RESTRICTED CIRCULATION

MINING PLAN
(INCLUDING FINAL MINE CLOSURE PLAN)
(3rd REVISION/MODIFICATION)
FOR
JK - 5 OPENCAST MINE

Under Rule 22a(2) of Mineral Concession Rules, 1960

JK-5 OCP BLOCK (1.4995 Sq.Km)

YELLANDU COAL BELT

GODAVARI VALLEY COAL FIELD

Sudimalla & Yellandu (Village & Mandal),

BHADRADRI DISTRICT, TELANGANA STATE

Mine Area – 490.14 ha
Capacity - 3.50 Mty

Plan Prepared by me

(SHAIK MADAR)
Recognised Qualified Person U/R 22(C of Mineral Concession Rules 1960 by Ministry of Coal, Govt. of India.
Ref. 34012/01/2015 - CPAM
Dt. 05-10-2017

JUNE, 2019

(After Incorporating Clarifications to the Observations Made by Standing Committee to Mining Plan (Including Final Mine Closure Plan) - April, 2019)

(BASE DATE – APRIL, 2018)

Volume – I of II
(Text & Annexure)

SHAIK MADAR

First Class Mine Manager's Certificate Holder & working as Additional Manager, Recognized as Qualified Person (RQP) U/R 22(C) of Mineral Concession Rules 1960 By Ministry of coal, Govt. of India Reg.No.34012/01/2015-CPAM, dated 05-10-2017

The Singareni Collieries Company Limited

(A Government Company)
Department of Project Planning (ISO 9001:2015 Certified)
P.O. Kothagudem - 507101.
Bhadradri-Kothagudem District :: Telangana State

MINING PLAN (INCLUDING FINAL MINE CLOSURE PLAN) (3rd REVISION/MODIFICATION) FOR JK - 5 OPENCAST MINE

I N D E X

Plan Prepared by me

(SHAIK MADAR)
Recognised Qualified Person U/R 22(C of Mineral Concession Rules 1960 by Ministry of Coal Govt of India.
Ref. 3401/2/01/2015 - CPAM
Dt. 05.10.2017

All Dimensions are in meters.

PLATE No: I

THE SINGARENI COLLIERIES COMPANY LIMITED
(A GOVERNMENT COMPANY)
DEPARTMENT OF PROJECT PLANNING
(ISO - 9001:2015 Certified)

Mining Plan (Including Final Mine Closure Plan) (3rd Revision/Modification) for JK-5 Opencast Mine YELLANDU AREA

LOCATION PLAN

P SATHAIAH	JVL. GANAPATHI	SK. MADAR	M GANGADHAR	S VENKATESWAR RAO
General Manager	AGM	Addl. Mgr	Dy Manager	Supdt. Sur Officer

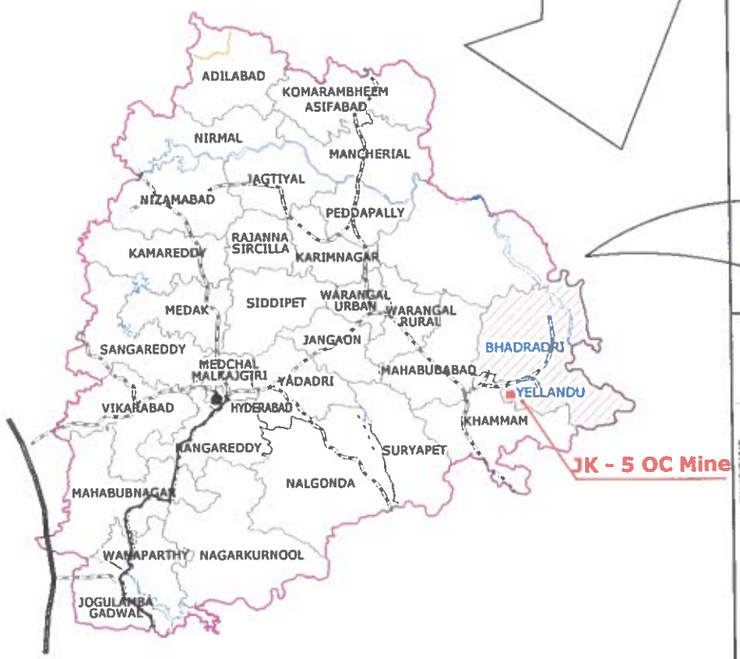
NOT TO SCALE | DATE: APRIL, 2018

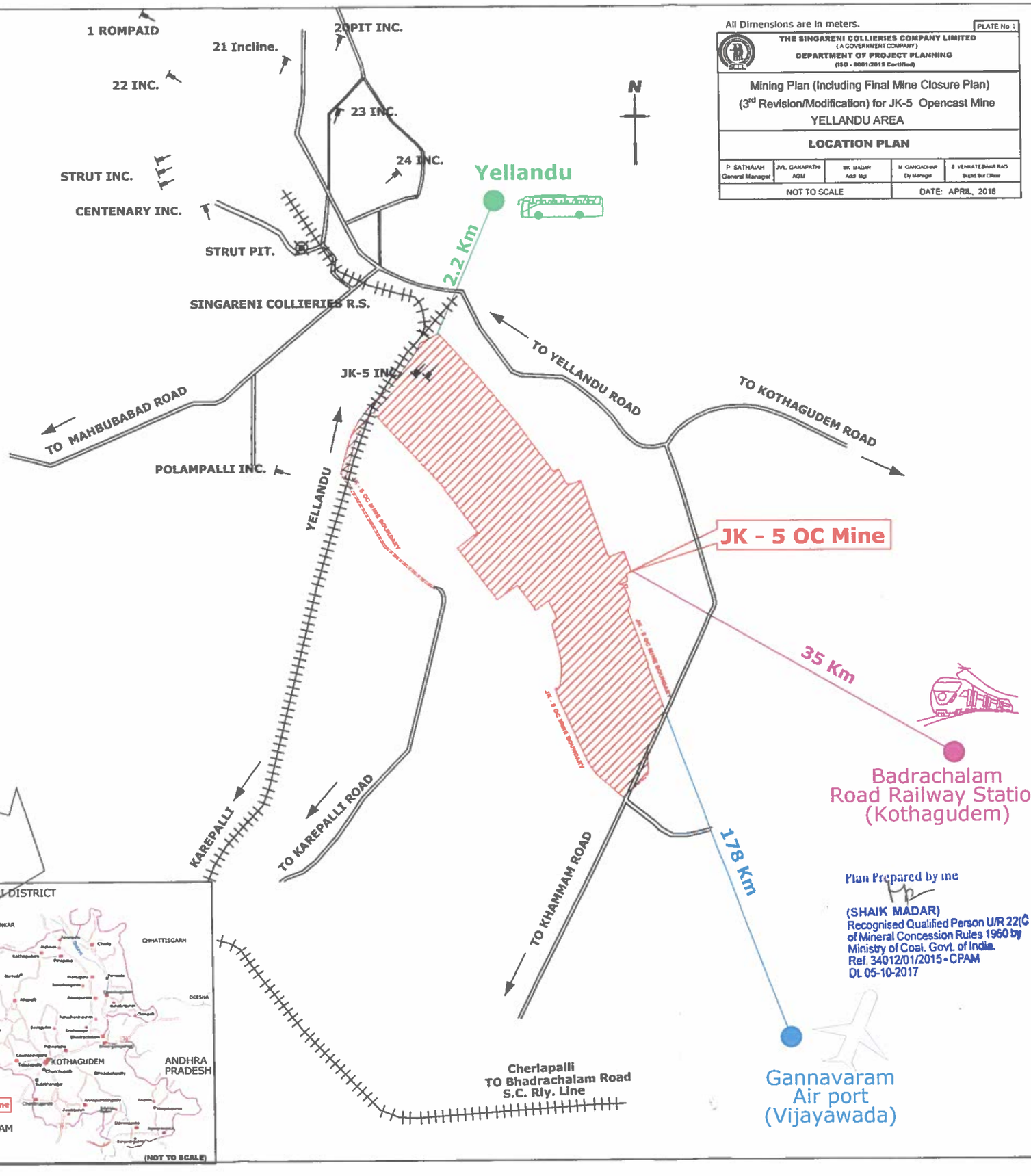
INDIA

NOT TO SCALE

TELANGANA STATE

NOT TO SCALE





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MINING PLAN (INCLUDING FINAL MINE CLOSURE PLAN)
(3rd REVISION/MODIFICATION) FOR
JK - 5 OPENCAST MINE
B. LIST OF DOCUMENTS ENCLOSED

Sl.No.	Description	Remarks
1	Copy of the Allotment Order	**Not Applicable** (Godavari Valley Coal Field (GVCF) is command area for SCCL since 1889)
2	Copy of Minutes Board Resolution for Approval of Mine Closure Cost of JK - 5 Opencast Mine	**Annexure -1**
3	Copy of C&MD Authorization letter	**Annexure -1A**
4	Certification of Lease Hold Areas Issued by State Governament	**Annexure - 2**
5	Certifyied plan of Lease hold area	**Annexure - 2A**
6	Copies of earlier approvals of the Mining Plan, if any	**Annexure - 2B, 2C & 2D**
7	Copy of MOC's letter granting recognition to RQP for prepare Mining Plan	**Annexure - 3**
8	Letter of Authorization by the Director, SCCL to the RQP for preparing Mining Plan	**Annexure - 4**
9	Certificate by RQP that he has been duly authorized by the Mining Company to prepare Mining Plan on their behalf and that he has a valid recognition from MOC under MCR, 1960 to prepare the Mining Plan and that provisions of all relevant rules and regulations have been considered while preparing the Mining Plan.	**Annexure - 6**
10	Confirmation from RQP that he has verified the Block area with the relevant plans CMPDI/SCCL/NLC and area covered by the Mining Plan does not encroach on any other Coal / Lignite Block.	**Annexure - 8**
11	Certificate from empowered representative of / or Allottee / Applicant that the mine will be developed as per the approval of the Mining Plan from MoC and all other approvals, as required will be obtained from relevant authorities.	**Annexure - 9**
12	Copy of the document to establish that the Geological Rteport has been duly purchased from CMPDI,GSI/MECL as the case may be.	**Not applicable** (Detailed exploration done by the SCCL)
13	No.of volumes in the Mining Plan and their contents.	**1. Volume-I** (Text, Annexure) **2. Volume-II** (Plates)
14	List of Annexures	**D- Annexures**
15	List of Plates / drawings	**E - Plates**
16	List of Abbreviations used	**F - Abbreviations.**
17	Copies of approvals regarding the setting up of end use	**Not applicable** (SCCL is doing mining and supplying coal to the notified customers as per the linkage provided by the Competent Authority).

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C. Summarized Data - Table I

A.	General	
a)	Name and address of the Applicant Company	The Singareni Collieries Company Limited (SCCL) P.O.Kothagudem Collieries - 507 101 Dist.Bhadradri (Erstwhile Khammam District) State: Telangana State
b)	Name and address of the Block Allottee	The Singareni Collieries Company Limited (SCCL) P.O. Kothagudem Collieries - 507 101 Dist.Bhadradri (Erstwhile Khammam District) State: Telangana State
c)	Relationship between the applicant and allottee company	Same company
d)	Status of the Applicant Company : Central /Public Sector Undertaking/State Government Undertaking/JV Company/ Pvt Company/Public Co/Others (Specify)	State Government undertaking
e)	Name of the Coal Block together with name of Coalfield & State where located	JK-5 OCP Geological Block of Yellandu Area, State: Telangana
f)	Date of allotment	Not applicable (Godavari Valley Coalfield, in Telangana state is the command area for SCCL)
g)	End Use of Coal/Lignite as per Approval by the Competent Authority	Not applicable (Commercial mining-Linkage as approved by the competent authority)
h)	ROM Quantity proposed to be produced as per Mining Plan	3.50 Mty
i)	Norms adopted for calculating ROM quantity requirement in case it differs from the quantity indicated in the Allotment Order.	Not applicable
j)	Beneficiation required – Yes/No	No
k)	Requirement of Beneficiated Coal & expected availability thereof.	Not applicable
l)	Period for which Mining Lease has been granted/is to be renewed/is to be applied for.	20 years w.e.f 15.04.2004
m)	Date of Expiry of earlier Mining Lease, if any	Yellandu Additional Mining Lease valid upto 14.04.2024

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Dt. 05-10-2017

n)	RQP who has prepared the Mining Plan Name Address Phone No/Fax Email ID Registration No & date till valid Date of grant/Renewal of RQP Status Validity	Name : **Shaik Madar**, First Class Mine Manager's Certificate Holder & **working as** Additional Manager, Project Planning Department **in** Project Planning Department. **Address:** Kothagudem Collieries-507101, Bhadradri District, Telangana (State) Fax: 08744-244115, Phone No. : 08744-242395 Email ID: gm_pp@scclmines.com Registration No: 34012/01/2015-CPAM Date of grant/Renewal of RQP Status : 05.10.2017 Validity: 10 years from 05-10-2017.

B. Information regarding earlier approved Mining Plans, if any.

a) Approval Letter no. and Date	13016/20/2005-CA-II dated 15.09.2015
b) Lease Area	514.95 Ha
c) Date of grant of Lease	15.04.2004
d) Date of Expiry of Lease	14.04.2024
e) Targetted Production	2.50 Mty
f) Proposed date of start of Production	Working Project
g) Proposed date of achieving the targeted production level	2012-13
h) Envisaged life of the mine (in years) from 2013-14	8 Years
i) Date of actual commencement of Mining Operations, if operations already started	01.01.2012
j) Likely date of Mining Operations, if operations not yet started & reasons for non-commencement of operations	Not Applicable
k) Planned production and actual levels achieved in last 3 years	
l) a) Coal :- O/Cast	Year Planned Actual 2015-16 2.50MT 2.514 MT 2016-17 2.50MT 2.692 MT 2017-18 2.50MT 2.962 MT
b) OB (M.cum)	2015-16 14.180 16.526 2016-17 14.070 15.941 2017-18 13.510 8.686
m) Reasons for difference between the planned and actual production levels	Due to optimum utilisation of equipments, the higher rated production was achieved.
n) Reason for revision of the Mining Plan	Expansion from 2.50 Mty to 3.50 Mty

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Ministry of Coal, Govt. of India.
Ref. 34012/01/2015 - CPAM
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o) Details of changes in the new mining plan compared to earlier approval	Old Plan	New Plan
(i) Mine take Area (Ha)	514.95	490.14
(ii) Block Boundary (Ha)	149.95	149.95
(iii) Production level (Mtpa)	2.50	3.50
(iv) Balance Reserves (Mt)/Life (yrs) from 2018-19	9.34	9.34
(v) Mining Technology(Additional sheets to be used, if required)	Shovel Dumper & Rock Breaker	Shovel Dumper & Rock Breaker

C. LOCATION	
a) Location of the Block Village Mandal District / State	 Sudimalla, Usirikayalapalli Yellandu Bhadradri, Telangana.
b) Name of the Coalfield/ Coal belt	Godavari Valley Coal Field / Yellandu Coal Belt
c) Particulars of adjacent blocks:	**North:** 21 Incline UG Mine **South:** F20 - F20 fault. **East:** Incrop / Basement **West:** Pollampalli / JK-5 Dip side block.
d) Area of the Allotted Block (hectares) i) Geological block area ii) Mining Block Area	 149.95 ha 149.95 ha
o) Reference no. of plan of block boundary issued by CMPDI/ SCCL/ NLC (A copy of the Plan also to be annexed)	Enclosed as Plate No: 2
f) Whether the lease boundary/ required boundary is same as demarcated by CMPDI/ SCCL/ NLC for delineating block/sub-block	Yes
g) Existing mining Lease Area in case of existing mines, (hectares)	490.14 (1st Renewal of Yellandu Additional Mining Lease-1741 ha)
h) Applied/ required Lease Area as per the Mining Plan under consideration (hectares)	490.14
i) Whether the applied lease area falls within the allotted block	NA
j) Area (hectares) of lease which falls outside the block/sub-block delineated by SCCL.	340.14
k) Details of outside area: -Whether forms part of any other coal block -Whether it contains any coal/lignite reserves -Purpose for which it is required, e.g. roads/ OB dumps/ service buildings/ colony/ safety zone/ others (specify)	JK-5 Incline and JK OCP
l) Whether some part(s) of the allotted block has not been applied for mining lease.	

