling of void – Re-handling of crown dump	Rs/cum	37.66 Mcum	77	289.98
	Manpower cost and supervision	Rs/Pers/Yr	25	400000	3.00
Others	Entrepreneurship development (vocational/skill development training) for sustainable income of affected people	Rs/Pers	148	100000	4.75
	Golden handshake/retrenchment benefits to 100 employees of OC	MDO mode of mine operation, Company staff will be re-deployed in other facilities of MCL			
	Golden handshake/retrenchment benefits to 200 employees of UG		Not Required		
	Onetime financial grant to societies/institutions/organizations which is dependent on the project	Rs/Inst/Org	14	500000	0.70
	Provide jobs in other mines of the company	Own staff to be retained and re-deployed			
	Continuation of other services like running of schools etc.	Rs/Sch/Yr	1	500000	0.50
TOTAL					693.54

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8.10.2 Financial Assurance: Amount to be deposited in Escrow account

(As a security against the mine activities to be carried out for the closure of the mine)

WPI as on	Apr-19		121.1
WPI as on base date-extrapolated	Apr-22		126.3
Escalated rate of Closure cost			1.0429
		UG	OC
Base Rate of Closure Cost "Rs, Crs./Ha"			0.0900
Closure Cost "Rs, Crs./Ha"			0.0939
Project Area "Ha"			1111.85
Amount to be deposited into Escrow Account "Rs,			104.3594
Amount already deposited into Escrow Account			0.00
Net Amount to be deposited into Escrow Account			104.3594
Rate of compounding of Annual Closure Cost			5.00%
Balance Life of the project "in Yrs"			36
Annual Closure Cost "Rs. Cr."			2.8989
"In Crs"			277.82

Year	OC	Year	UG	Total
Rupees in Lakhs				
1	289.8871			289.8871
2	304.3815			304.3815
3	319.6006			319.6006
4	335.5806			335.5806
5	352.3596			352.3596
6	369.9776			369.9776
7	388.4765			388.4765
8	407.9003			407.9003
9	428.2953			428.2953
10	449.7101			449.7101
11	472.1956			472.1956
12	495.8054			495.8054
13	520.5957			520.5957
14	546.6255			546.6255
15	573.9568			573.9568
16	602.6546			602.6546
17	632.7873			632.7873
18	664.4267			664.4267
19	697.6480			697.6480
20	732.5304			732.5304
20	732.5304			732.5304
22	807.6147			807.6147
23	847.9954			847.9954
24	890.3952			890.3952
25	934.9150			934.9150
26	981.6608			981.6608
27	1030.7438			1030.7438
28	1082.2810			1082.2810
29	1136.3951			1136.3951
30	1193.2149			1193.2149
31	1252.8756			1252.8756
32	1315.5194			1315.5194
33	1381.2954			1381.2954
34	1450.3602			1450.3602
35	1522.8782			1522.8782
36	1599.0221			1599.0221
Total	**27781.7189**			**27781.7189**

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ANNEXURE-I

(Copy of Allotment Order)

Government of India

Ministry of Coal

O/o the Nominated Authority

Shastri Bhawan, New Delhi

Office of the nominated authority constituted under section 6 of the Coal Mines (Special Provisions) Act, 2015.

Allotment order under clause (c) of sub-rule (2) of rule 7 and sub-rule (1) of rule 13

In re: **Utkal A Coal Mine** (the "mine") particulars of which is specified in **Annexure 1**

Order no.: NA-103/1/2021-NA

Date: November 18, 2021

In favour of: **Mahanadi Coalfields Limited** incorporated in India under the Companies Act, 1956 with corporate identity number U10102OR1992GOI003038, whose registered office and principal place of business is at Jagruti Vihar, Burla, Sambalpur, Odisha 768020 India (the "allottee")

For: Sale of Coal

WHEREAS, the nominated authority has, in accordance with provisions of the Coal Mines (Special Provisions) Act, 2015 (the "Act") and the Coal Mines (Special Provisions) Rules 2014 (the "Rules") conducted the allotment of the mine;

AND WHEREAS the allottee is eligible to receive this allotment order with respect to the mine including, inter-alia,

(a) the coal bearing land acquired by the prior allottee and the lands, in or adjacent to the coal mines used for coal mining operations acquired by the prior allottee; and

(b) any existing mine infrastructure as defined in clause (j) of sub-section (1) of section 3 of the Act;

AND WHEREAS the allottee has furnished a performance bank guarantee dated July 09, 2021 for an amount equal to INR 5,54,40,00,000.00 (Indian Rupees Five Hundred Fifty Four Crore and Forty Lakh) issued by State Bank of India in accordance with the provisions of sub-section (6) and sub-section (12) of section 8 of the Act and sub-rule (4) of rule 13 of the rules.