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-Total area in Ha. Of such part(s). -Total reserves in such part(s). -Brief reasoning for leaving such part(s),	No
m) Type of Land involved in Hectares - Forest Land - Non Forest Land • Private Land • Govt Land	 Nil 490.14 ha 253.40 ha 236.74 ha
n) Broad Land Use Pattern (Forest, Township, Industrial, Agricultural, Grazing, Barren etc.)q	Broad land use pattern given below Details given in Chapter-13

Area in Hectares

Sl.No.	NFL/FL	Ownership	Type	Total
1	Non Forest Land	Private	Agriculture	18.23
2			Township	26.55
3			Barren	208.62
			Total:	**253.40**
4		Government	Grazing/Other (Waste)	225.75
5			Roads	7.57
6			Waterbody	3.42
			Total:	**236.74**
		Total Non-Forest Land:		**490.14**
7	Forest Land			Nil
	Total Project Area:			**490.14**

o) Proximity of public road / railway line/major water body if any and approximate distance	Public road: Public road passing at 1 Km distance from the block. Railway line: The nearest rail head is Mahabubabad Railway Station – about 30km. Major water body: Bugga Vagu flowing north of the block
p) Topo sheet No. with latitude and longitude	Topo sheet No. 65C/6 Latitude: N17° 33' 59" to 17° 35' 25" Longitude: E 80° 18' 51" to 80° 19' 51"

D. GEOLOGY AND EXPLORATION	
a)Name of the Geological Block and area in hectares	JK-5 OCP Geological Block, 149.95 ha
b)Name of the Geological Report (GR) with year of preparation	GEOLOGICAL REPORT ON JK-5 OCP BLOCK (GODAVARI VALLEY COAL FIELD),June -2008
c) Name of the agency which conducted exploration and prepared GR	EXPLORATION DIVISION SINGARENI COLLIERIES COMPANY LIMITED (SCCL)
d) Period of conducting exploration	1992 and intermittently up to 2008

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Dt. 25-10-2017

e) Details of drilling (by all agencies)	**Agency**	**No. of BHs**
	SCCL	32
f) No. of boreholes drilled within the block	32	
g) Overall borehole density within the block (no./ sq. km)	21.34	
h) Area covered by 'detailed' exploration within the block (hectares)	149.95 ha	
i) Area covered by 'detailed' exploration outside the block (hectares) -No. of boreholes drilled outside the block -Bore hole density for outside area (no./sq. km)	340.14 Ha 82 24.10 -	
j) Whether entire lease area has been covered by 'detailed' exploration.	Yes	
k) Whether any further exploration is required or suggested and timeframe in which it is to be completed	No	
l) Number of coal/lignite seams/horizons - thickness range of coal seams - mean Thickness of total coal horizon - Standard Deviation of thickness - Minimum & maximum depth of coal seams	Given below	

Seam	Thickness (m)				Depth (m)	
	Min	Max	Mean Thickness	Standard Deviation	Min	Max
Queen	5.79	20.23	14.00	10.21	13.70	126.35

m) Gross Calorific Value (GCV in K Cal/kg) and Useful Heat Value(UHV in K.Cal/Kg), of coal as per GR : Range Mean	**Given below**

Seam	Moisture%	Ash%	UHV K.Cal/kg	Avg. UHV	Grade	Avg. GCV	Grade
Queen	2.24-2.54	48.45-50.68	1597-1885	1727	G	3428	G15

n) Quality (Grade) of coal as per GR : Range Mean	Given in above table
o) Total geological reserves in the block	26.30 Mt
p) Depletion of reserves (in case of running mine)	13.15 Mt by Opencast upto 31.03.2018
q) Additional reserves established (if any for running mine)	No

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Ref: [illegible]2015-[illegible]

r) Geological reserves considered for mining: by opencast by Underground	 23.67 Mt Nil
s) Corresponding Extractable reserves: by opencast by Underground	 Given below Nil

In Million Tonnes

Seam	Geological Reserves	Mineable reserves	Extractable Reserves	Reserves already extracted upto 31.03.2018	Balance extractable reserves
				OC	
Queen	26.30	23.67	22.49	13.15	9.34

t) Percentage of recovery w.r.t. geological reserves: by opencast by Underground	 85.51% -

E. MINING

a) Existing and proposed method of mining (Opencast for OB & coal separately with dragline/ shovel/ surface miners/ manual/ etc.) (underground by longwall/ bord & pillar/ continuous miners/LHD/ SDL/ manual/ etc.,)	Existing & Proposed method of mining is Opencast with shovel-dumper combination.
b) Targeted capacity in MTPA when the mine is fully developed and the year in which proposed to be achieved By Underground : By opencast : Total :	 Nil 3.50 in year 2019-20 3.50
c) Life of the mine : Underground workings : Opencast workings : Overall :	3 years from 2018-19 Nil 3 3

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d) Indicate quantum of production and expected grade as in table below :-

Year		Coal Production (Mte)			OB "Mm^3"	SR
		UG	OC	Total "Mt"		
Upto 31.03.2018			13.15	13.15	72.95	5.548
Y-1	2018-19		3.00	3.00	12.978	4.326
Y-2	2019-20		3.50	3.50	14.896	4.256
Y-3	2020-21		2.84	2.84	9.376	3.301
Sub-total			**9.34**	**9.34**	**37.25**	3.988
Grand Total			**22.49**	**22.49**	**110.20**	4.899

Furnish the detailed calendar programme of coal production year wise and seam wise along with OB removal in the relevant chapter	Furnished in para 5.4.1 of Chapter 5 and point E(d) of summarised data.
e) Whether the proposed external OB dump site is coal/ lignite bearing: - If so, whether coal/lignite below waste disposal area is extractable.	Decoaled area (voids of Yellandu OC)
f) Whether negative proving for coal / lignite in the proposed site for OB dump/ infrastructure has been done.	Decoaled area (voids of Yellandu OC)

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g) Proposed configuration of HEMM for OC (Coal & OB) & Major Equipment for UG.	Given below

SL. NO	PARTICULARS	No. of Units
A)	C O A L (Departmental)	
1	3-3.5 Cum Hyd. Shovel	1
2	3-3.5 Cum Diesel Hyd. Shove	1
3	35 T Rear Dumpers	14
4	150 - 160 mm RBH Drills	2
5	410 HP Dozers	2
B)	Overburden (Offloading)	
1	3.0 Cum Hyd. Shovel	12
2	15 Cum Dump Trucks	60
3	145 HP Motor Graders	5
4	150 - 160 mm RBH Drills	5
5	410 HP Dozers	6
6	28KL Water Sprinkler	6
B)	C O M M O N (Departmental)	
1	280 HP Motor Graders	1
2	145 HP Motor Graders	2
3	0.9 Cum. Diesel Hydraulic Sh	1
4	28KL Water Sprinkler	1
5	4-5 Cum FEL	1
6	Diesel Bowser 12 KL	1
7	8/10T Cranes	3
8	40T Crane	1
9	Fire Tender	1
10	Mobile maintenance van	1

The proposed equipment configuration in the MP/MCP has already achieved 2.94 Mty consistently in the last 4 years. The gap in proposed capacity will be achieved through outsourcing mode, the equipment configuration of which is reconciled and modified. However, the equipment configuration with matching rated capacity has been reconciled and modified.

h) Mode of entry for underground mines (shaft, incline, adit,):	Not applicable
i) Operations that are proposed to be outsourced	Overburden will be removed by outsourcing which includes the following major activities. • Drilling & Blasting of OB benches • Excavation & transportation of overburden
j) Proposed coal evacuation facilities • Face to Surface • Surface to end use plants	• Coal transport from face to pithead CHP is by Shovel-Dumper to feeder breaker, then by belt conveyor upto preweigh bin truck loading bunkers on surface. • By road to major customer (APGENCO)

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F. END USE OF COAL/ LIGNITE	
a) Capacity of the approved end use plants	Not Applicable (Coal is delivered to consumers as per approval from the Competent authority)
b) Coal/ lignite requirement for end use plant with grade/quality	Not Applicable
c) %age of end use requirement to be met from this mine	Not Applicable
d) If washing / beneficiation of the coal/ lignite is planned to be conducted on site or adjacent to the extraction area, briefly describe the nature of the beneficiation and recovery rate.	No beneficiation/washing is proposed
e) Proposed Use of Rejects/Middlings	Not applicable

G. ENVIRONMENTAL MANAGEMENT

a) Existing land use pattern (in ha) — Given below

Sl. No.	Description	Total Land
1	Quarry area	149.95
2	External dump yard	195.56
3	Safe barrier, Road and drainage around quarry and external dump yard.	101.72
4	Roads and Infrastructure area	18.18
5	Road diversion	7.41
6	Top soil dump	17.32
	Total Land:	**490.14**

b) Land area indicating the area likely to be degraded due to mining, dumping, roads, workshop, washery, township etc. — **Given below**

Area in Hectares

Sl. No.	Description	Total Land
1	Quarry area	149.95
2	External dump yard	195.56
3	Safe barrier, Road and drainage around quarry and external dump yard.	101.72
4	Roads and Infrastructure area	18.18
5	Road diversion	7.41
6	Top soil dump	17.32
	Total Land:	**490.14**

c) Surface features over the block area	Part of Yellandu town, Karepalli Road, HT power lines, Water lines
d) No. of villages/Houses to be shifted	No R&R involved in this proposal.
e) Population to be affected by	-

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f) Year wise proposal for reclamation of land affected by mining activities	Given below

Cumulative area in ha

Year/Stage		Land Degraded area (ha)				Technically Reclaimed Area (ha)			
		Excavation	Dump (External+ Top Soil)	Infra structure/ Others	Total	Backfill	Dump (External + Top Soil)	Others	Total
Upto 31.03.2018		102.29	212.88	127.31	442.48	-	174.59	37.51	212.10
Y-1	2018-19	114.01	212.88	127.31	454.20	-	174.59	43.03	217.62
Y-2	2019-20	133.89	212.88	127.31	474.08	-	174.59	47.33	221.92
Y-3	2020-21	149.95	212.88	127.31	490.14	42.27	191.91	127.31	361.49
Post Closure									
Y-6	2023-24	149.95	212.88	127.31	490.14	42.27	191.91	255.96	490.14

Year/Stage		Biologically Reclaimed Area (ha)					Forest Land (Return)	Un Disturbed/ to be left for public/ Company use	Total
		Agriculture	Plantation	Water Body	To be left for Public/ Company Use	Total			
Upto 31.03.2018		-	119.40	-	-	119.40	-	-	119.40
Y-1	2018-19	-	151.60	-	-	151.60	-	-	151.60
Y-2	2019-20	-	190.05	-	-	190.05	-	-	190.05
Y-3	2020-21	-	251.49	-	-	251.49	-	-	251.49
Post Closure									
Y- 6	2023-24	-	327.30	137.47	25.37	490.14	-	-	490.14

g) Monitoring schedules for different environmental components after the commencement of mining and other related activities.	• Air, water, and noise- **once in fortnight** • Phreatic surface-**once in season** • Metrological data- **continuous** • Vehicular emissions- **once in six months**

H. PROGRESSIVE AND FINAL MINECLOSURE PLAN
(A separate chapter is also to be incorporated)

a) Estimated total capital expenditure for mine closure activities	Estimated total capital expenditure for Mine Closure Activities is **Rs. 68.832 Crore**.
b) Major closure Activities with proposed Capital expenditure	The list of the major Mine Closure Activities is furnished at Para 15.70 of Chapter 15 and a Bar chart showing the time schedule & cost estimation is enclosed as Annexure 15 'A' and 15 'B'.

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Head	Activity	Unit	Quantity	Rate Rs. / Unit	Amount "Rs. In Cr"
A. Progressive Closure Activities	Water quality management	Year	3	10121000	3.036
	Air quality management	Year	3	15700000	4.710
	Waste Management	Mm^3	4	100000000	40.000
	Barbed wire fencing around the Pit	m	5800	772	0.448
	Top Soil management	Mm^3	0.932	42500000	3.961
	Technical and Biological Reclamation of Mined out of land and OB Dump	ha	132.09	35000	0.462
	Toe Wall around the dump	m	2320	4800	1.114
	Garland drain around Quarry	m	3140	214	0.067
	Garland Drain around the dump	m	2850	214	0.061
	Sub-Total (A):				53.859
B. Post Closure Activities					
Dismantling of Infrastructure & Disposal/ rehabilitation of Mining machinery	Dismantling of workshop	No	1	16500000	1.650
	Dismantling of Office Buildings & Infrastructure	No	1	23000000	2.300
	Dismantling of CHP	No	1	14400000	1.440
	Dismantling of Pumps and Pipes/ other facilitites	No	6	700000	0.420
	Dismantling of Power lines	km	17	480000	0.816
Safety and security	Barbed wire fencing around the Pit	m	4480	772	0.346
	Toe Wall around the dump	m	7120	960	0.684
	Garland drain around quarry	m	11340	40	0.045
	Garland Drain around the dump	m	7650	40	0.031

Plan Prepared by me

(SHAIK MADAR)
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Dt. 05-10-2017

Head	Activity	Unit	Quantity	Rate Rs. / Unit	Amount "Rs. In Cr"
Technical and Biological Reclamation of Mined out of land and OB Dump	Top Soil management	Mm^3	0.248	42500000	1.054
	*OB Re-handling for backfilling	Mm^3	0.5	20000000	1.000
	Terracing, blanketing with soil and vegetation of External OB Dump	ha	33.00	35000	0.116
	Landscaping and Plantation	ha	75.81	35000	0.265
Post Closure Management and Supervision	Power Cost	Year	3	6000000	1.800
	Post Mining Water quality management	Year	3	2030000	0.609
	Post Mining Air quality management	Year	3	3390000	1.017
	Manpower Cost and supervision	No	3	4599000	1.380
	Sub-Total (B):				14.973
Grand Total (A+B):					68.832

*** OB Re-handling for backfilling is for Technical Reclamation for OB dumps/Final void.**

I OTHERS	
a) Base date of Mining Plan.	April, 2018
b) Calendar year from which the production will start	working mine (2012)
c) Results of any investigation carried out for scientific mining, conservation of minerals and protection of environment; future proposals.	Nil
d) Signature of RQP Date Place	11/6/2018 Kothagudem

******

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MINING PLAN (INCLUDING FINAL MINE CLOSURE PLAN)
(3rd REVISION/MODIFICATION) FOR
JK - 5 OPENCAST MINE
D LIST OF ANNEXURES

Sl.No.	Description	Annexure No.
1	Copy of Minutes Board Resolution for Approval of Mine Closure Cost of JK - 5 Opencast Mine	**Annexure -1**
2	Copy of C&MD authorization letter	**Annexure -1A**
3	Certification of Lease Hold Areas Issued by State Governament	**Annexure - 2**
4	Certifyied plan of Lease hold area	**Annexure - 2A**
5	Copies of earlier approvals of the Mining Plan, if any	**Annexure - 2B, 2C & 2D**
6	Copy of MOC's letter granting recognition to RQP for preparation of Mining Plan.	**Annexure -3**
7	Letter of Authorization by the Director, SCCL to the RQP for preparation of Mining Plan	**Annexure -4**
8	Certificate of Acceptance of the RQP to formulate the Mining Plan & Mine Closure Plan on behalf of the Project proponent.	**Annexure -5**
9	A Certificate by the RQP that he has been duly authorized by the Mining company to preprare Mining Plan & MCP on their behalf and that he has a valid recognition from MOC under MCR, 1960 to prepare the Mining Plan and that provisions of all relevant rules and regulations made there under have been observed in the preparation of Mining Plan.	**Annexure -6**
10	The Mining Plan / Mine Closure Plan has been prepared considering the guidelines pertaining to Mining Plan / Mine Closure plan issued by MoC, GOI & wherever specific permission will be required the applicant will approach the concerned authorities.	**Annexure -7**
11	Confirmation from RQP that he has verified the Block area with the relevant plans CMPDI/SCCL/NLC and area covered by the Mining Plan does not encroach on any other Coal / Lignite Block.	**Annexure -8**
12	Certificate from empowered representative of / or Allottee / Applicant that the mine will be developed as per the approval of the Mining Plan from MoC and all other approvals, as required will be obtained from relevant authorities.	**Annexure -9**
13	Certificate of RQP that the project boundary considered for the Mine Closure Plan has been verified by RQP. It is in coherence with the block boundary of vesting order and approved Mining Plan and no discrepancy has been found.	**Annexure -10**
14	Certificate from empowered representative of / or Block allottee / applicant that he mine that the reclamation & rehabilitation work shall be carried out in accordance with the approved mine closure plan and any modification/amendaments which amy be made in the Mine Closure Plan by Ministry of Coal, from time to time.	**Annexure -11**
15	Documents in support of Mining Lease, in case the lease has already been granted.	**Annexure - 12**
16	Copy of letter of Hydrological Study Report	**Annexure -13**
17	Environmental Clearence	**Annexure -14**
18	Barchart showing Mine Closure Activities for Open Cast Project	**Annexure -15'A' & 15'B'**
19	DGMS Permissions	**Annexure -16**
20	Mining Leases held by SCCL	**Annexure -17**
21	Mining Leases pending for SCCL	**Annexure -18**
22	Consent of Operation	**Annexure -19**
23	Copy of Ground Water Clearance	**Annexure -20**