AND WHEREAS the allottee has entered into an allotment agreement dated June 17, 2021 ("Allotment Agreement") (as amended) with the nominated authority in accordance with the provisions of sub-rule (5) of rule 13.

NOW, THE NOMINATED AUTHORITY DOES ORDER:

1. On and from November 18, 2021 ("allotment date") and in accordance with sub-section (4) of section 8 read with sub-section (12) of section 8 of the Act, with respect to the mine, the following shall stand fully and absolutely transferred and vested in the allottee, namely:

Govt. of India, Min of Coal, Nominated Authority

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(a) all the rights, title and interest of the prior allottee in and over the land and mine infrastructure free from all encumbrances;

(b) entitlement to a mining lease to be granted by the State Government with the terms and conditions of Allotment Agreement forming a part of it on making an application;

(c) all statutory licences, permits, permissions, approvals or consents as per rules, required to undertake coal mining operations in the mine, if already issued by the Central Government, to the prior allottee on the same terms and conditions as were applicable to the prior allottee, as listed in the **Annexure 2**;

(d) entitlement to any statutory licence, permit, permission, approval or consent required to undertake coal mining operations in the mine, if already issued by the Central Government, to the prior allottee on making an application on the same terms and conditions as were applicable to the prior allottee, as listed in the **Annexure 3**;

(e) entitlement to any statutory licence, permit, permission, approval or consent required to undertake coal mining operations in the mine, if already issued by the State Government, to the prior allottee on making an application on the same terms and conditions as were applicable to the prior allottee, as listed in the **Annexure 4**;

(f) rights appurtenant to the approved mining plan of the prior allottee;

(g) any subsisting contract in relation to coal mining operations, to which the prior allottee was a party and which is assumed, adopted and continued by the allottee and listed in the **Annexure 5** shall stand novated (by virtue of a deemed consent from the relevant party(ies)), in accordance with the provisions of sub-section (1) of section 11 of the Act in favour of the allottee for the residual term or residual performance of such contract;

2. The allottee may seek any change in the terms and conditions attached to such licence, permit, permission, approval or consent by making an application in accordance with applicable laws;

3. Hereinafter, the allottee shall be entitled to take possession of the mine as specified in **Annexure 1** without let or hindrance;

4. This allotment order is liable to be cancelled in accordance with the provisions of sub-rule (6) of rule 13.

16/11/21

(By the nominated authority)

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Annexures:

Annexure 1: Particulars of the mine

Part A – Description of the mine

Name of Coal Mine	Utkal A
Latitude	20° 55' 56.225" N - 20° 58' 47.344" N
Longitude	84° 58' 42.383" E - 85° 00' 50.476" E
Coal Field	Talcher Coalfield
Villages	Kankarei, Chhotabereni, Golagadia, Kaunsidhipa, Raijharan, Balichandrapur, Pirakhaman, Baghuabola, Bhalugadia and Kumunda
Tehsil/ Taluka/ Block	Chhendipada & Talcher
District	Angul
State	Odisha

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Part B – Description of Land in relation to the mine

Type of Land	Land Acquired (acres)
Utkal-A	
Forest Land	-
Government Land	-
Private Land	-
West of Gopalprasad West	
Forest Land	-
Government Land	439.885
Private Land	128.00

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Part C – Description of Mine Infrastructure in relation to the mine

C1- Mine Infrastructure: Immovable Assets

Nil

C2- Mine Infrastructure: Land for Compensatory Afforestation

Type of Land: Freehold Land for Compensatory Afforestation

Nil

Type of Land: Leasehold Land for Compensatory Afforestation

Nature	Area (Hectares)
Government Land	-
Private Land	-
Forest Land	-

C3- Mine Infrastructure: Resettlement and Rehabilitation Land

Type of Land: Resettlement and Rehabilitation Freehold Land

Nil

Type of Land: Resettlement and Rehabilitation Leasehold Land

Nature	Area (Hectares)
Government Land	-
Private Land	-
Forest Land	-

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Annexure 2: Particulars of statutory licences, permits, permissions, approvals or consents issued by the Central Government which are being transferred along with this allotment order.

S. No	Statutory Clearance	Ministry	Letter No.	Date
1.	**Approval of Mining Plan and Mine Closure Plan**			
	a) Approval of the Mining Plan of Gopalprasad Opencast Project (capacity 15.0 Mty) in the name of MJSJ Coal Ltd.	Ministry of Coal	No. 43012(1)/2008-CPAM	23-04-2009
	b) Approval of Mine Closure Plan for Gopal Prasad OCP (15 MTY) dated March 2011		No. 34012/(4)/2011-CPAM	10-01-2013
2.	**Utkal-A Block**			
	Order by the Central Government under Section 4(1) of the CBA Act, 1957 in 1012.80 acres (approx.)/ 409.87 ha (approx.) of lands	Ministry of Coal	S.O. 831	Issued on 18-03-2011 (published in Gazette of India on 26-03-2011)
	Order by the Central Government under Section 7(1) of the CBA Act, 1957 in 1010.715 acres (approx.)/ 409.03 ha (approx.) of lands		S.O. 398	Issued on 17-01-2012 (published in weekly Gazette of India on 28-01-2012)
	Order by the Central Government under Section 9(1) of the CBA Act, 1957 in 1010.715 acres (approx.)/ 409.03 ha (approx.) of lands		S.O. 311(E)	Issued on 31-01-2013 (published in Gazette of India on 01-02-2013)
	Order by the Central Government under Section 11(1) of the CBA Act, 1957		S.O. 2314	Issued on 29-10-2013 (published in weekly Gazette of India on 02-11-2013)
	Gopalprasad West Block			
	Order by the Central Government under Section 4(1) of the CBA Act, 1957 in 4695.52 acres (approx.)/ 1900.25 ha (approx.) of lands		S.O. 1979	Issued on 30-06-2003 (published in weekly Gazette of India on 19-07-2003)
	Order by the Central Government under Section 7(1) of the CBA Act, 1957		S.O. 2671	Issued on 15-10-2004 (published in Gazette of India on 23-10-2004)
	Order by the Central Government			

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S. No	Statutory Clearance	Ministry	Letter No.	Date
	under Section 9(1) of the CBA Act, 1957 in 2527.46 acres (approx.)/ 1022.85 ha (approx.) of lands		S.O. 155	Issued on 11-01-2007 (published in weekly Gazette of India on 20-01-2007)
	Order by the Central Government under Section 11(1) of the CBA Act, 1957		S.O. 2928	Issued on 25-09-2007 (published in weekly Gazette of India on 06-10-2007)

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Annexure 3: Particulars of statutory licences, permits, permissions, approvals or consents issued by the Central Government to be obtained on application by the allottee.

Nil

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Annexure 4: Particulars of statutory licences, permits, permissions, approvals or consents issued by the State Government to be obtained on application by the allottee.

Nil

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Annexure 5: Particulars of the contracts adopted by the allottee.

The allottee does not intend to adopt and continue with any of the contracts of the prior allottee.

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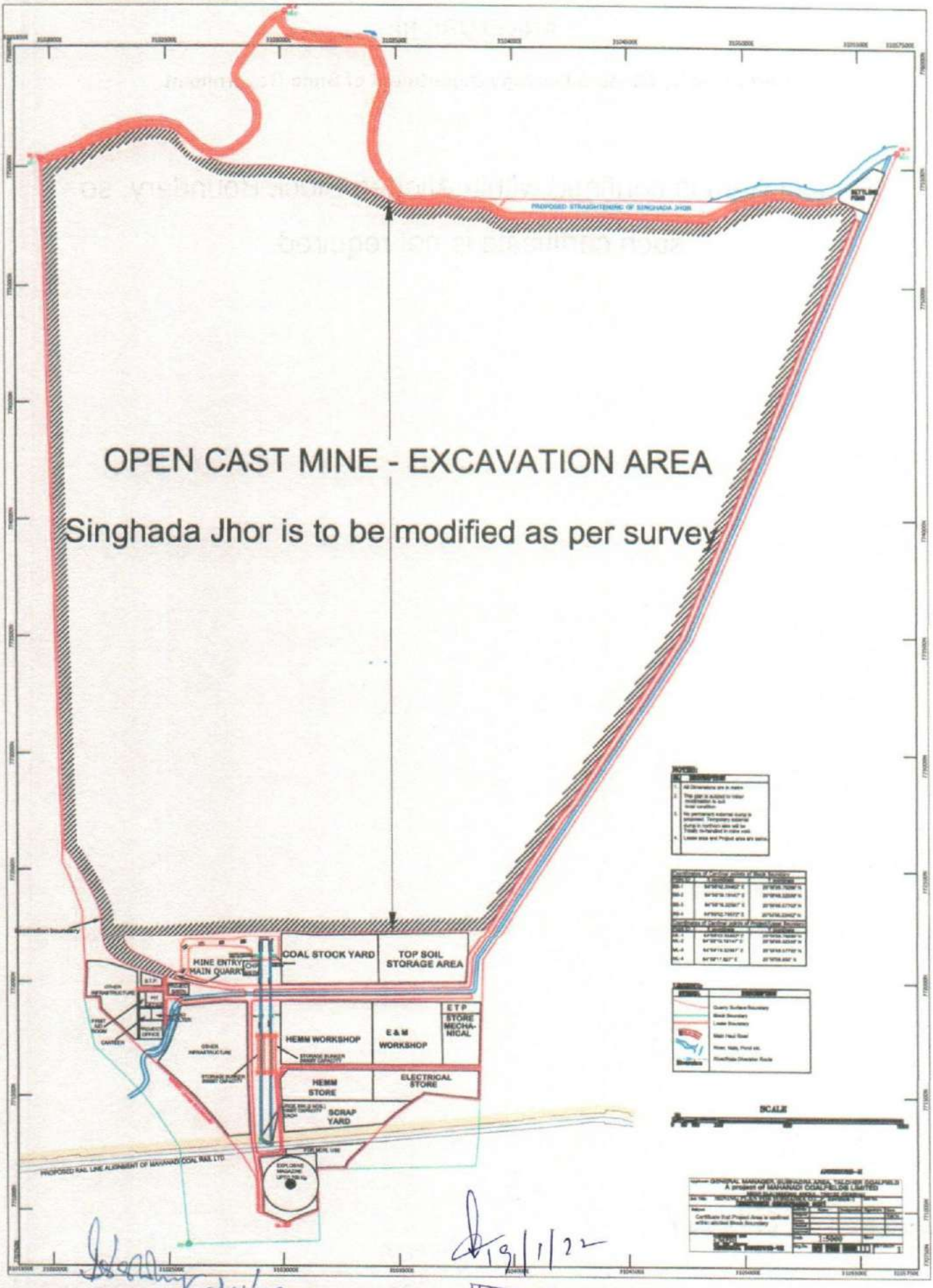
एम. सि. एल. सुभद्रा क्षे.