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JK - 5 OPENCAST MINE

E. LIST OF PLATES

Sl. No.	Description	Plate No.
1	Location Plan	I
2	KML File of the Block Area	IA
3	Topographical Plan	II
4	Certification of lease plan by State Government	IIA
5	Plan showing the Project Area vis-à-vis Geological Block & Mining Lease	III
6	Geological Plan	IV
7	Lithologs of Boreholes	V
8	Surface Feature Plan	VI
9	Conceptual Plan	VII
10	Pre-Mining Land Use Plan	VIII
11	Floor contour plan of Queen Seam	IXA
12	Isochore and Iso-GCV Plan of Queen Seam	IXB
13	Structures of Queen seam (Sheet 1 & 2)	IXC
14	Geological Cross Sections	X
15	Surface layout	XI
16	Land Use (During Mining) Plan	XII
17	Post Mining (End Land Use) Plan	XIII
18	Plan showing Coal to OB Ratio Plan (Stripping ratio)	XIV
19	Plan showing Coal Thickness and OB Thickness Plan	XIVA
20	Initial Plan upto 31.03.2018	XV
21	Stage Plan at the end of 1st year	XVIA
22	Stage plan at the end of 2nd year	XVIB
23	Final Stage plan (At the end of 3rd year)	XVIC
24	Ultimate Pit Configaration	XVII
25	Elements of Mining System Plan	XVIII
26	Post Closure Land Use Plan	XIX
27	Layout of Coal Handling Plant	XX

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MINING PLAN (INCLUDING FINAL MINE CLOSURE PLAN)
(3rd REVISION/MODIFICATION) FOR
JK - 5 OPENCAST MINE
F. LIST OF ABBREVIATIONS

Sl.No.	Abbreviation	Expanded Form
1	APPCB	Andra Pradesh Pollution Control Board
2	Approx.	Approximate
3	b.g.l	Below Ground Level
4	BH	Bore Hole
5	CC	Coal Controller
6	CHP	Coal Handling Plant
7	CO	Carbon Monoxide
8	Cum	Cubic Meters
9	dB(A)	Decibels
10	DGMS	Director General Mines Safety
11	EIA	Environmental Impact Assessment
12	EMP	Environmental Management Plan
13	Ext.	External
14	Extn.	Extension
15	GL	Ground Level
16	GPM	Gallons per Minute
17	GR	Geological Reserves
18	GVCF	Godavari Valley Coal Field
19	Ha	Hectare
20	HOB	Hard Overburden
21	Hr	Hour
22	Hz	Hertz
23	Int.	Internal
24	K.Cal/Kg	Kilo calories/Kg.
25	Kg	Kilogram
26	KLD	Kilo Litre per day
27	KLP	Kakatiya Longwall Project
28	Km	Kilometer
29	kmph	Kilometer per Hour
30	JK - 5 OC Mine	Jawaharkhani - 5 Opencast Mine
31	KTPS	Kothgudem Thermal Power Station
32	kV	Kilovolts

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33	kW	Kilowatts
34	kWH	Kilo Watt Hour
35	Leq	Equivalent Noise Levels
36	LPS	Litters per second
37	m	Meter
38	M.Cum	Million Cubic Meters
39	MBCM	Million Bank Cubic Meters
40	Mg	Milli Gram
41	mm	Millimeter
42	MOC	Ministry of Coal
43	MOEF	Ministry of Environment & Forest
44	Mt	Million tonnes
45	MTPA	Million Tonnes Per Annum
46	MVA	Mega Volt Ampere
47	NE	North East
48	No.	Numbers
49	NR	Not Recorded
50	NW	North West
51	OB	Overburden
52	OC	Opencast
53	PAF	Project Affected Families
54	PDF	Project Displaced families
55	PPM	Parts Per Million
56	RCC	Reinforced Cement Concrete
57	Rs.	Rupees
58	R&R	Rescue & Rehabilitation
59	SCCL	Singareni Collieries Company Limited
60	SDL	Side Discharge Loader
61	SE	South East
62	Sec.	Seconds
63	Sq.km	Square Kilometer
64	SW	South West
65	T	Tonnes
66	TSGENCO	Telangana State Power Generation Corporation Limited
67	TPD	Tonnes per Day
68	UG	Underground
69	V	Volts
70	°c	Degree Centigrade
71	µg	Microgram

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Ref. 340 12/01/2015 - CPAM
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G.CHAPTERS

CHAPTER 1
INTRODUCTION

1.1.0 General

The Singareni Collieries Company Ltd. (SCCL) is a Government coal mining company jointly owned by the Government of Telangana and Government of India on a 51:49 equity basis. The company was initially incorporated as "Hyderabad (Deccan) Company Limited" in England and acquired mining rights in 1886 to exploit coal found in Yellandu area. The present Company was incorporated on 23rd December 1920 under the Hyderabad Companies Act as a public limited company with the name 'The Singareni Collieries Company Limited' (SCCL).

In the year 1945, the State of Hyderabad, the Nizam's Dominion, took over Singareni Collieries Company Limited by acquiring all the stocks in the company, thereby continuing the mandate to mine coal from entire Godavari Valley Coal Field. In 1948, with annexation of Nizams' Dominion into Union of India, SCCL became a Government Company. From 1960, Govt. of India participated in Equity with 49% shares.

In 1972-73, all coking and non-coking coal mines of private operators (except the captive mines of IISCO, TISCO, and DVC) were nationalized and brought under Coal India Limited with a view of centralizing the Coal mining operation in all coal fields, other than Godavari Valley Coal Field. Since then, Ministry of Coal has been referring to Godavari Valley Coal Field as command area for SCCL. The mining rights of SCCL cover a stretch of 350 km in Godavari Valley with proved coal reserves of about 10971.04 Million Tonnes as on 31.3.2018 as per SCCL estimation.

SCCL currently operates 29 underground mines and 19 opencast mines located in 6 districts of Telangana State viz. Kumram Bheem, Mancherial, Peddapalli, Jayashanker-Bhupalpalli, Bhadradri-Kothagudem and Khammam. For administrative convenience, coal mines in Kumram Bheem & Mancherial districts are grouped under one region called Bellampalli Region, mines in Peddapalli & Jayashanker-Bhupalpalli districts are grouped under Ramagundam Region and mines in Bhadradri-Kothagudem & Khammam district are grouped under Kothagudem Region. All the Mining leases for coal held by SCCL are given in Annexure -17. Mining leases for coal applied by SCCL and pending for sanction and renewal are given in Annexure -18.

1.2.0 Demand and Supply

SCCL is the only coal mining company existing in Southern India and supplying coal to the major power utilities like NTPC, TSGENCO, APGENCO, KPCL and Maha GENCO. During financial year 2017-18, SCCL has supplied 53.44 Mt of coal to power utilities as per FSA quantities. Apart from supply to power utilities, 8.70MT coal was supplied to cement industry, captive power plants, heavy water plant and other consumers during FY 2017-18 through Fuel Supply Agreements. Further, SCCL supplied coal to small and medium scale sector units to the extent of 2.44 MT. Total coal supplied to customers by SCCL during FY 2017-18 was 64.58 MT.

After bifurcation of Andhra Pradesh State, Government of Telangana has embarked on an action plan for capacity addition of around 10,480 MW. SCCL has also constructed a power plant of 1200 MW capacity in Srirampur area. Further, NTPC also has the mandate as per AP Re-organization Act to set up 4000 MW Thermal Power Plant in Telangana State. With the addition of new power plants, there will be an additional demand for SCCL coal over and above the existing supplies. Therefore, SCCL, being a state-owned public sector company, has the responsibility to cater to the needs of the new power plants coming up in the State. The details of demand, supply and gap with regard to SCCL are furnished hereunder:

(Units in **Million Tonnes**)

Sl. No.	Year	2018-19	2019-20	2020-21
1	Demand	71.50	77.85	83.05
2	Production	65.00	68.00	72.00
3	Gap	-6.50	-9.85	-11.05

Projected production.

As, such, SCCL has set an ambitious production target of 70.00 MT for the year 2018-19 & is taking the following steps for increasing/maintaining the coal production.

- ❖ Adoption of opencast technology wherever possible for high rate of production.
- ❖ Conversion of shallow depth underground mines into opencast mines for extraction of balance coal reserves.
- ❖ Further extension of the existing opencast workings to the dip side up to optimum depth.

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- ❖ Improving the productivity in the existing mines by optimizing the utilization of resources like Manpower, Equipments and Time.
- ❖ Opening of new mines in the adjoining/superjacent areas/seams for higher production.
- ❖ Reconstruction of existing mines for optimum production by intermediate and high capacity technology.

In this context, it is proposed to enhance the production capacity of the existing JK-5 Opencast project from 2.50 MTPA to 3.50 MTPA with optimum utilization of resources like Manpower, Equipments and Time.

1.3.0 Applicant's Experience in Mining

The applicant, the Singareni Collieries Company Limited, having the distinction of being the first Government-owned Coal Company in India, has been engaged in coal mining activity for well over a century since it started exploiting coal in 1889. In 2016-17, SCCL has commissioned its own thermal power plant of 2X600 MW capacity in Jaipur of Mancherial district.

1.4.0 Project Background

Mining Plan (II Revision) & Mine Closure Plan of JK-5 Opencast Project was approved vide Lr. No.13016/20/2005-CA-II, dt.15.09.2015 with a rated capacity of 2.50 MTPA for a life of 8 Years from 2013-14.

Environmental Clearance was also obtained for Jawahar Khani Opencast Project vide letter No. J-11015/31/2013-1A-II(M), Dated:03.03.2016 for a rated capacity of 2.5 MTPA.

As per approved above Mining Plan, the project boundary was envisaged as 514.95 ha. Now the project boundary is revised to 490.14 ha, due to entire external dump area of 24.81 ha is avoided and planned entire dumping in the 266.81 ha JK OC voids to avoid further degradation of land. Hence, the project area has been reduced from 514.95 ha to 490.14 ha.

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1.5.0 Present Proposal

In view of existence of huge demand for coal and delay in starting of new projects, it is proposed to enhance the rated capacity of the existing JK-5 Opencast project from 2.50 Mty to 3.50 Mty. Further, the balance life of the project is 3 years only from 2018-19, as such it is proposed to prepare the final mine closure plan also.

The Salient features of the present proposal are provided in table 1.1.

Table 1.1

01	Name of the Project	JK - 5 Opencast project
02	Project Area (ha)	490.14 ha
03	Geological Block	JK-5 OCP Geological Block
04	Seams present	5 seams: A (Queen Seam), B Seam, C Seam, D Seam and E (King Seam).
05	Seams Considered	A (Queen Seam)
06	Technology Proposed	Opencast with Shovel Dumper Combination
07	Capacity (MTPA)	3.50 Mty
08	Life (years)	3 Years of balance life from 2018-19
09	Reserves (Mt) Geological: Minable: Extractable: Already extracted Balance extractable	 26.30 Mt 23.67 Mt 22.49 Mt 13.15 Mt. 9.34 Mt.
10	Status of Mining Lease	490.14 ha of project area is covered under 1st renewal of Yellandu Additional Mining Lease, which was granted vide G.O.Ms.No: 278 (I&C dept), dated:23.10.2007 to an extent of 1741 Ha for a period of 20 years and valid from 15.04.2004 to 14.04.2024.
11	Land	
	Forest land (Ha)	Nil
	Non-Forest land (Ha)	490.14 ha

Mining Plan was earlier approved for renewal of Yellandu Additional Mining Lease for two mines, namely JK 5 Incline and JK OC, which were operating. Subsequently, Revised Mining Plan (1st Revision) for part of Yellandu Additional Mining Lease (JK 5 OC Project) was approved by converting the aforesaid JK 5 UG Mine to OC by utilizing the decoaled voids of the aforesaid JK OC Mine and no other mine was operating in the Mining Lease area.

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Ref. 34012/01/2015-CPAM
Dt. 05-10-2017

Further, Mining Plan (II Revision) & Mine Closure Plan for JK 5 Opencast Project was approved for this sole operating mine in the said ML.

As such, only one mine has been operating all along previously with Single approved MP/MCP and thus, the present proposal would not affect any other mining plans.

The proposal is named as "Mining Plan (Including Final Mine Closure Plan) (3rd Revision/Modification) for JK-5 Opencast Mine".

Approval is sought for the "Mining Plan (Including Final Mine Closure Plan) (3rd Revision/Modification) for JK-5 Opencast Mine" as mentioned above in view of the following modifications.

- ***Increase in production capacity.***

1.6.0 Details of End Use Plant (S)

The main customer of the project is TSGENCO and coal is being supplied directly for its power utilities.

1.7.0 Mode of dispatch of coal:

At present, 2 Nos. of 500TPH feeder breakers are provided for crushing of ROM coal upto -200 mm in JK 5 OCP. Yellandu Area is having a 3.50 Mtpa capacity CHP to meet the coal dispatching requirement of the area. This CHP is handling the coal produced from JK-5 Opencast Project. The crushed coal from the Pit head CHP of JK 5 OC is being directly issued to customers through road dispatch or to Yellandu CHP for rail dispatch. The weighted average lead for transportation of coal from the pit to the Pit head CHP is 1.80 km. The existing Pit head Coal handling arrangements are capable to meet the additional output of 1 Mty due to production enhancement from 2.50 Mty to 3.50 Mty.

1.8.0 Washing of Coal:

Washing of coal is not envisaged for the coal produced from this mine. The ROM coal will be supplied after sizing, without beneficiation to the consumers.

1.9.0 JUSTIFICATION

- In order to meet the ever increasing coal demand, it is essential to enhance the production. The project has got capacity to contribute 3.50 Mt of coal per annum.

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- The project enables utilization of existing HEMM, manpower and infrastructure of JK OC.

- It is proposed to obtain Environmental Clearance for JK-5 Opencast Mine for the enhanced capacity from 2.50Mty to 3.50 Mty and name the project as JK- 5 Opencast Mine as per MoEF & CC - S.O. 804 (E), dated: 14th March, 2017 and S.O. 1030 (E), dated: 8th March, 2018.

Hence, the **"Mining Plan (Including Final Mine Closure Plan) (3rd Revision/Modification) for JK-5 Opencast Mine"** is prepared with enhanced production capacity of 3.50 Mty without increasing extent of land and submitted for approval.

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Dt. 25-10-2017

CHAPTER - 2
DETAILS OF EARLIER APPROVAL OF MINING PLAN

2.1 Details of Earlier Approved Mining Plan

Mining Plan (II Revision) & Mine Closure Plan of Jawaharkhani-5 Opencast Project was approved vide Lr. No.13016/20/2005-CA-II, dtd.15.09.2015 with a rated capacity of 2.50 MTPA for a balance life of 8 Years from 2013-14. Copy of approval letter of earlier Mine closure Plan is enclosed as **Annexure-2D**.

Mining Plan was earlier approved for renewal of Yellandu Additional Mining Lease for two mines, namely JK 5 Incline and JK OC, which were operating. Subsequently, Revised Mining Plan (1st Revision) for part of Yellandu Additional Mining Lease (JK 5 OC Project) was approved by converting the aforesaid JK 5 UG Mine to OC by utilizing the decoaled voids of the aforesaid JK OC Mine and no other mine was operating in the Mining Lease area. Further, Mining Plan (II Revision) & Mine Closure Plan for JK 5 Opencast Project was approved for this sole operating mine in the said ML.

As such, only one mine has been operating all along previously with Single approved MP/MCP and thus, the present proposal would not affect any other mining plans.