देबाशीष रॉय 18/01/22
महाप्रबंधक (उत्खनन)
सी.एम.पी.डी.आई.एल., क्षेत्रीय संस्थान-7

19/1/22
प्रकल्प अधिकारी
Project Officer
MCL, Subhadra Area
एम. सि. एल. सुभद्रा क्षेत्र

ANNEXURE-III

Certificate by Mines & Geology Department of State Government

Project Area is confined within Allotted Block Boundary, so such certificate is not required.

18/01/22
देबाशीष रॉय
महाप्रबंधक (उत्खनन)
सी.एम.पी.डी.आई.एल., क्षेत्रीय संस्थान-7

19/1/22
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Project Officer
MCL, Subhadra Area
सी. एम. पी. एल. सुभद्रा क्षेत्र

ANNEXURE-IV
Approval of the Company Board

ମହାନଦୀ କୋଲ୍ଫିଲ୍ଡସ୍ ଲିମିଟେଡ୍
महानदी कोलफील्डस लिमिटेड
Mahanadi Coalfields Limited
(A subsidiary of Coal India Limited)

Office of the Company Secretary
At/Po. Jagruti Vihar, Burla, MCL
Dist. Sambalpur – 768020 (Odisha)
CIN: U10102OR1992GOI003038
TeleFax No. 06832542977
Email id: cosecymcl@gmail.com
Website: www.mahanadicoal.in

Ref. No. MCL/SBP/CS/BD-235/Excl/2021/11767 Date: 07.06.2021

गोपनीय/CONFIDENTIAL

सेवा में,
GM (P&P),
एम सी एल मुख्यालय, सम्बलपुर ।

Sub: Extract from the minutes of the 235th meeting of the Board of Directors of Mahanadi Coalfields Limited scheduled to be held at 12.15 PM on Saturday, the 29th May, 2021 at Registered Office of the Company, Jagruti Vihar, Burla, Sambalpur, Odisha-768020.

प्रिय महोदय,

आप के सूचनार्थ एवं उचित कार्यवाही हेतु एम.सी.एल. निदेशक मण्डल की 235 वी बैठक का उद्धृत दिया जा रहा है।

235.C/19 Approval of the following:
1) Mining Plan and Mine Closure Plan for Subhadra OCP (25.0 MTY) (Modification-1) with a total closure cost of Rs.227.82 Crores for a period of 36 years compounded @5% annually.
2) Authorisation of Shri Debashis Roy, General Manager, RI-VII, Bhubaneswar, CMPDI for preparation of Mining Plan & Mine Closure Plan of Subhadra OCP (25 MTY) as per the OM: F. No.34011/28/2019-CAPM, dtd. 29.05.2020.

19.1 The Board deliberated on the proposal in detail and based on the clarifications offered and facts brought out in the agenda note, approved the proposal as per the following.