Salient Features of the Approved Mining Plan Vis-à-vis Proposed Mining Plan:

Description	As per Approved Mining Plan (II Revision) & Mine Closure Plan of Jawaharkhani-5 Opencast Project	As per Proposed Mining Plan (Including Final Mine Closure Plan) (3rd Revision/Modification) of JK-5 Opencast Mine
Lease area "Ha"	514.95	490.14
Project Area "Ha"	514.95	490.14
Life of the Project "Yrs"	03 from 2018-19	03 from 2018-19
Minimum and Maximum Depth of working "m"	35-120	35-120
Geological Block "Ha"	149.95	149.95
Production Target "MTPA"	2.50	3.50
Seams Available "As per GR"	5 seams (A (Queen), B, C, D & E (King seams)	5 seams (A(Queen), B, C, D & E (King seams)
Seams not considered for Mining with Reasons	Out of 5 seams, 3 seams (B, C, D) are very thin, lenticular in nature and unworkable and	Out of 5 seams, 3 seams (B, C, D) are very thin, lenticular in nature and unworkable and

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Description	As per Approved Mining Plan (II Revision) & Mine Closure Plan of Jawaharkhani-5 Opencast Project	As per Proposed Mining Plan (Including Final Mine Closure Plan) (3rd Revision/Modification) of JK-5 Opencast Mine
	King seam was exploited extensively by Britishers	King seam was exploited extensively by Britishers
Geological Reserve "Mt"	26.30	26.30
Blocked Reserve "Mt"	2.630 (Batters)	2.630 (Batters)
Minable Reserve "Mt"	23.67	23.67
Extractable Reserves "Mt"	22.49	22.49
% of Extraction/ recovery	85.51	85.51
OB in Mm^3	110.20	110.20
Reserve Depleted (upto 31.03.2018) Reserves " Mt"	13.15	13.15
Balance Extractable reserve from 01.04.2018 ("Mt")	9.34	9.34
Average Grade	G 15	G-15
Extractable OB in Mm^3 from 01.04.2018	37.25	37.25
SR Mm^3/te (Balance life)	3.988	3.988
Mining Technology	Opencast Mining by shovel-dumper combination	Opencast Mining by shovel-dumper combination
Coal Beneficiation envisaged	Beneficiation/washing is not planned	Beneficiation/washing is not planned
Handling of Rejects	Not applicable	Not applicable
Land use pattern " Ha"		
Excavation Area	149.95	149.95
Top Soil Dump		17.32
External Dump	247.04	195.56
Safety Zone	106.09	101.72
Other Use	7.41	7.41
Infrastructure area	4.46	18.18
Green Belt	-	-
Undisturbed Area	-	-
Total:	**514.95**	**490.14**
General gradient of the seams	1 in 7	1 in 7

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2.2 Deficiencies, if any, that existed in the Approved Mining Plan and their rectification proposals

There were no deficiencies in the approved Mining Plans. There was no change in the lease extent of the approved Mining Plans mentioned above.

2.3 Compliance of Condition(s) Imposed With Approval of The Mining Plan.

Sl. No	Conditions	Status of Compliance
1.	The mining company shall take all necessary precautions regarding safety of mine workings, persons deployed therein.	Complied
2.	Mining lease to be acquired shall not encroach into any other coal block.	Complied
3.	The approval of the Mine Closure plan is without prejudice to the requirement of approvals from competent/prescribed authority under the relevant rules/regulations, etc.	Complied

2.4 Salient Features Of The Approved Mining Plan Vis-À-Vis That During Actual Operation

Name of approved Mining Plan	Salient Features	Approved Mining Plan	Actual Operation
Mining Plan (II Revision) & Mine closure plan of Jawaharkhani-5 Opencast Project	Mining Lease extent	514.95 ha	490.14 ha
	Mining Method	Opencast with shovel dumper combination	Opencast with shovel dumper combination
	Production Capacity	2.50 Mty	2.96 Mty (2017-18)

Planned Production and Actual levels achieved in last 3 years

		Planned (Mte)		Actual (Mte)		
	Calendar year	Coal	OB	Total "Mte"	OB "MM3"	SR
Y-1	2015-16	2.50	14.180	2.514	16.526	6.57
Y-2	2016-17	2.50	14.070	2.692	15.941	5.92
Y-3	2017-18	2.50	13.510	2.962	8.686	2.93
	Total	**7.50**	**41.76**	**8.168**	**41.153**	**5.04**

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Due to optimum utilization of equipments, the higher rate production would have been possible.

The proposed equipment configuration in the MP/MCP has already achieved 2.94 Mty consistently in the last 4 years.

The gap in proposed capacity will be achieved through outsourcing mode, the equipment configuration of which is reconciled and modified.

However, the equipment configuration with matching rated capacity has been reconciled and modified.

2.5. Reasons for the Revision of Earlier Mining Plan

In view of existence of huge demand for coal and delay in starting of new projects, it is proposed to enhance the rated capacity of the existing JK-5 Opencast project from 2.50 Mty to 3.50 Mty. Further, the balance life of the project is only 3 years from 2018-19, as such it is proposed prepare the Final Mine closure plan also. Hence Mining Plan (Including Final Mine Closure Plan) (3rd Revision/Modification) for JK - 5 Opencast Mine is prepared and is submitted for approval.

*****

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Dt. 05-10-2017

CHAPTER 3

LOCATION, TOPOGRAPHY & COMMUNICATION

3.1 Location of Coal Deposit:

The Jawaharkhani-5 Opencast Project forms part of existing JK-5 Incline block, which situated near Sudimalla, Usirikayalapalli Village and falls in the Northern part of the Yellandu coal-belt between 21 Incline block and Yellandu OC (JK OC).The JK-5 OCP block covers an area of 1.4995 Sq.Km. The block is bound by North Latitudes $17^0$33'59" to $17^0$35'25" and East Longitudes $80^0$18'51" to $80^0$19'51", and is covered in Survey of India Topo sheet No:65C/6. The mine covers an area of 490.14 ha.

3.2 Access to the Location:

Jawaharkhani-5 Opencast mine is situated adjacent to Usirikayalapalli village in Yellandu mandal of Bhadradri district, Telangana State. Yellandu town is 37 Km due North West of Bhadradri district head quarters and a road links the two towns. The nearest rail head is the 'Singareni Collieries railway Station' the terminus of the branch line from Dornakal Junction. The state capital Hyderabad is connected both by rail and road and is 262 Km. from Yellandu.

3.3 Availability of Power Supply and Water:

The source of power for JK 5 OC project is fed from 33 KV sub station of TSTRANSCO located at Yellandu. This Sub-station is having sufficient spare capacity to fulfill the power requirement of this project. Two Transformers of 33/3.3 KV of 1.5 MVA capacity (One is standby) feed power to various loads. The Sub-station is commissioned near the entry of the quarry. From this Sub-station, 3.3 KV overhead transmission line is laid along the edge of the quarry to feed power to the equipment inside the quarry. The surface loads of workshop, stores etc., are fed by distribution transformers. The system of power supply at all the voltages in the project i.e., 3.3 KV, 550 V and 230 V are by earthing neutral as per statutory regulations.

The water produced in the mine during mining activity is being collected at identified sumps and is being pumped to surface by means of suitable capacity of pumps. The water is being treated in slow sand filters followed by disinfections can be utilized for drinking. The water required for industrial purpose such as washing, spraying, etc. is the pumped out water.

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Ref. 34012/01/2015-CPAM
Dt. 05-10-2017

3.4 Physiographic Features:

JK-5 OC Block is of plain to undulatory terrain sloping towards North. The topographic elevation of the block area varies from 235 m above MSL on the rise side of the property to 201 m above MSL near the main incline of JK-5 Incline. The average slope of the block is about 27m/km towards North North-West to South South-East. The plan showing the Topography of the area (Topographical Plan) is enclosed as Plate No: II.

The Reduced Level shown on Topographical plan is with reference to the MSL.

Datum as 700 m shown on Stage plans, cross sections etc. are with respect to Survey of Indian National Grid, which is required as per the DGMS Circular No.20/1966&No.42/1967.

3.5 Drainage Pattern:

There is no effective drainage developed in this area due to sandy soil cover and elevated ground. Two small streamlets are flowing over the mining block area. One of the above streamlet was diverted along dip side of the quarry to join Bugga vagu in the north. A peripheral drain also made and connected to the Bugga Vagu. The drainage density is 1.0 Km/Sq.Km. The drainage is scantily developed within the block area. There is no river or vagu flowing across or adjacent to the property. As such there is no significance of HFL for this Project.

3.6 Meteorology:

The area experience tropical climate of a distinct hot summer from March to May with temperatures recording around 45^{O} C, a good rainy season spreading from mid June to September and a pleasant Winter between October and February are the well defined seasons.

3.7 Rain Fall Data:

Daily rainfall data was collected from the nearest rain gauge station Yellandu and analysed During 1963-2017) rainfall varies widely from 544 mm (2009) to 1710 mm (2008) with an average of 1103.3 mm (Table-3.1). On average the SW monsoon contributes 80% of rainfall, while NW monsoon is 20%. The maximum monthly rainfall during this period is 799.6 mm (Sept '05).
The annual rainfall, percent deviation of rainfall from the mean and rainfall variability is presented in Table-3.1.

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Ref. 340 12/01/2015 - CPAM
Dt. 05-10-2017

3.7.1. Rainfall Data

Table-3.1

Year	Rainfall (mm)	% of deviation from avg. RF	Status	Year	Rainfall (mm)	% of deviation from avg. RF	Status
1973	1027.1	-6.9	Normal	1996	1013.2	-8.2	Normal
1974	1102.7	-0.1	Normal	1997	901.1	-18.3	Normal
1975	1052.3	-4.6	Normal	1998	1159.3	5.1	Normal
1976	868.8	-21.3	Deficit	1999	1054.5	-4.4	Normal
1977	1300.7	17.9	Normal	2000	974.5	-11.7	Normal
1978	915.8	-17.0	Normal	2001	994.4	-9.9	Normal
1979	1460.3	32.4	Excess	2002	1138.4	3.2	Normal
1980	1086.0	-1.6	Normal	2003	1432.8	29.9	Excess
1981	1089.7	-1.2	Normal	2004	1394.0	26.3	Excess
1982	968.6	-12.2	Normal	2005	1690.2	53.2	Excess
1983	1197.1	8.5	Normal	2006	1471.6	33.4	Excess
1984	1267.6	14.9	Normal	2007	922.2	-16.4	Normal
1985	612.8	-44.5	Deficit	2008	1710.8	55.1	Excess
1986	1404.0	27.2	Excess	2009	544.0	-50.7	Deficit
1987	557.6	-49.5	Deficit	2011	913.4	17.7	Normal
1988	1176.4	6.6	Normal	2012	1298	18.1	Normal
1989	1273.7	15.4	Normal	2013	1332	21.2	Excess
1990	1110.0	0.6	Normal	2014	566	-48.5	Deficit
1991	1612.6	46.2	Excess	2015	1219	11.0	Normal
1992	872.2	-20.9	Deficit	2016	1161	5.6	Normal
1993	1009.2	-8.5	Normal	2017	1012	-7.9	Normal
1994	808.4	-26.7	Deficit				
1995	1074.4	-2.6	Normal				
Maximum Yearly Rain fall (2008)						**1710.8**	
Minimum Yearly Rain fall (2009)						**544.0**	
Monthly Maximum Rain fall (Sep/2005)						**799.6**	
Mean						**1099.0**	

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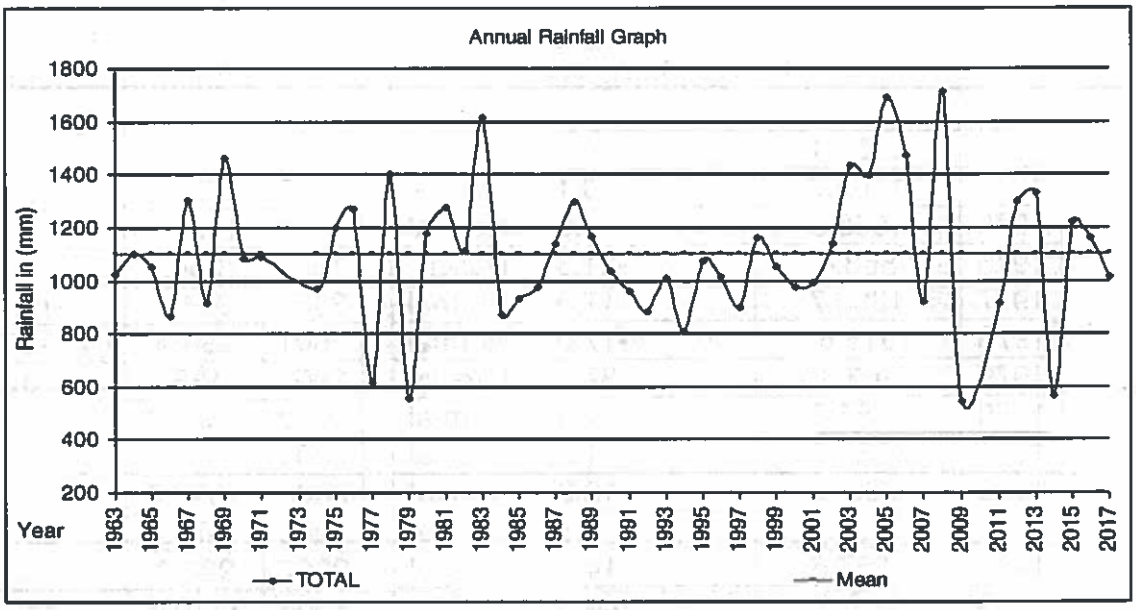
Annual rainfall data plot



3.8 PWD Roads & Railway Lines:

Yellandu town is 37 Km due North West of Bhadradri Kothagudem district head quarters and a road links the two towns. The nearest rail head is the 'Singareni Collieries railway Station' the terminus of the branch line from Dornakal Junction and 30 Km from Mahabubabad railway station of Grand-Trunk railway line between Warangal and Vijayawada. The state capital Hyderabad is connected both by rail and road and is 262 Km. from Yellandu.

3.9 Occupancy of Land:

There is no involvement of forest land in entire mine take area i.e. 490.14 ha of non forest land. The total land is under possession of SCCL. The Occupancy of & Ownership details of the land required for the Project and pre-mining land use is furnished in para 13.1 & Para 13.2 of Chapter 13.

3.10 Important Surface Features:

No important surface features exist within the project area. There are no wildlife sanctuaries, national parks, ecologically sensitive zones, defence installations and critically populated areas within 10 Km from the proposed project area. The project didn't require any Rehabilitation and Resettlement as no habitations fell within the project area.

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Ref. 34012/01/2015 - CPAM
Dt. 05-10-2017

3.11 Major Diversion & Shifting Involved:

Roads: Old metalled road connecting the previous Yellandu Opencast was existed within the project area. As this mine was converted in to JK-5 OC Mine there was no need for the diversion of the road.

Nallahs: There is no effective drainage developed in this area due to sandy soil cover and elevated ground. Two small streamlets are flowing over the mining block area. One of the above streamlet was diverted along dip side of the quarry to join Bugga vagu in the north. The drain made around the project served the purpose of diverting this nallah.

Power lines: Power transmission lines and telephone lines were passing over the quarry area. These were diverted before starting of the quarry operations.

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Dt. 05-10-2017

CHAPTER 4

EXPLORATION & GEOLOGY

4.1.0 Details of Exploration Carried Out:

The JK-5 OCP block is covered by Lower Gondwana group of rocks and is located in the rise side portion of existing JK-5 Incline area. The block covers an area of 1.50 Sq. Km. The block is bound by North Latitudes 17° 33' 59"' to 17° 35' 25"' and East Longitudes 80° 18' 51" to 80° 19' 51", covered in Survey of India Toposheet No. 65C/6 of Bhadradri Kothagudem District.

The mine boundaries are as follows :-

North West	Quarry surface is fixed about 100 - 200 m away from Railway track leading to 'Singareni collieries railway station'.
South East	Yellandu Opencast Project, Block-D
North-east	Quarry floor is about 150m in bye of Incrop of Queen Seam.
South West	Quarry floor aligns with 120m Depth line of Queen seam.

In the present JK-5 OCP block area, exploration for coal was started about a century back and has been continuing intermittently depending on the requirement. Very old boreholes data added with some new boreholes drilled were taken into consideration for preparation of this background information for this project.

The borehole density in the JK-5 Opencast mine is 21.34/Sq.km

Details of the boreholes drilled with time frame & agency:

S.no	Agency	No.of boreholes	Year
1	SCCL	32	1992 to 2008

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Ref 340 12/01/2015 - CPAM
Dt 05-10-2017

4.1.1 Details of Geological Report:

Seam wise borehole intersections and seam wise borehole density:

Following are the details furnished in the Geological Report of the JK-5 OCP block. Only one seam, i.e. Queen seam, is workable.

Seam	Area(Sq.Km)	No. of BH intersected	Bore hole Density
Queen Seam	1.4995	32	21.34

4.1.2 Requirement of Further Exploration:

The total area of the Block and all Coal seams have been explored in detail, so there is no requirement of further exploration.

4.2.0 Regional Geological Setup of the Area:

The Yellandu coal belt forms a major outlier of Godavari valley coalfield, situated 20 Km to the west of the main basin. It forms a narrow long belt extending over a length of 20 Km aligned in a North-North-West-South-Southeast direction and has an areal extent of about 60 Sq.Km. Talchir formation is exposed on the northern closure followed by Barakar along the eastern margin, while the central part and southern closure is occupied by Kamthi formation. In the northern part synclinal structure is more pronounced than in the southern part. Therefore, the beds dip in opposite direction at places. The development of coal seams and the general trend of the Gondwana sediments in this area are in broad conformity with the regional set up of the Godavari Valley Coalfield.

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Ref. 34012/01/2015 - CPAM
Dt. 05-10-2017

The generalized stratigraphic succession of Yellandu coalbelt is given below:

Age	Group	Formation	General Lithology	Max. Thickness (m)
Recent	--	--	Soil cover	6.20
P E R M I A N	L O W E R G O N D W A N A	KAMTHI	Ferrugenous sandstones, clays and shales	200+
		BARAKAR	Dominantly sandstones sub-ordinate clays & shales with few regionally persistent coal seams	350 ±
		TALCHIR	Greenish sandstones, clay/shales and boulder beds etc.	60+
----------Unconformity----------				
Pre-Cambrian		PAKHAL	Quartzites, Phyllites, Crystalline Lime stones etc	—
Archaean			Hornblende gneisses granite etc	—

4.2.1 Structure:

The Yellandu outlier comprises of two basins. The Northern basin is shallow while the southern basin is deeper the dividing line is almost at the centre. The western margin is faulted against the Pakhals and eastern margin shows normal deposition. The coal seams in general show, NNW-SSE strike and gradually swings to E-W on the southern side and continues along the western margin up to the central line. The dip of the beds varies from moderate to steeper. The outlier is divided longitudinally into two halves by a major fault with a throw to west. The coal mines are located along the eastern margin, upto the major fault on dip side and extended along the southern closure and followed the western margin upto the middle of the outlier. There are number of faults displacing the coal seams with varying throws.

The sub-surface data has established the occurrence of eight correctable coal seams within Barakar formation which are named from bottom to top as, 5-Incline seam, Marker/Index seam, Local seam, E/King seam, D seam, C seam, B-seam and A/Queen seam.

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Dt 7-10-2017

Sequence of coal seams of Barakar Formation in Yellandu coal belt is given below:

Seam/ parting	Lithology	Thickness (m)
	Surface soil	2 - 4
Strata	Predominantly brown to Pinkish sandstone with clays and one workable coal seam (Index seam)	250+
A/Queen	Seam with intercalations of shales carbonaceous shales and clays	1.53 - 18.59
Parting	Predominantly medium grained grey sandstone	5.25 - 16.67
B-Seam	Impersistent coal seam	0.24 - 2.26
Parting	Sandstone	4.45 - 19.50
C-Seam	Persistent coal seam but particular in nature	0.25 - 4.27
Parting	Grey sandstone with thin coal bands	8.53 - 22.98
D-Seam	Persistent coal seam devoid of dirt bands but lenticular in nature (mixed in a very limited area, in this 4 and 6 Incline along with King seam workings)	0.30 - 6.10
Parting	Grey sandstone	2.90- 23.61
E/King seam	Coal seam with clean coal bands, occurs in two sections, with a sandstone parting at places (extensively mixed through out the coal field in 1 to 8 Inclines and totally mined out)	0.15 - 4.11
Parting	Grey sandstone	5.41 - 16.56
Local seam	Lenticular coal seam(with thin persistent coal bands) occurring in bands	0.22 - 1.73
Parting	Sandstone	8.10 - 20.12
Marker/ Index Seam	Persistent coal seam occurring as thin coal bands	0.15 - 1.22
Parting	Grey Sandstone	6.40 - 10.04
5-incline seam	Thin coal seam devoid of dirt bands (mined in patches mostly in 5&6 Incline)	0.38 - 1.22
Strata	Sandstone	20 - 60
V seam	Coal	0.30 - 3.90
Talchir Formation	Greenish sandstone	60+

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Ref. 34012/01/2015 - CPAM
Dt. 05-10-2017

Local Geology Of JK-5 OCP Block:

The JK-5 OCP block is covered by Lower Gondwana group of rocks and is located in the rise side portion of existing JK-5 Incline area. The block covers an area of 1.4995 Sq. Km.

A brief description of the geological formations of JK-5 OCP Block area is given below:

4.2.2 Talchir Formation:

This is the basal most formation of the Gondwana super group, exposed within the block limits.

4.2.3 Barakar Formation:

This formation succeeds the Talchir formation with a gradational contact as revealed by the regional sub surface data. The Barakar Formation predominantly consists of medium to coarse grained brown and greyish white feldspathic sandstones, often found kaolinished with subordinate shales, clays and five correctable coal seams.

The sandstones are moderately hard in nature. Of the five coal seams only King and Queen seams are workable. B,C, D seams are very thin, lenticular in nature and unworkable. King seam was exploited extensively, by Britishers, in most of the area. These seams are mostly confined to middle part of the Barakar formation.

4.2.4 Kamthi Formation:

The Kamthi formation overlies the coal bearing Barakar Formation with gradational contact. This formation is not exposed within the block limits.
Note: Geological Plan of the Area is enclosed as Plate No-IV

4.3.0 Structure of the block:

The JK-5 OCP block area falls in the central part of the Yellandu coalbelt on its Eastern margin. Based on the surface and sub-surface data, the trend of the beds is NNW-SSE with dipping towards WSW.

The gradient of coal measures in this block vary from 1 in 6.5 to 1 in 7.5. The structure of this block has been interpreted based on the geological cross sections (Plate-VII), floor contours of coal seam (Plate-VIA) and seam structures (Plate-VIC) further, this block was already worked with underground and the structure is well established.

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Ref. 34012/01/2015-CPAM
Dt. 05-10-2017

4.3.1 Faults:

The JK-5 OCP Block is dissected by 15 faults. The particulars of the faults such as fault trend, throw direction and amount, linear extent and evidence of faulting etc., are given below.

Sl. No.	Fault No.	Type of Fault	Trend of fault	Throw Amount & direction	Linear extension	Evidence for faulting
1	FI-FI	oblique	NW-SE	25-31m towards S W	1842m	Difference in floor levels between Bh Nos.196 and 168
2	F2-F2	Oblique	NW-SE	3m towards SW	742m	Fault encountered in the underground workings
3	F3-F3	Oblique	NW-SE	2m towards NE	133m	Fault encountered in the underground workings
4	F4-F4	Oblique	NW-SE	5-10m towards SW	465m	Difference in floor levels between Bh Nos.240 and 493
5	F5-F5	Oblique	NW-SE	7-13m towards NE	462m	Difference in floor levels between Bh Nos.457and 494
6	F6-F6	Oblique	NW-SE	7m towards SW	468m	Fault encountered in the underground workings
7	F7-F7	Oblique	NW-SE	3m towards SW	174m	Fault encountered in the underground workings
8	F8-F8	Oblique	NW-SE	Im towards SW	66m	Fault encountered in the underground workings
9	F9-F9	Oblique	NW-SE	5m towards NE	216m	Fault encountered in the underground workings
10	F10-F10	Dip	NE-SW	2m towards SE	123m	Fault encountered in the underground workings
11	F11--F11	Oblique	WNW-ESE	2.5-5m towards SSW	244m	Fault encountered in the underground workings
12	F12-F12	Oblique	WNW-ESE	Im towards NNE	264m	Fault encountered in the underground workings
13	F13-F13	DIP/ Oblique	NE-SW	5m towards NW	147m	Fault encountered in the underground workings
14	F14-F14	DIP/ Oblique	E-W	1.8m towards North	280m	Fault encountered in the underground workings
15	F15-F15	DIP/ Oblique	E-W	1.5m towards North	175m	Fault encountered in the underground workings

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Dt 05-10-2017

4.3.2 Stratigraphic Sequence:

The JK-5 opencast forms part of existing JK-5 Inclines block, which is situated in the Northern part of the Yellandu coal-belt between 21 Incline block and JK OCP. The stratigraphic sequence of the block is given below:

Age	Group	Formation	Lithology	Thickness(m)
Recent			Soil cover	0.60-6.20
P E R M I A N	Lower Gondwana	Kamthi	Medium to coarse grained brownish, grey ferruginous and calcareous sand stones	
			----Gradational contact----------	----------
		Barakar	Medium grained sand stones with coal seams and sub ordinate shales/clays	181.90+
			Gradatinal contact ----------	----------
		Talchir	Greenish sand stones and silt stones	

4.3.3 Characteristics of the Lithological units:

The generalised sequence of coal seams based on sub surface data is summarized in the Table given below.

Strata/Se	Lithology Description	Thickness
Strata	Medium to coarse grained brown to grey sandstone pebbly at places	13-126m
"A" (Queen	Coal seam of composite nature with carb. shale, carb.clay intercalations	5.79-20.23m
Strata	Medium grained grey sandstone with thin carb.shale/coal bands	5-27m
"B" seam	The seam is represented by coal /carb.shale bands	0.10-0.61 m
Strata	Medium grained sandstone with thin carb.shale/coal bands	6-15m
"C" seam	The seam consists thin coal bands with carb.shale intercalations	0.30-1.20m
Strata	Medium grained sand stone with very thin coal/carb.shale intercalations	7-23m
"D" seam	By and large contains clean coal and at places with carb.shale bands	0.60-0.91 m
Strata	Medium grained sandstone	5-32m
"E" (King	Contains clean coal	0.15-3.00m
Strata	Medium to Fine grained sandstone	5.0-20.0m

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4.4.0 Description of Coal Seams:

Detailed exploration carried out in JK-5 Incline area has proved the existence of 5 coal seams viz. E (King seam), D seam, C seam, B seam and A (Queen seam). Out of the five coal seams, only King and Queen seams are workable. B,C, D seams are very thin, lenticular in nature and unworkable. King seam was exploited extensively, by Britishers, in most of the area. Since the E/King seam was extensively exploited during Britishers period and the three seams namely D, C & B are unworkable, only the Queen seam which is persistent and workable has been considered for opencast assessment upto a depth of 120 m.

Brief description of Coal seams is furnished here under:

4.4.1 E (King Seam)

This seam is the bottom most workable coal seam in JK-5 OCP area. It has been extensively exploited by Britishers.

4.4.2 D seam

This seam overlies the King seam with a parting thickness varying from 5 to 32m. This seam does not attain workable thickness. This serves as marker horizon.

4.4.3 C seam

This seam overlies the D seam with a parting thickness varying from 7 to 23m. This seam does not attain workable thickness. This serves as marker horizon.

4.4.4 B seam

This seam overlies the C seam with a parting thickness varying from 6 to 15m. This seam does not attain workable thickness. This serves as marker horizon.

4.4.5 A (Queen Seam)

This is the top most persistent coal seam and has been extensively developed by Bord & Pillar and Longwall method of mining. It occurs over a considerable area with a good workable thickness and is considered for extraction of coal by opencast method. The depth of (roof) intersection varies from 13.70 to 126.35m. The thickness of the seam varies from 5.79m. to 20.23m.

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Ref. 34012/01/2015 - CPAM
Dt. 05-10-2017

4.5.0 Quality of the Coal Seams with Grades:

The JK-5 OCP consists of only one workable seam, namely, Queen seam, having average thickness around 14m. Overall gradient of the seam is 1 in 7. The seam was fully developed in bottom as well as top section with Bord & Pillar System. A portion of the property is also depillared by caving. Quality of the coal is invariably diluted in process of excavation. The dilution is relatively more in developed and steep gradient seams.

OB and Coal is being subjected to drilling, blasting, dozing, grading, water spraying and shoveling. As this project contains underground galleries, the overburden immediately above the coal seam, and the coal is being blasted simultaneously to ensure safety as per DGMS stipulations. So the dilution of coal with OB is inevitable. In the process of excavation, the coal gets contaminated particularly along the roof as well as floor horizons and around underground gallaries. It is seen in the present workings that spontaneous heating is also prevalent in the old gallaries. It is observed that the quality of coal gets diluted with the fire.

During preparation of Geological Report, the average Gross Calorific Value of Coal seam is calculated based on the Ash and Moisture percentages. But, dilution is inevitable while operation of Opencast Mine. About 10 cm layer of OB along floor, roof and all around galleries due to spontaneous heating is considered for dilution. Further, 30% volume of galleries filled with OB is considered for dilution in the Coal. All together, the percentage of dilution is estimated at 6% including spontaneous heating for this project. The Gross Calorific Value (GCV) and grade of the seam is arrived at basing on standards of grading for SCCL.

The quality and thickness parameters of the Queen Seam of JK-5 OCP Block are shown below

Bh.No.	From	To	Thickness(m)	M%	A%	GCV	Grade
Q/457	55.94	68.2	12.26	2.54	49.67	3266	G14
Q/493	72.73	88.25	15.52	2.38	48.45	3395	G14
Q/495	74.45	91.78	17.33	2.24	50.68	3199	G14
Overall Grade						**3285**	**G14**
Overall Grade with 6% dilution						**3088**	**G15**

The average GCV and Grade of the JK-5 OCP is 3285 K.cal/Kg and G-14 respectively. With 6 % dilution, the average GCV and Grade of the JK-5 OCP is 3088 K.cal/Kg and G-15 respectively.

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Ref 34012/01/2015-CPAM
Dt 05-10-2017

4.5.1 Thickness Computation

As this mine was worked earlier by underground and day lighted presently, the Queen seam is well proved. Apart from this, data has been established through subsurface information obtained through detailed drilling programme.

Based on the total ash and moisture content, the Central Fuel Research Institute has classified the carbonaceous material as coal upto 40%, shaly coal between 40% to 55%, Carbonaceous shale between 55% to 75% and non-combustible bands above 75%. Based on the above characteristics, the in band thickness of the seam is computed by considering coal, shaly coal and carbonaceous shale up to 1.00m thickness within the seam. The non-combustible bands like sandstones, clays, shales, carb.clays and shaly sandstones which are having more than 0.05m thickness are excluded from the computation of in-band thickness.

4.5.2 Grading

The grade wise Specific gravity considered for all the coal seams are given in the Table below:

Grade	Specific Gravity	GCV(K.Cal/Kg)	UHV(K.Cal/Kg)
A	1.4	>6333	>6200
B	1.45	5925 - 6333	5600 – 6200
C	1.5	5475 - 5925	4940 – 5600
D	1.55	4971 - 5475	4200 – 4940
E	1.61	4399 - 4971	3360 – 4200
F	1.68	3745 - 4399	2400 - 3360
G	1.75	2996 - 3745	1300 - 2400

The Useful Heat Values are calculated by using following formula.
UHV = 8000 -138 (Ash% + Moisture%)

The Gross Calorific Values are calculated by using following formulae.
GCV = 85.56*(100 - (1.1*Ash% + Moisture%)) - 60*Moisture%

GCV = 2111+0.681*UHV

For the purpose of calculations of quality and quantity for seam wise mineable coal reserves of JK-5 Block, the Specific gravity as detailed above have been considered.

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The coal mined and marketed by the Singareni Collieries, is graded as per the notification of Govt. of India (No.S.O.13/E, dated January 1984) with effect from 01.01.1985 as shown below:

Grade	UHV (K.Cal/Kg.)		GCV (K.Cal/Kg.)		GCV Grade		Specific gravity
	From	To	From	To	From	To	
B	5600	6200	5925.7	6334.4	G5	G4	1.45
C	4940	5600	5476.1	5925.7	G7	G5	1.5
D	4200	4940	4972	5476.1	G8	G7	1.55
E	3360	4200	4399.8	4972	G10	G8	1.6
F	2400	3360	3745.9	4399.8	G12	G10	1.68
G	1300	2400	2996.6	3745.9	G15	G12	1.76

As the coal is G-15 grade and inferior, the density of coal was considered as 1.75.

4.6.0 Surface Contour Plan & Geological Plan:

Surface Contours at 3m interval are shown in Surface Features Plan, attached as Plate No. 6. The Geological Plan showing all boreholes drilled along with allotted block boundary and required lease hold boundary marked in distinct colors are attached as plate No. 4.