1. Mining Plan and Mine Closure Plan for Subhadra OCP (25.0 MTY) (Modification-1) and recommendation for final approval from MoC.
2. Total closure cost of Rs.277.82 Crores Project starting from 01.04.2022 for a period of 36 years compounded @ 5% annually for Subhadra OCP.
3. Authorisation for Director (Tech/Operation), Nominated Owner for Talcher Coalfields for making Allotment Agreement with the Nominated Authority from MoC.
4. Authorisation of Shri Debashis Roy, General Manager, RI-VII, Bhubaneswar, CMPDI as Qualified Person (QP) for preparation of Mining Plan & Mine Closure Plan of Subhadra OCP (25 MTY).
5. Commitment for the following:
   The entire mining operation will be carried out as per the statutory provisions given under Mines Act - 1952, The Coal Mines Regulations- 2017, EP Act-1986 and FC Act-1980 and wherever specific permission is required the Company will approach the concerned authorities.
6. Undertaking for the following:

- The data used in preparation of mine plan of Subhadra OCP comprising of West of Gopalprasad (west) & Utkal-A combined blocks is correct.
- The mine will be developed as per the approval of mining plan from the Ministry of Coal. All other approvals, as may be required will be obtained from concerned authorities.

देबाशीष रॉय 18/01/22
महाप्रबंधक (उत्खनन)
सी.एम.पी.डी.आई.एल., क्षेत्रीय संस्थान-7

18/1/22
परियोजना अधिकारी
Project Officer
MCL, Subhadra Area
एम. सि. एल. सुभद्रा क्षेत्र

- Financial Assurance for implementation of Subhadra OCP (West of Gopalprasad (west) & Utkal-A coal mine) will be provided.

- The reclamation and rehabilitation works shall be carried out in accordance with the Mine Closure Plan approved by the Ministry of Coal, from time to time.
- The protective measures contained in the mine closure plan including reclamation plan and final mine closure plan shall be complied with and further undertake to submit a yearly report before 1st July of every year to the Coal Controller, setting forth the extent of protective and rehabilitative works carried out as envisaged in the approved mine closure plan (progressive and final closure).
- MCL will obtain a Mine Closure certificate from the Coal Controller to the effect that the protective, reclamation and rehabilitation works have been carried out in accordance with the approved Mine Closure Plan/ Final Mine Closure Plan and will surrender the reclaimed land to the concerned state Govt

भवदीय,

कंपनी सचिव

18/01/22

देबाशीष रॉय
महाप्रबंधक (उत्खनन)
I.I.एम.पी.डी.आई.एल., क्षेत्रीय संस्थान-7

19/1/22

प्रकल्प अधिकारी
Project Officer
MCL, Subhadra Area
एम.सी.एल. सुभद्रा क्षेत्र

MCL

(35)

No. 34012/(9)/2012-CPAM
Government of India

New Delhi, dated 31st May, 2012

To

1	Chairman, Coal India Limited, 10-Netaji Subash Road, Kolkata –700001 (W. B).
2	CMD, Eastern Coalfields Limited, Sanctoria, P.O. Dishergarh, Dist. Burdwan-713333, (W. B).
3	CMD, Central Coalfields Limited, Darbhanga House, Ranchi – 834001 (Jharkhand).
4	CMD, Northern Coalfields Limited, P.O. Singrauli, Distt. Sidhi 486889 (M. P).
5	CMD, Bharat Coking Coal Limited,Koyla Bhavan, Koyla Nagar,Dhanbad-826005 (Jharkhand).
6	CMD, Mahanadi Coalfields Limited, Jagriti Vihar, P.O. A. Katpali, Burla,UCE-768 020. Distt. Sambalpur (Orissa)
7	CMD, Western Coalfields Limited, Coal Estate, Civil Lines, Nagpur-440001 (Maharashtra).
8	CMD, South Eastern Coalfields Limited, Seepat Road, Bilaspur - 495001 (Chhasttisgarh).
9	CMD, Central Mine Planning & Design Institute Limited, Gondwana Place, Kanke Road, Ranchi (Jharkhand).

Subject | **Approval of Mine Plans / Mine Closure Plans of Coal / Lignite Projects.**

Sir

I am directed to state that Mining Plans/Mine Closure Plans of Coal India Limited [CIL] and its subsidiaries are not required to be approved by the Standing Committee at Ministry of Coal under MMDR Act for obtaining lease in case of areas of Nationalized mines acquired under Coal Bearing Areas [Acquisition and Development] Act. 1957. Mining Plans of projects of CIL and its subsidiaries are thus prepared by CMPDIL and the project report subsequently prepared and approved by the Board of CIL / Coal companies or Ministry of Coal as per delegated powers.

CIL, its subsidiaries, Neyveli Lignite Corporations Limited [NLC] and Singareni Collieries Company Limited [SCCL] are required to prepare Mining Plans for obtaining leases/renewal of mining leases for areas acquired under LA Act. for non-nationalized areas under MC Rule, 1960 and obtaining the approval of Standing Committee at Ministry of Coal.