4.7.0 Methodology of Reserve Estimation:

Estimation of seam wise geological reserves is done by using the **Carlson Mine Planning Software.**

4.8.0 Reserve Estimation:

During Reserve estimation, a 10% deduction has been made from the geological reserves towards the un-foreseen geological disturbances to arrive at geological reserves in the proposed quarry area. Heave zones of the faults are excluded from reserves calculation. Seams with thickness less than 0.50m were considered as uneconomical. As such, the Reserves for B, C and d seams are taken to be uneconomical due to less thickness. Mineable reserves are obtained by deducting reserves to be left in the batters & uneconomical reserves from geological reserves.

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4.9.0 Geological Reserves & Reserves Already Extracted:

The observation has been complied with. Extractable reserves are now estimated by deducting 5% from the mineable reserves as standard practice. Accordingly, the changes are made at all relevant pages. The details furnished below Table.

Geological reserves are calculated with the help Carlson Mine Planning Software. Seam wise geological reserves, mineable reserves, Mining Losses, extractable reserves & Balance extractable reserves are shown in table 4.6. As the mine is already being worked with shovel dumper combination since 2013-14.

The details of Geological Reserves of the whole Block vis-à-vis Geological Reserves considered for present proposal are shown below.

Seam	Thickness Range 'm'	Depth Range 'm'	Net GR "Mte"	Blocked Reserve below (Mte)					Mineable Res " Mte"		Mining losses (Mte)
				High wall/ Batters	Nala/ River/ Road	Barrier	Un-economic/ unworkable	Total Blocked	UG	OC	
"A" (Queen) Seam	5.79 - 20.23	30 - 120	26.3	2.63						23.67	1.18
Total			26.3	2.63						23.67	1.18

Seam	Ext Res "Mte"			As on base date "Mte"							Reason not considered for mining
				Depletion of Reserve			Balance Reserve				
	UG	OC	Highwall	UG	OC	High wall	UG	OC	High wall	Total	
"A" (Queen)		22.49			13.15			9.34		9.34	
Total		22.49			13.15			9.34		9.34	
Percentage of Extraction										85.51%	

The JK-5 OCP Block covers an area of 1.4995 Sq.Km, with 26.30 Mt of Geological Reserves and 22.49 Mt of extractable reserves.

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4.9.1 Reserves Already Extracted

The JK-5 Opencast Mine is an existing project and conversion of part of JK-5 Incline into opencast upto the depth of 120m. The JK-5 OCP is producing Coal from 2012-2013.

In Million Tonnes

Seam	Geological Reserves	Extractable Reserves	Reserves already extracted		Balance extractable reserves
				OC	
Queen	26.30	22.49		13.15	9.34

The JK-5 Opencast Mine is planned to extract up to 120 mtr depth from Queen seam only. Out of the balance 4 seams, E/King seam was extensively exploited during Britisher's period. Remaining B, C, D seams are very thin, lenticular in nature and not extractable by even OC method.

4.9.2 Floor Contour Plans, Seam folio Plans & Iso-Grade Plans:

Surface Feature Plan, Geological Plan, Land Requirement Plan and Floor Contour Plan, Iso-core & Iso-UHV plan, Structure Plan and geological cross sections of Queen seam of JK-5 Opencast project area are given below.

Sl.No.	Description	Plate.No.
1.	Surface Feature Plan	VI
2.	Geological Plan	IV
3.	Floor Contour Plan of Queen Seam	IX A
4.	Iso-Chore & Iso-UHV Plan of Queen Seam	IX B
5.	Structures of Queen Seam	IX C
6.	Geological Cross Sections	X

4.10 UNFC CLASSIFICATION:

UNFC Classification is an initiative taken by United Nations to develop a user friendly and uniform system for clarifying and reporting reserves of solid fuels and mineral commodities & resulted in development of United Nations Framework Classification for Reserves and Resources of Solid Fuels and Mineral Commodities (UNFC 1997). In 2004, the classification was extended also to apply to petroleum (oil and natural gas) and uranium (UNFC-2004).

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UNFC is a three-digit code-based system, for defining the reserves/ resources for immediate recognition of status. The First Digit in the Code represents Economic viability axis, the second digit in the code represents Feasibility axis & the third digit represents Geological Axis. The sequence is always fixed, i.e. if the deposit is characterized as E-1, F-1, G-1 it will be written in number form as 111. The details are furnished in pictorial format below.

AXIS CODE	AXIS DESCRIPTION	AXIS-WISE UNITED NATIONS FRAMEWORK OF CLASSIFICATION			
E	ECONOMIC	ECOMOMIC	POTENTIALLY ECONOMIC	INTRINSICALLY ECONOMIC	
		1	2	3	
F	FEASIBILITY	FEASIBILITY AND MINING REPORT	PRE-FEASIBILITY STUDY	GEOLOGICAL STUDY	
		1	2	3	
G	GEOLOGIC	DETAILED EXPLORATION	GENERAL EXPLORATION	PROSPECTING	RECONNAISSANCE
		(PROVED RESERVES)	(INDICATED RESERVES)	(INFERRED RESERVES)	(SCOUTING)
		1	2	3	4

UNFC Classification												
COAL RESOURCE (Mt)								*COAL RESERVES(Mt)*				*TOTAL*
3,3,3	*3,3,2*	*3,3,1*	*3,2,1*	*2,3,1*	*2,2,1*	*2,1,1*	*Total*	*1,2,2*	*1,2,1*	*1,1,2*	*1,1,1*	
0	*0*	*2.63*	*1.18*	*0*	*0*	*0*	*3.81*	*0*	*0*	*0*	*22.49*	*26.3*

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Project	UNFC Classification	UG & OCP
Geological Reserves (Mt)		26.3
Projectised (Mt)		26.3
Blocked in batters(Mt)	3,3,1	2.63
Blocked in barriers(Mt)	2,3,1	--
Mining losses (Mt)	3,2,1	1.18
Extractable reserves considered (Mt)	1,1,1	22.49

4.11 Hydro-Geological Report:

The attitude of phreatic surface in this area is being monitored since 1997 on long term basis periodically. The depth to water varies over a wide range from 1.90 m to 11.90 m during pre-monsoon period and 0.10 m to 9.70 m during post - monsoon period. The water level fluctuation during 2012, on an average, is 0.9 m to 7.55m, with a net fluctuation of 2.67m. The depth of the open wells in this area varies from 5.50 to 12.0m with diameter varies from 1.0m to 4.0m. The attitude of phreatic surface is furnished in Hydrogeological Report.

Six Piezometric wells were constructed at a distance of 300 and 600m from the edge of the JK-OCP. The depth to water varies from 3.40m to 15.08 in a year. The attitude of piezometric surface data is furnished in Hydrogeological Report.

An Aquifer Performance Test (APT) is conducted in the nearby Koyagudem OC Block of Yellandu area. Since JK-5 OC Block is of similar hydro-geological environ, the aquifer performance test data of Koyagudem OC mine is used to assess the probable inflow of water into the workings of JK-5 OC Block.

From the Aquifer Performance Test conducted at Koyagudem OC, the hydraulic parameters are estimated to be:

Transmissivity	:	10.73 m2/ day
Hydraulic Conductivity	:	9.4x10-2 m/day
Storativity	:	5.13x10-4

The above data indicates that the aquifers are under confined condition.

Copy of the Hydro geological Report is enclosed as Annexure-13.

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CHAPTER 5

MINING

5.1.0 Mine Boundaries:

As in any opencast mine, the boundary of Jawaharkhani-5 Opencast Mine was delineated based on surface constraints, lay and disposition of the coal seams, position of in-crop and disposition of various faults. The following geo-mining conditions and surface features were taken into consideration for delineating the Jawaharkhani-5 Opencast Mine boundary.

North - 21 Incline Underground Mine.
East - Incrop / Basement
South - F20-F20 fault.
West - Pollampalli /JK-5 Dip side block.

Floor of seam was taken as pit floor.
For the project boundary, the parameters are worked out as furnished in table 5.1:

Table 5.1

Sl.No	Description	Value
1.	Geological Reserves (Mt.)	26.30
2.	Extractable Reserves (Mt.)	22.49
3.	Reserves already extracted by OC (Mt.) upto 31.03.2018.	13.15
4.	Balance extractable Reserves (Mt.) from 01.04.2018	9.34
5.	Total Overburden (Mm^3)	110.20
6.	Overburden already extracted (M.Cum) uptp 31.03.2018	72.95
7.	Balance Overburden (Mm^3) from 01.04.2018	37.25
8.	Average Stripping Ratio (tonnes/Cum)	4.899
9.	Stripping ratio for balance life of the project	3.988
10.	Capacity (Mty)	3.50
11.	Life of the mine (Yrs.) from 01.04.2018	3
12.	R&R Involved	Nil

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5.2.0 Choice of Mining Method

The JK-5 OCP Block was considered for opencast method because of the following reasons:

- Occurrence of Coal Seam at shallow depth, i.e. 35m
- Having shallow depth limit, i.e. 120m
- Having Maximum Strike length of 2.4 Km.
- Need for Bulk Production with minimum Sterilisation of Reserves.
- Mild Gradient, i.e. 1 in 7.0.
- Economical Stripping ratio, i.e., 4.899 Cum/T.
- Sterilisation of reserves already worked by Underground method

Hence the mining was proposed by Opencast (Shovel-Dumper combination) method to extract the remnant reserves.

5.2.1 Choice of Technology:

Shovel-Dumper Combination:

Under the prevailing geo-mining conditions, with multiple seams and steep gradient, it was proposed to mine the property using shovel-dumper combination which was considered most suitable.

The method of work with Shovel-dumper Mining comprises of

- Initial opening of Box cut
- Removal of topsoil
- Removal of OB to expose the coal seam
- Excavation of coal

5.2.2 Justification for Optimization of Targeted Capacity:

Optimization of target capacity at 3.50 Mty is based on the following factors:

- Quantity of OB to be handled,
- Maximization of internal dumping,

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- ❖ Geological disturbances such as faults,
- ❖ Conservation of coal reserves,
- ❖ Thickness and gradient of the seams.

5.3.0 Sequence of Mining:

5.3.1 Sequence of Mining for Opencast Project:

The mining sequence was planned in such a way as to permit mining the coal reserves in a more effective manner and at the same time allows backfilling of considerable quantity of overburden. This aspect considerably mitigates the adverse environmental impact generally associated with opencast mining. Sequence of mining was also planned considering the lay and disposition of the deposit.

Based on the analysis of various Stages of mining and life of mine, the development strategy has been arrived at.

The sequence of mining is based on the criteria of start-up of mining operations at minimum depth, optimizing running stripping ratio and at the same time creating sufficient space as early possible for internal dumping. The above sequence is to ensure superior cash flows in the initial stages of mining as well as superior back-filling of voids created during the course of mining operations.

The haul road width of 30 m has been designed considering space for dozer track, pipes, electric lines, cables, provision for berms and two way traffic for dumper movement. Adequate lighting arrangements were made for smooth mining operations at night. Further, to improve visibility, numbers of bends are restricted and the road is nearly straight.

The sequence of operations were planned considering:

- ❖ Availability of sufficient coal exposure to sustain a steady level of production.
- ❖ Creation of sufficient void for accommodating the OB internally.

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5.4.0 Production Scheduling

Year wise production achieved for the last 3 years is furnished in the table below.

		Planned (Mte)		Actual (Mte)		
	Calendar year	Coal	OB	Total "Mte"	OB "MM3"	SR
Y-1	2015-16	2.50	14.180	2.514	16.526	6.57
Y-2	2016-17	2.50	14.070	2.692	15.941	5.92
Y-3	2017-18	2.50	13.510	2.962	8.686	2.93
	Total	**7.50**	**41.76**	**8.168**	**41.153**	**5.04**

5.4.1 Year wise Production Schedule of JK - 5 OC Mine:

The JK-5 Opencast Mine is planned for a rated capacity of 3.50 Mty. The balance life of the project will be 3 years from 2018-19.

Year wise total production schedule is furnished in table 5.4.

Table 5.4

Year		Coal Production (Mte)			OB "Mm^3"	SR
		UG	OC	Total "Mt"		
Upto 31.03.2018			13.15	13.15	72.95	5.548
Y-1	2018-19		3.00	3.00	12.978	4.326
Y-2	2019-20		3.50	3.50	14.896	4.256
Y-3	2020-21		2.84	2.84	9.376	3.301
Sub-total			**9.34**	**9.34**	**37.25**	3.988
Grand Total			**22.49**	**22.49**	**110.20**	4.899

5.5.0 Equipment Configuration

The proposed equipment configuration in the MP/MCP has already achieved 2.94 Mty consistently in the last 4 years.
The gap in proposed capacity will be achieved through outsourcing mode, the equipment configuration of which is reconciled and modified.

However, the equipment configuration with matching rated capacity has been reconciled and modified.

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In the JK - 5 Opencast Mine, Shovel-Dumper combination is being deployed departmentally for extraction of coal seam. OB removal is being done by departmental as well as out-sourcing agency. The departmental equipment deployed is furnished in table 5.5.

Table-5.5

SL.NO.	PARTICULARS	No. of Units
A)	C O A L (Departmental)	
1	3-3.5 Cum Hyd. Shovel	1
2	3-3.5 Cum Diesel Hyd. Shovel	1
3	35 T Rear Dumpers	14
4	150 - 160 mm RBH Drills	2
5	410 HP Dozers	2
B)	Overburden (Offloading)	
1	3.0 Cum Hyd. Shovel	12
2	15 Cum Dump Trucks	60
3	145 HP Motor Graders	5
4	150 - 160 mm RBH Drills	5
5	410 HP Dozers	6
6	28KL Water Sprinkler	6
C)	C O M M O N (Departmental)	
1	280 HP Motor Graders	1
2	145 HP Motor Graders	2
3	0.9 Cum. Diesel Hydraulic Shovel	1
4	28KL Water Sprinkler	1
5	4-5 Cum FEL	1
6	Diesel Bowser 12 KL	1
7	8/10T Cranes	3
8	40T Crane	1
9	Fire Tender	1
10	Mobile maintenance van	1

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5.6.0 Brief Description of All Operation

5.6.1 Coal Winning in Opencast Project

The mining sequence has been planned in such a way as to permit mining the coal reserves in a more effective manner and at the same time allows backfilling of considerable quantity of overburden. Both overburden and coal will be broken by drilling vertical holes and blasting with explosives. The methods of excavation of OB and extraction of coal in virgin & underground developed areas are explained below.

5.6.1.1 In Virgin Area:

Since most the strata requires drilling and blasting operations before excavation, major portion of overburden is planned to be excavated by Shovel Dumper combination by hiring of HEMM, except meager quantity from inter parting by departmental HEMM.

In this method, the equipment is deployed on a horizontal plane and their movement is along a particular horizon. This method has been adopted as the equipment is not able to stand/ work along the inclined plane where inclination is 1 in 6.0. For extraction of coal, diesel operated hydraulic backhoes are used to facilitate quick withdrawal of the machine when it is required.

5.6.1.2 Over UG developed/worked-out Area:

In the case of area where underground workings are developed, the method of mining is slightly differ from the method described above. A layer of parting of minimum 4m thickness in OB and 6 m thickness in coal is being left over the developed seams and the equipment is deployed above this parting so as to prevent them from falling into the U/G galleries. The drilling is done in the lower horizon. Where the coal seam is developed in the upper horizon, the drilling is done in solid parting and where coal seam is developed in the lower horizon, the drilling is done both in solid parting and in coal seam together(as per requirement of parting thickness). Drilling is done over the coal pillars and drilling over the galleries is avoided. Then blasting is carried out in both overburden and coal. This helps in packing the galleries with blasted material, which prevents the machinery from falling into the galleries. This method is adopted in view of the experience at Gouthamkhani OC, JK OC and RG OC-III of SCCL, where developed pillars are being extracted.

In the extraction of coal, diesel operated hydraulic shovel is being used to facilitate selective mining and quick withdrawal of the machine, if required.

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Different safety rules in force and regulations made under Mines Act 1952 is being strictly followed in the mine. Various precautions as laid down in DGMS circulars issued from time to time in this regard are also taken into consideration.

The special precautions being taken based on the earlier experience in SCCL are as follows:

- The actual working plans of the opencast mine and the old plans of the developed underground mine workings are maintained and checked regularly.
- The galleries and junctions of the developed underground workings are accurately and clearly plotted on the plan of the opencast workings and also demarcated on the OB and coal benches.
- The thickness of parting over developed seam is reduced up to 6 m so as to prevent chances of the heavy machinery from falling into the underground workings.
- Holes are drilled in the pillar and the parting allowed to drop so as to fill in the void for safe working of the heavy machinery.
- The spacing of the holes in the last overburden bench (immediately above the coal seam) is so adjusted that the holes do not lie immediately above the galleries to ensure that the blast holes do not directly fire into the underground workings.