As per Guidelines for preparation of Mine Closure Plan [dated January 2012] in the case of projects / mines of Govt. Companies the competent authority to approve the Mine Closure Plan [MCP] will be the authority competent to approve the Mining Plan.

Yours faithfully,

[V.S. Rana]
Under Secretary to the Govt. of India
Phone No. 23073934

18/01/22
देबाशीष रॉय
महाप्रबंधक (उत्खनन)
सी.एम.पी.डी.आई.एल., क्षेत्रीय संस्थान-7

19/1/22
प्रकल्प अधिकारी
Project Officer
MCL, Subhadra Area
एम. सि. एल. सुभद्रा क्षेत्र

File No. CPAM-34011/28/2019-CPAM
Government of India
Ministry of Coal
***

Room No. 622-A, Shastri Bhawan,
New Delhi, dated 9th September, 2020

To,

The Chairman,
CIL, Kolkata

Subject: Approving Authority for mining plan for projects of CIL and its subsidiary companies - reg.

I am directed to refer to your letter No. CIL:CH:1307 dated 31.08.2020 on the subject cited above and to convey that there is no change in the existing provisions of approving authority of Mining Plan of CIL and its subsidiary companies which was issued vide this Ministry's letter No. 34012/(9)/2012-CPAM dated 31.05.2012.

This has the approval of competent authority.

Yours Sincerely,

(Hitlar Singh)
Under Secretary to the Govt. of India
E-mail id: hitlar.singh85@nic.in

18/01/22
देबाशीष रॉय
महाप्रबंधक (उत्खनन)
सी.एम.पी.डी.आई.एल., क्षेत्रीय संस्थान-7

19/1/22
प्रकल्प अधिकारी
Project Officer
MCL, Subhadra Area
एम. सि. एल. सुभद्रा क्षेत्र

ANNEXURE-V

(Copy of Earlier Approval)

No. 43012/(1)/2008-CPAM
Government of India
Ministry of Coal
Shastri Bhawan
.....

New Delhi, Dated 23rd April, 2009

To,
The Chief Executive Officer,
MJSJ Coal Ltd.,
At/PO – South Balanda,
Distt. Angul,
ORISSA - 759116

Subject :- **Approval of the Mining Plan of Gopalprasad Opencast Project (capacity 15.0 Mty) in the name of MJSJ Coal Limited.**

Sir,

You may please refer to letter No. CMD/MCL/ES/5580 dated 13.03.2009 on the subject mentioned above. This is to convey the approval of Mining Plan of Gopalprasad Opencast Project (capacity 15.0 Mty) of MJSJ Coal Limited / a subsidiary of Mahanadi Coalfields Ltd. subject to following conditions :-

i) The mining company shall take all necessary precautions regarding safety of mine workings persons deployed therein.

ii) The approval of the Mining Plans is without prejudice to the requirement of approval from competent/prescribed authority under relevant rules / regulations.etc.

2. Four copies of the approved mining plan are enclosed herewith.

Yours faithfully,
23/4/2009
(P.R. Mandal)
Adviser (Projects)

Copy to : Chairman-cum-Managing Director
Mahanadi Coalfields Limited,
AT/P.O. Jagriti Vihar, Burla, Distt. Sambalpur
ORISSA.

18/01/22
देबाशीष रॉय
महाप्रबंधक (उत्खनन)
सी.एम.पी.डी.आई.एल., क्षेत्रीय संस्थान-I

19/1/22
प्रकल्प अधिकारी
Project Officer
MCL, Subhadra Area
एम. सि. एल. सुभद्रा क्षेत्र

ANNEXURE-VI

(Undertaking – Environment Protection)

Annexure- 6

ମହାନଦୀ କୋଲ୍ ଫିଲ୍ଡସ୍ ଲିମିଟେଡ୍
महानदी कोलफील्डस लिमिटेड
Mahanadi Coalfields Limited
(A subsidiary of Coal India Limited)

Office of the General Manager
(Subhadra Area)
NEAR BIJU MAIDAN
PO/Dist: Angul – 759122 (Odisha)
Website :www.mcl.gov.in
Email Id: gmsubhadraarea@gmail.com
gm-subhadra.mcl@coalindia.in

CERTIFICATE OF COMMITMENT REGARDING ENVIROMENT & FOREST CLEARANCE CONDITIONS.

This is to certify that the Subhadra OCP, Subhadra Area will comply all Environment & Forest conditions as stipulated in respective clearances issued from Ministry of Environment, Forest & Climate change, New Delhi.