While drilling over galleries, initially, the physical parting over the gallery is ensured at various points and as per physical parting, drilling is carried out by terminating the hole by leaving 1.5-2.0 m of parting over the gallery.

5.6.2 Coal Extraction & OB Removal Details:

Upto 31.03.2018, Coal : 13.15 Mt extracted and Overburden: 72.95 Mm^3 removed.

5.6.2.1 Coal & OB Extracted till 31.03.2018

Since inception of the project i.e. up to 31.03.2018, total coal extracted was 13.15 Mt and OB, including top soil, removed was 72.95 Mm^3. Top soil removed up to 31.03.2018 was 2.688 Mm^3. Hence hard OB removed up to 31.03.2018 was 70.262 Mm^3. Out of 70.262 Mm^3 of hard OB, about 69.56 Mm^3 was dumped in external dump yard, raising the dump up to 60m above surface level, and about 0.702 Mm^3 was dumped in internal dump yard up to 31.03.2018.

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Since commencement of mining operations, total project topsoil of about 2.688 Mm^3 was removed up to 31.03.2018. Out of 2.688 $Mm^3$of top soil, 0.248 Mm^3 was temporarily stored, 2.44 Mm^3 was spread on external dump yards up to 31.03.2018.

5.6.2.2 Coal & OB Extracted During balance life of the Project i.e. next 3 years:

During balance life of the Project i.e. next 3 years, quarrying of JK-5 Opencast mine produces 9.34 Mt of coal with 37.25 Mm^3 of OB removals. This quantity of OB i.e. 37.25 Mm^3 will be totally dumped in internal dump yard only. Further dumping in external dump yard is not envisaged.

Hence, the total coal that will be extracted from the project throughout the life of the project will be 22.49 Mt and the OB will be 110.20 Mm^3 including 3.620 Mm^3 of Topsoil.

Stage wise cumulative figures of coal extracted & OB removed along with volume of excavation, volume of internal dump, volume of external dump & void left is furnished in table 5.6.

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Table 5.6

Production Year		Coal Production		OB Removal (Mm^3)			Total Excavation (Mm^3)	Hard OB Placement (Mm^3)			Top Soil (Mm^3)			
		MT	Mm^3	Top soil	Hard OB	Total		Internal (A)	External (B)	TOTAL (A+B)	Temp Stor-age	Spreading		Total
												Internal Dump	Ext. Dump	
Upto 31.03.2018		13.15	7.82	2.688	70.262	72.950	80.77	0.702	69.56	70.262	0.248	-	2.440	2.440
Y - 1	2018-19	16.15	9.60	2.938	82.99	85.928	95.528	13.430	69.56	82.990	0.248	-	2.690	2.690
Y - 2	2019-20	19.65	11.68	3.472	97.477	100.949	112.494	27.917	69.56	97.477	0.248	0.338	2.886	3.224
Y - 3	2020-21	22.49	13.37	3.620	106.580	110.200	123.560	37.020	69.56	106.580	0.248	0.363	3.009	3.372
Post Closure														
Y-6	2023-24	22.49	13.37	3.620	106.580	110.200	123.560	37.020	69.56	106.580	--	0.611	3.009	3.620

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5.6.3 Transport:

Dealt in chapter no. 12

5.6.4 Blasting:

Dealt in chapter no. 6

5.6.5 Overburden Removal & Disposal:

Overburden that will be excavated throughout the life of the project is 110.20 Mm^3. Out of 110.20 Mm^3, 72.95 Mm^3 of OB already extracted (69.56 Mm^3 dumped in the external dump yard and 0.702 Mm^3 dumped in the internal dump yard and the balance 0.248 Mm^3 of topsoil is stored in the temporary storage yard at the dip side of the quarry). Remaining 37.25 Mm^3 of OB will be accommodated in the internal dump yard. Percentages of external and internal dumping will be 63.12% and 36.88% respectively.

5.6.6.1 Dump Yards:

The utilization of JK OC Mine voids for OB dumping to avoid degradation of land is now mentioned in the Mining Plan at all relevant pages.

Earlier approved Mining Plan envisaged to use 266.81 ha voids of JK OC and 24.81 ha external dump for dumping of OB.
In this proposal, entire external dump area of 24.81 ha is avoided and planned entire dumping in the 266.81 ha JK OC voids to avoid further degradation of land. Hence, the project area has been reduced from 514.95 ha to 490.14 ha.

It is proposed to accommodate hard overburden and top soil in the following dump yards during the life of the mine. The details are furnished in Table 5.6.1.

Table 5.6.1

By the end of the year		Cumulative OB Removal (Mm^3)		
		Top Soil	OB	Total
Upto 31.03.2018		2.688	70.262	72.950
Y - 1	2018-19	2.938	82.990	85.928
Y - 2	2019-20	3.472	97.477	100.949
Y - 3	2020-21	3.620	106.580	110.200
Post Closure				
Y - 6	2023-24	3.620	106.580	110.200

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5.6.6.2 External Dump Yard:

About 72.00 Mm^3 i.e. 63.12% of total OB was already dumped in the external dump yard. Maximum height of external dump yard is 60m from ground level. The dumping of OB in the external dump yard was already completed. The area of the external dump yard is 195.56 ha. About 2.44 Mm^3 of top soil was already spread over the finished decks of external dump yard and 0.569 Mm^3 of top soil is proposed to spread over the finished decks of external dump during the balance life of the project.

The OB dump in the plans under reference was shown by mistake. This has been corrected. The area shown as OB dump is not basically an OB dump. The purpose of this dumping is for blanketing the subsidence cracks of adjoining UG mine and not part of this project area. The plan is modified accordingly.

5.6.6.3 Internal Dump Yard:

In the JK-5 OC Mine About 0.702 Mm^3 of hard overburden was already dumped in the internal dump yard up to 31.03.2018. About 37.25 Mm^3 of OB is envisaged to be back-filled in the quarry area up to ground level. Total 0.611 Mm^3 of Topsoil will be spread over the finished decks of the internal dump yards in which about 0.363 Mm^3 of topsoil is proposed to be spread up to end of mining operations and the balance 0.248 Mm^3 of topsoil is proposed to spread during the post closure period of the mine.

5.6.6.4 Top Soil Storage Yard:

Top soil management and waste management is furnished for the entire life of the mine plus 3 years i.e. post closure period.

A total of 2.688 Mm^3 of top soil was already removed from the project area. Out of the total top soil removed, 2.44 Mm^3 was already spread over the finished decks of external Dump yard. The balance 0.248 Mm^3 of topsoil is stored in the temporary storage yard at the dip side of the quarry. Maximum height of temporary top soil storage yard is 5m. The details of the Topsoil (Cumulative) are given in the table 5.6 below:

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Table: 5.6.4 Topsoil Management

Year/ Stage		Top Soil Removal in Cumulative (Mm^3)	Top Soil Used in Cumulative "Mm^3"				
			Embankment	Spreading over the backfilled area	Spreading over the OB Dump area	Using for Green Belt Area	Total utilised
Upto 31.03.2018		2.688			2.440		2.440
Y-1	2018-19	2.938			2.690		2.690
Y-2	2019-20	3.472		0.338	2.886		3.224
Y-3	2020-21	3.620		0.363	3.009		3.372
Post Closure							
Y-6	2023-24	3.620		0.611	3.009		3.620

*Note: At present 0.248 Mm^3 of Topsoil is stored in the temporary

5.6.6.5 Final Void:

Two final voids (V2:31.97 ha - 23.64 Mm^3, V3: 75.71 ha - 32.33 Mm^3) are left by optimizing the OB dumping strategy. The maximum depth of two final voids are 120m. The final voids at the end of the mining operations left as water reservoir.

5.6.6 Life of The Mine:

The balance life of the project for the remaining property is 3 years from 2018-19.

5.7.0 Reserves:

The observation has been complied with. Extractable reserves are now estimated by deducting 5% from the mineable reserves as standard practice. Accordingly, the changes are made and furnished in table 5.7.

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Table 5.7

Seam	Thickness Range 'm'	Depth Range 'm'	Net GR "Mte"	Blocked Reserve below (Mte)					Mineable Res "Mte"		Mining losses (Mte)
				High wall/ Batters	Nala/ River/ Road	Barrier	Un-economic/ unworkable	Total Blocked	UG	OC	
"A" (Queen) Seam	5.79 - 20.23	30 - 120	26.3	2.63						23.67	1.18
Total			26.3	2.63						23.67	1.18

Seam	Ext Res "Mte"			As on base date "Mte"							Reason not considered for mining
				Depletion of Reserve			Balance Reserve				
	UG	OC	Highwall	UG	OC	High wall	UG	OC	High wall	Total	
"A" (Queen)		22.49			13.15			9.34		9.34	
Total		22.49			13.15			9.34		9.34	
Percentage of Extraction										85.51%	

5.8.0 Location of Access Trench & Reason:

The initial opening of the deposit has been designed considering:

- Low stripping ratio zones at progressively increasing depths
- Availability of sufficient coal exposure to sustain a steady level of production
- To create a void to accommodate internal dump

The opencast layout was designed considering early approach to the coal seam, constant and continuous production of coal meeting the demand of supply and consequent internal dumping with an aim to achieve optimum stripping ratio and maximum internal dumping.

5.9.0 The Mining System

5.9.1 Geometry & Bench Parameters

Working benches of moving faces are designed to have 40m width, 10m height and 70° angle to the horizontal & final highwall benches are designed to have 10m width, 10m height and 70° angle to the horizontal.

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A study was conducted to design bench parameters like Height, width and bench slope. Considering the recommendations made by him pit design was made. After 90m of pit depth from pit surface, a 20m wide exposed bench width in-situ condition was left to arrest local failures of upper 90m height. It divides pit in two different vertical zones. Working benches have a width of 40m and a height of 10m. Final slope of the benches is maintained at 37^0.

It has been envisaged that wherever possible, coal and OB faces will be staggered along the strike to avoid intermixing of material. Hydraulic backhoes and suitable numbers of dozers are provided to minimize the mixing of OB material with coal so that the dilution is kept at a minimum possible.

5.9.2 Haul Road Planning:

The main access trench or haul road is constructed on the floor of Bottom seam. Though the gradient of the bottom most seam is steep (1 in 5), sufficient strike length in the quarry did permit a haul road on quarry floor. The steepest gradient has been designed not to exceed 6% at any point on the haul road. Local ramps, for inter-bench movements, have been planned on 10% grade. The haul road has been developed progressively as the quarry deepens.

The haul road width of 30 m has been designed considering space for dozer track, pipes, electric lines, cables, provision for berms and two way traffic for dumper movement. Adequate lighting arrangements are made for smooth mining operations at night. Further, to improve visibility, numbers of bends are restricted and the road is nearly straight.

5.9.3 Quarry Parameters:

Quarry parameters like surface area, floor area etc. are furnished in table 5.8

Table 5.8

a)	Maximum strike length along surface	2480 m
b)	Minimum strike length along surface	1220 m
c)	Maximum width of the quarry along surface	796 m
d)	Minimum width of the quarry along surface	162 m
e)	Minimum Depth of the quarry	35 m
f)	Maximum depth of the quarry	120 m
g)	Floor area of quarry	106.89 ha
h)	Area of excavation on surface	149.95 ha
i)	Average gradient of the seam	1 in 7.0
j)	Total land requirement	490.14 ha

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5.10.0 Thickness Range of Each Seam & Parting, Minimum & Maximum Depth:

Thickness Range of Each Seam & Parting, Minimum & Maximum Depth for all seams of JK - 5 Opencast Mine are furnished in Table No. 5.9.

Table 5.9

Seam/ Parting	Depth (m)		Thickness(m)		
	Minimum	Maximum	Minimum	Maximum	Usual
'A' (Queen Seam)	30	120	12.26	17.33	15.0

5.11.0 Quarry Stage Plans & Corresponding Details

Quarry stage plans at 1st, 2nd and 3rd (Final) years of coal production and plan showing ultimate pit configuration are enclosed as Plates No.XVIA to XVIC.

5.12.0 Time Frame for Commencement of Back Filling of quarry void & Justification

Internal dumping/back filling was already started. Out of total OB excavated from the quarry (**110.20** Mm^3), **69.56** Mm^3 was already dumped in the external dump yard and 0.702 Mm^3 was dumped in the internal dumping. The balance OB i.e. **37.25** Mm^3 will be dumped in to internal dumping.

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CHAPTER 6

BLASTING

6.1 Drilling And Blasting in Opencast Project:

Both coal and overburden require drilling and blasting prior to excavation. 150-160 mm steep gradient diesel drill (crawler mounted) is being used for drilling on coal and drilling on OB benches is being done partly by departmental 150mm drill and partly by hiring drill.

6.1.1 Drilling Pattern:

Drilling pattern may be suitably modified to ensure separation of coal and OB depending on the local site conditions. However, based on experience on coal measure rocks of similar characteristics, burden and spacing of 4m x 5m is being kept for outsourcing OB. The burden and spacing for coal is being kept as 5m x 5m.

6.1.2 Blasting in the Vicinity of Villages/Dwellings/Structures

There are no villages and structures within the danger of the quarry. Whenever villages/dwellings/structures etc. lie within the danger zone, SCCL is conducting controlled blasting and vibration study by any scientific agency for relaxation of danger zone. To reduce noise pollution secondary blasting of boulders is avoided completely by using rock breakers.

Ground vibration produced by blasting depends on various factors namely,

- ❖ Geology of the strata.
- ❖ Maximum charge per delay.
- ❖ Distance from blast point to observation station,

Site-specific constants vary from site to site. However, as per DGMS Technical circular no.7, dated 29.8.97, depending on the type of structures and the dominant excitation frequency, the peak particle velocity (PPV) on the ground adjacent to structures should not exceed the values furnished in table 6.1.

Permissible peak particle velocity (PPV) at the foundation level of structures in mining areas (in mm/sec.)

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(Figures in mm/sec) Table-6.1

	Type Of Structures	Dominant excitation frequency, Hz.		
		< 8 Hz	8 – 25 Hz	>25 Hz
(A)	Building/Structures not belonging to Owner,			
	Domestic houses/structures (kuchha, brick & cement)	5	10	15
	Industrial buildings (RCC & framed structures).	10	20	25
	Objects of historical importance and sensitive structures.	2	5	10
(B)	Building belonging to owner with limited span of life,			
	Domestic houses/structures (kuchha, brick & cement).	10	15	25
	Industrial buildings (RCC & framed structures).	15	25	50

6.1.3 Controlled Blasting:

For the controlled blasting operations, the following factors are being considered in general:

- Distance between blasting point and the structure to be protected will be earmarked.
- A free face will always be maintained.
- In multi row blasting, greater relief will be provided between rows using suitable delay intervals.
- Proper use of different type of relay/delay detonator for proper sequencing of the blast will be used. Non-electric down the hole delay detonators shall be used.
- All loose debris will be cleared off the blasting site.
- All the holes will be suitably muffled before blasting to control the fly rock.

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For the reduction of ground vibrations, the following additional precautions are being taken.

- ❖ Blasting design and initiation pattern should be such that the maximum charge per delay is within the stipulated range.
- ❖ Wherever possible, the progress of detonating holes, through delay intervals, should progress away from the structures to be protected.
- ❖ Burden and spacing should be to the requirement.
- ❖ Avoid blasting during cloudy days and when the wind is blowing towards structures.

6.1.4 Explosive Consumption and Magazine Capacity:

The following specific consumption of explosives has been adopted for estimating the daily requirement of explosives.

- ❖ OB benches - 0.32 Kg/Cum
- ❖ Coal benches - 0.23 Kg/Cum

Based on specific consumption of explosives and calendar programme of excavation, the average requirement of explosive is 26.80 Tonnes/day including daily requirement for secondary blasting.

Magazine Capacity

Site Mixed Emulsion explosive is being used for blasting at Jawaharkhani-5 Opencast Project. SCCL has out sourced the supply of SME. Hence, no magazine is required at the project site.

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CHAPTER 7

VENTILATION

Not applicable as it is an opencast project.

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CHAPTER 8
PUMPING & MINE DRAINAGE

8.1.0 Pumping System

The pumping system of Jawaharkhani-5 Opencast Project is designed to dewater the inflow of water due to precipitation within the active pit limit during the monsoon season and the ground water discharged from aquifers to enable the mining activity to continue round the year. The planning of dewatering of the mine is being done in such a way that as far as possible the working faces and haul roads remain dry.