General Manager
Subhadra Area

देबाशीष रॉय 18/01/22
महाप्रबंधक (उत्खनन)
पी.एम.पी.डी.आई.एल., क्षेत्रीय संस्थान-7

19/1/22
प्रकल्प अधिकारी
Project Officer
MCL, Subhadra Area
एम. सि. एल. सुभद्रा क्षेत्र

ANNEXURE-VII

Sl	Activity	Start from	Duration
A	**Progressive Closure Activities**		
1.	Avenue Plantation		
	a. In 7.5m safety zone	Yr-1	3 years
	b. Along surface roads	Yr-1	3 years
	c. Around structures like CHP, Workshop, Offices, Quarters	Yr-1	3 years
2.	Landscaping with recreational activities	Yr-3	5 years
3.	Top soil management	Yr-1	36 years
4.	OB dump stabilization – temporary OB dump	Yr-2	11 years
5.	Garland drains, Foot drains, retaining walls	Yr-2	11 years
6.	Plantation on re-handled OB dump	Yr-14	2 years
7.	Fencing along lease boundary	Yr-1	36 years
8.	Fencing around open pit	Yr-1	36 years
9.	Establish STP and ETP, operate and maintain	Yr-2	36 years
10.	Backfilling with grading & stabilization	Yr-5	32 years
11.	Plantation on final slope of backfilled OB dump	Yr-5	32 years
12.	Air & Water Quality monitoring	Yr-1	36 years
B	**Final Closure Activities**		
1.	Re-handling of backfilled OB top to fill void further	Yr-31	3 years
2.	Gradation of backfill top, spread top soil, add fertilizer, arrange for irrigation to make it fit for agriculture	Yr-37	3 years
3.	Dismantling of CHP, Workshops, Stores, Scrap yard, siding lines, ETP plant	Yr-37	2 years
4.	Leveling and grading on infrastructure	Yr-37	2 years
5.	Plantation on reclaimed infrastructure area	Yr-39	1 year
6.	Strengthening of fencing around open pit	Yr-37	1 year
7.	Stabilization, plantation & grass carpeting of backfilled OB dump slope	Yr-37	3 years
8.	Renovation and handing over office buildings for future use	Yr-37	3 years
9.	Arrangement for converting final void to reservoir and pumping system for maintenance of plantations	Yr-37	3 years
10.	Air & Water Quality monitoring	Yr-37	3 years
11.	Entrepreneurship development (vocational/skill development training) for sustainable income of affected people	Yr-37	3 years

देबाशीष रॉय
महाप्रबंधक (उत्खनन)
सी.एम.पी.डी.आई.एल., क्षेत्रीय संस्थान-7
18/01/22

19/1/22
प्रकल्प अधिकारी
Project Officer
MCL, Subhadra Area
एम्. सि. एल्. सुभद्रा

ANNEXURE-VIII

(Change of name of the Mine)

महानदी कोलफील्डस लिमिटेड
Mahanadi Coalfields Limited
(A subsidiary of Coal India Limited)

महाप्रबंधक (परियोजना एवं योजना) का कार्यालय
Office of the General Manager (P&P)
At/Po : Jagruti Vihar, Burla, MCL
Dist: Sambalpur – 768 020 (Odisha)
CIN: U10102OR1992GOI003038
Ph: +91 (663) 254 2808 / Fax: +91 (663) 254 2767,
e-mail: cpng.mcl@gmail.com/ gmprojectsmcl@gmail.com
cgm-cpng.mcl@coalindia.in
Website : www.mahanadicoal.in

क्रमांक: एम.सी.एल. मुख्यालय /सम्बलपुर/ महाप्रबंधक (परियोजना एवं योजना) 19 539-H दिनांक:26-Sep-19

सेवा मे,

क्षेत्रीय निदेशक,

क्षेत्रीय संस्थान- 7,

सेंट्रल माईन प्लानिंग एंड डिजाइन इंस्टिट्यूट लिमिटेड (सी.एम.पी.डी.आई.एल),

सामंतपुरी (गान्धी पार्क के नजदिक), आर. आर. एल, भुवनेश्वर - 751 013 (ओडिशा)

विषय: **Preparation of Project Report and Mining plan of Subhadra OCP(25 MTY).**

संदर्भ: 1. Letter No: MCL/HQ/EE/2019/2454 Dtd 20.09.2019
2. MOM: MCL/SBP/DTOP/2019/271, Dtd. 24.09.2019

महोदय,

Please find enclosed herewith the Office Order and MOM reffered above, regarding the opening of new Area and project in MCL combining Utkal-A and West part of Gopalprasad(W). The Project Report of Gopalprasad west OCP (25 MTY) which is under preparation at RI-VII, CMPDI, to be named as Subhadra OCP (25 MTY). The new timeline for preparation of Project Report and Mining Plan for Subhadra OCP has been mentioned in the Minutes enclosed.

Therefore, you are requested to prepare the reports as per the new timeline and submit at the earliest for Competent Approval.

भवदीय

26/09/2019

महाप्रबंधक(परियोजना एवं योजना)

संलग्न: यथोपरि

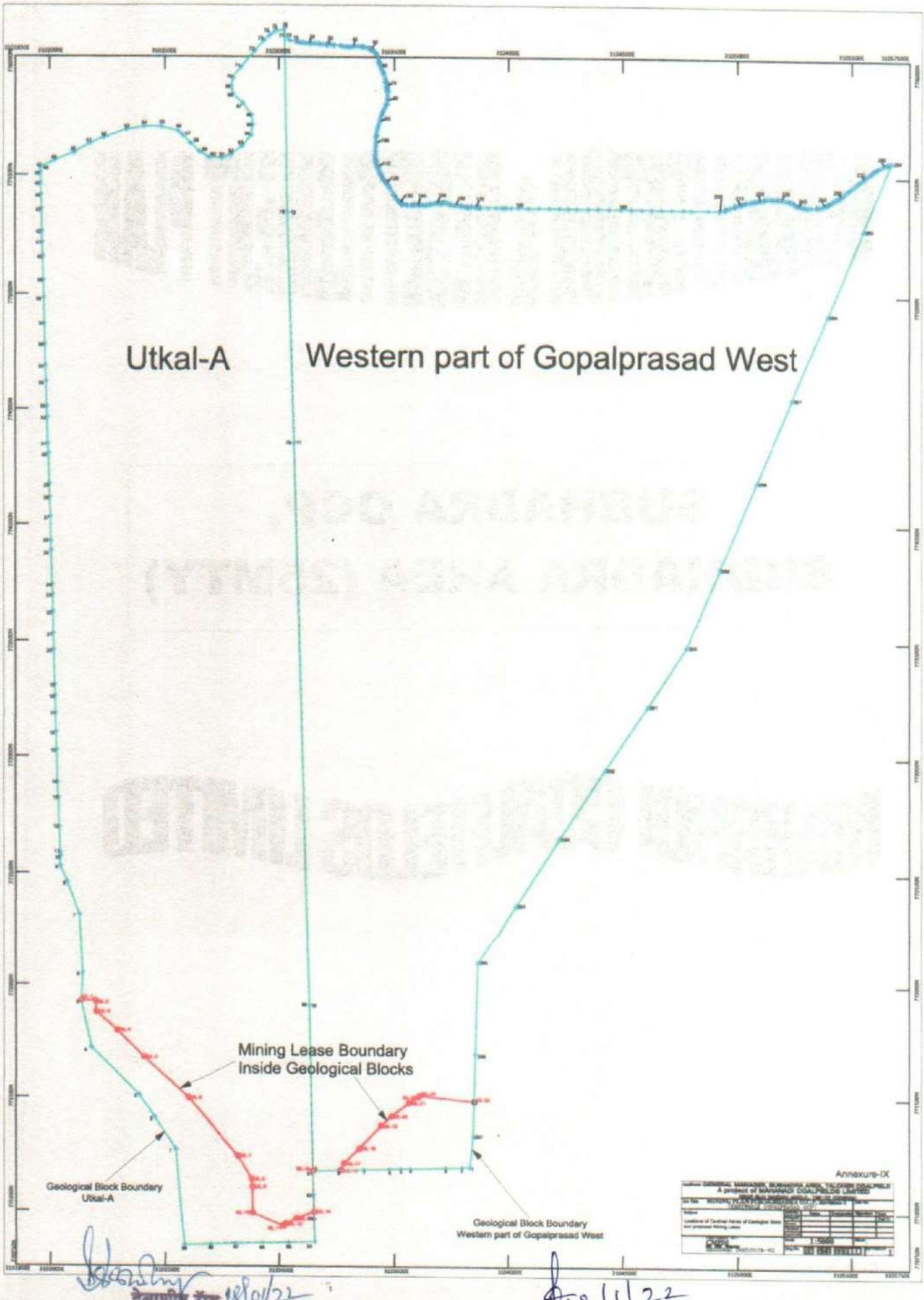
प्रतिलिपि:

कार्यालय कापी

सं० प्र० (सुभद्रा दो न)

18/01/22
देबाशीष रॉय
महाप्रबंधक (उत्खनन)
सी.एम.पी.डी.आई.एल., क्षेत्रीय संस्थान-7

19/1/22
प्रकल्प अधिकारी
Project Officer
MCL, Subhadra Area
एम. सि. एल. सुभद्रा क्षेत्र



देवाशीष रॉय 18/01/22
महाप्रबंधक (उत्खनन)
सी.एम.पी.डी.आई.एल., क्षेत्रीय संस्थान-7

18/1/22
प्रकल्प अधिकारी
Project Officer
MCL, Subhadra Area