Seepage water is being collected in the sumps created in the dip most area of the quarry. The water is being pumped to the surface and treated before it is used. The inflow of water into JK-5 Opencast mine is 2864 m^3/day. Of this, 807 m^3/day is for mine requirement (dust suppression and HEMM washing), 113 m^3/day is for work shop and 160 m^3/day for plantation and 50 m^3/day for domestic consumption at the project. The balance 1734 m^3/day of surplus water is let out into the local tanks and streams for use of the local people for their agricultural needs. This acts as constant source of recharge to the groundwater regime and improves the water levels around the mine.

The intake of rainwater to the opencast mine is non-uniform during the year. The maximum rainwater intake will be during the period of about four months from June to September. During dry season, seepage from strata is expected to be moderate and the same can be dealt by running a few numbers of small pumps. During this period, repair and overhauling of the pumps will be done by rotation. The main pumps have adequate capacity to handle the quantity of water inflow during a day of peak rainfall in monsoon.

8.1.1 General Considerations:

The general criteria of determining the number of pumps, lay-out and design of the pumping installation are as under:

- Geographical location of the project.
- General climatic conditions, surface features of the terrain beyond the boundary of the mine.
- Calendar plan of excavation of quarry.
- Meteorological data of nearest rain-gauge station.

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- ❖ Catchments areas: - mined out areas, spoil dump areas and areas beyond excavation.
- ❖ Run-off characteristics of the area.
- ❖ In-flow of ground water into the quarry.
- ❖ Surface drainage system and garland drains.
- ❖ Depth of the quarry at different stages.
- ❖ Maximum number of days to pump out the accumulated water in the quarry during peak rainfall in monsoon and the number of pumping operation hours per day (24 hours/day for pumping calculations).
- ❖ Desired location at surface where quarry water can be discharged considering the surface drainage system.

8.1.2 Mine Drainage and Sump:

The bottom-most bench is being used to form the sump of the quarry. There is no stage wise pumping at the Jawaharkhani-5 OCP, the water is being pumped to surface from the main sump directly.

8.1.3 Basic Data:

The following data has been taken into consideration for arriving at the size of the pumps

- Maximum Annual Rain-fall : 1690 mm
- Maximum Rainfall in a day : 106.80 mm
- Rainfall Considered 100 mm
- Working Life of the mine 3 years balance life
- Depth of Mine (Max.) 120 m
- Run-off co-efficient
  - 0.60 For Area of extraction excluding Area of internal dump
  - 0.10 For area beyond excavation
  - 0.15 For dumped area

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- 10% of the water accumulated in the mine due to rain-fall is taken as inflow of water to the mine due to seepage and ground water
- The maximum rainfall in a day is considered as 106.80 mm for calculating pumping system.

8.1.4 Pumping Calculations:

Volume of rain water entering into the mine and accumulating in the quarry (make of water) has been assessed on the basis of the following formula:

$Q = A \times H \times \beta \quad m^3/day$

Where, A - Catchment area in m^2

H - Maximum daily precipitation in m

β - Run-off co-efficient

For mined out area	:	0.60
For internal dumped area	:	0.15
For area beyond excavation	:	0.10

The estimation has been done taking into consideration the following parameters.

- Area of Excavation : 1.4995 Sq.km
- Area beyond excavation : 3.65 Sq km
- Area of internal dump : 1.132Sq km
- Area of excavation excluding internal dump : 0.3675 Sq.km

Probable water accumulation on the day of maximum rainfall:

(0.1*3.65+0.15*1.132+0.6*0.3675)*(1000*1000)*(220.60/1000) = 80666.04 Cu.m.

Taking 10% for seepage and inflow of ground water total

make of water: = 88732.64 Cu.m/day

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Assuming 20 hrs. pumping per day, pumping capacity

Required to pump out the total make of water in 8 days = 554.579 Cu.m/Hr.

Requirement of pumps	=	554.579/270 = 2.05
270 Cum. discharge	=	Say 3 Nos. (1 spare)

8.1.5 Selection of Pumps:

a. Main Pumps:

Basing on the requirement, the pumps being used at Jawaharkhani-5 OCP are detailed below:

1 No. of pumps of 270 Cu.m/Hr, 150m head, 180KW Borehole submersible pump and 2 Nos. 270 Cu.m./Hr, 75m head, 94KW have been used to de-water the mine throughout its life.

In addition to the above main pumps, sufficient number of face/bucket pumps are also provided to keep the working faces always dry.

The delivery pipe lines from the pumping station are proposed to be taken out through the high wall side of the quarry to the surface, from where, the water will be discharged to the natural drainage system.

b. Selection of Delivery Ranges:

The delivery ranges were selected on the basis of the pumping capacity during probable maximum rainfall and velocity of flow within the reasonable limit. The ranges thus selected for pumps are of 200mm, 100mm and 50mm nominal diameter.

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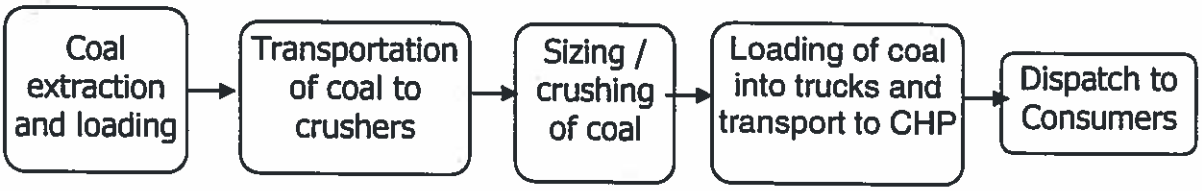
CHAPTER 9

COAL HANDLING, WASHING & MODE OF DISPATCH

9.1 Existing Coal Transport System

Yellandu Area is having a 3.50 Mty capacity CHP to meet the coal dispatching requirement of the area. At present, 2 Nos. of 500TPH feeder breakers are provided for crushing of ROM coal upto -200 mm in JK 5 Opencast Mine. This CHP is handling the coal produced from JK-5 Opencast Project. The crushed coal from the Pit head CHP of JK 5 OC is being directly issued to customers through road dispatch or to Yellandu CHP for rail dispatch. The weighted average lead for transportation of coal from the pit to the Pit head CHP is 1.80 km.

The line diagram/ flow chart of coal transport system is furnished below:



Flow Chart of Coal Transport

9.2 Handling / Disposal of Rejects

The existing coal handling facilities do not have shale picking arrangement. Since, the coal from the project is inferior grade, it is planned to provide shale picking arrangements. The coal is then conveyed by 2nos. 30KW, 1400mm width, shale picking belt conveyors. A 75 T, truck loading shale bunker and a 30KW shale carrying conveyor with necessary hoppers are also envisaged for stocking and dispatching separated shale.

9.3 Illumination

Adequate lighting has been made for illumination since the mine is being operated in three shifts. Adequate lighting at the Coal Handling Plant also arranged with suitable energy efficient lamps confirming to DGMS 1/1976 on lighting standards for opencast mines under CMR 154(2).

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9.4 Water Spraying Arrangements for Dust Suppression

The objective of this system is to eliminate the air borne coal dust or suppress the dust at its source. The system involves confinement of the dust within the dust producing area by a curtain of moisture and wetting the coal dust by direct contact between the particles and droplet of water. To arrest the propagation of dust while unloading the coal into the receiving bunker, and similarly to arrest the generation of dust while conveying, water jets and mist sprayers were provided. Adequate arrangements were made for arrangement of mist generators at CHP to keep the dust concentration in and around the CHP within permissible limits.

9.5 Surface Arrangements for Loading of Coal:

A Pit head coal handling plant receives ROM coal transported form the quarry by 35T Rear Dumpers. 2Nos. of 500 TPH feeder breakers receive the ROM coal and reduce it to (-) 200mm size. From this CHP, crushed coal is being directly issued to customers through road dispatch or to Yellandu CHP for rail dispatch. For periodical cross checking of truck weighment, a pit less electronic lorry weighbridge was already provided. Sufficient Water spraying arrangements for dust suppression and fire fighting so as to maintain healthy environment at the CHP. The schematic layout of CHP is given vide Plate No: XX.

9.6 Beneficiation/Washing

At present, no beneficiation/washing is proposed to be undertaken by SCCL.

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CHAPTER 10

MANPOWER, SAFETY & SUPERVISION

10.1.0 Manpower & Supervision Requirement in Brief:

JK - 5 Opencast Mine is an existing project which is considered for production capacity enhancement. The present men on roll at the project are 333-SCCL and 210-offloading for conducting various operations. As no additional equipment is proposed, the same manpower will be continued.

10.1.1.1 Summary of Manpower

The summary of manpower requirement activity wise is furnished below.

Sl.No.	Description	Average Daily Attendance	Men on Roll
a	Coal		
i	Coal operation with Shovel & Dumper	63	75
ii	Pithead Coal Handling Arrangements	36	41
b	Overburden (OBR with shovel & dumper)	10	13
c	Common services	46	55
d	Reclamation	4	4
e	Maintenance	61	74
f	Administration	29	29
g	Staff	40	42
	Total employment	**289**	**333**

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10.1.1.2 Summary Supervision Requirement:

The supervision requirement for operations and administration is furnished below.

Sl. No.	Designation	Average Daily Attendance	Men on Roll
1	Project Officer	1	1
2	SOM/Colliery Manager	1	1
3	Asst. Manager	4	5
4	Safety Officer	1	1
5	Under Manager	6	8
6	S.E (E & M)	1	1
7	Dy.SE(E&M)	3	4
8	E.E(E&M)	2	3
9	A.E(E&M)	1	1
10	Sr. Surveyor	1	1
11	Surveyor	1	1
12	Welfare Officer	1	1
13	Overman	9	11
14	E.P.Foreman (Mech)	3	4
15	E.P.Foreman (Electrical)	3	4
	Total	**38**	**47**

10.1.1.3 Productivity

- **Output per Man Shift (OMS)**

1.	Manpower (At Mine level)	333
2.	Average daily attendance (At Mine Level)	289
3.	Output at 100% performance level	3.50 Mty
4.	No. of working days	330 days/year
5.	OMS at 100% performance level at Mine level	49.33 Tonnes

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The average daily requirement of manpower at the project level is 289. The average daily production will be 10606 tonnes (3.50 Mty). The planned O.M.S. is 49.33 tonnes.

10.2.0 Important Safety Aspects

The Jawaharkhani-5 OCP involves extraction of coal by opencast method of virgin coal seam and some patches developed by U/G method. As such, the safety risks involved are studied in detail and remedial measures are suggested/being implemented.

10.2.1 Risks associated

The major risks associated with opencast method are

- Extraction of Already Developed Coal Pillars.
- Movement of HEMM
- Drilling and Blasting Operations
- Slope Stability
- Fire Fighting
- Inundation

The measures to be taken to mitigate the risks are explained in detail below.

10.2.1.1 Extraction of Already Developed Coal Pillars:

During the initial stages of the Project, OC workings were carried out in the area where coal seams were developed by UG mines and adequate safety precaution were taken to ensure safety of men and machinery.

10.2.1.2 Movement of HEMM:

In the Jawaharkhani-5 OCP coal extraction is being done by departmental HEMM and OB is being done by outsourcing HEMM. As such movement of HEMM poses a major risk for safety of persons employed. Measure to Prevent Accidents due to Trucks and Dumpers are as under:

- ❖ All transportation within the mine working is being carried out directly under the supervision and control of the management.
- ❖ The vehicles are being maintained in good condition and checked thoroughly at least once a week by the competent person authorized for the purpose by the Management.

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Dt. 05-10-2017

- Sufficient lighting and road signs are being provided at each and every turning point especially for the guidance of the drivers at the night.
- To avoid danger to human life while reversing at the embankment and tipping points, these areas are being maintained human free. Human movement in the haul roads is being avoided.
- All statutory provision of the fences, constant education, training etc. are being arranged to reduce accidents.
- Drains were provided on either side to keep the road dry. Sharp curves are being avoided.
- The haul road width of 30 m has been designed considering space for dozer track, pipes, electric lines, cables.
- Haul roads were designed in such a way to have one way traffic where ever possible. Where one way is not possible there the haul road were sufficiently widened.
- Separate haul roads provided for coal and OB transportation.
- Separate way for light vehicles is being maintained.
- Traffic rules were framed and strictly implemented in true spirit.
- Only properly trained workmen are employed in the mine.
- Safety gadgets like radium jackets, whistles were provided to all workmen.
- The safety procedures to be followed by contractor were incorporated during tendering process itself.

10.2.1.3 Drilling and Blasting Operations:

In the Jawaharkhani-5 OCP breaking of Overburden and coal is being done by drilling and blasting system, which involves use of explosives in large quantity.

10.2.1.4.1 Drilling Operation:

Accidents occur while transporting, positioning of drill machines and during drilling operations. The following precautions will be taken.

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Dt. 05-10-2017

While transporting drill machine, its mast should be lowered, even within the drilling area on inclined plane (High gradients) to avoid toppling of drill machine.

- ❖ While positioning drill machine on inclined planes, wedges should be used under jack pads for leveling of the drill machine.
- ❖ While changing drill rods, proper Holding of drill rods on drill mast is ensured.
- ❖ The drilling crew is being provided with radium jackets.

10.2.1.4.2 Blasting Operation

Opencast operations involve heavy blasting in overburden and coal. Most of the accidents in blasting occur due to the projectiles, as they may sometimes go even beyond the danger zone, mainly due to overcharging of shot holes or as a result of certain special features of the local ground. Fly rocks, Vibrations, dust and noise problems are common problems associated with blasting operations.

Proper precautions are being taken by way of posting guards, siren etc. at the time of blasting. Men and machinery are being withdrawn to safer place before blasting. Blasting is being done between shift timings. Proper care in storage, transport and handling of explosives is being taken to ensure safety in blasting operations.

By doing controlled blasting techniques ground vibrations resulting from blasting are minimized. The peak particle velocity of vibration is now accepted as the more reliable criterion for assessing the damage potential of vibrations. This factor takes into account both frequency and amplitude giving an indication of the level of hazards and fairly accurate indication of the "nuisance" value of the movements.

USBM have statistically established a relationship between peak particle velocity (V) with the maximum charge per delay (W) and the distance of the shot from the measuring point (D). $V = H (D/W^{1/2}) B$

Where H and B are constant and $(D/W^{1/2})$ is called the Scaled 'distance'.

Chargé/hole will be restricted as per distance from villages. Safety zone as required by mining statutes will be ensured.

There are a large number of factors that influence fly rocks. Most important of these factors are long explosive columns with little stemming at the mouth of the hole, irregular shape of face, long water column in holes, loose stones on face of the surface blasting area, and strong wind.

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Measures to Control Ground Vibrations & Fly Rocks:

- Shots should be muffled so that the flying fragments do not project beyond a distance of 10 meters from the place of blasting.
- Optimum delay sequence and stemming to column ratio should be maintained to minimize the fly rock distance and ground vibration intensity.
- Basing on the distance of the nearest sensitive areas from the epicenter of the blast, charge weight should be altered to meet the stipulated standards.
- Blast hole geometry should be designed considering bench height, diameter of hole, type of explosive, nature of rock, level of fragmentation required etc.
- Total charge per blast should be divided in to several parts so as to keep minimum explosive per delay i.e. use of milli-second delay detonators & relays.
- Concentration of explosive is avoided by using deck charging technique.
- Distance between blasting point and the structure to be protected should be earmarked.
- A free face should be always maintained.
- In multi row blasting, greater relief will be provided between rows using suitable delay intervals.
- All loose debris should be cleared off the blasting site before blasting.

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10.2.1.4 Slope Stability

10.2.1.5.1 Stability of Quarry Benches:

Collapse of sides/slopes is likely to pose problems in the opencast mine. Proper benching and sloping will be ensured to guard against collapse of sides.

Working benches of moving faces are designed to have 40m width, 10m height and 70° angle to the horizontal & final highwall benches are designed to have 10m width, 10m height and 70° angle to the horizontal.

A study was conducted by VK Singh to design bench parameters like Height, width and bench slope. Considering the recommendations made by him pit design was made. After 90m of pit depth from pit surface, a 20m wide exposed bench width in-situ condition was left to arrest local failures of upper 90m height. It divides pit in two different vertical zones. Working benches have a width of 40m and a height of 10m. Final slope of the benches is maintained at 37^0.

- ❖ Drains were provided to protect the slope surfaces against rain-cuts and seepage during rains. These make a safe way to discharge top and surface water to the bottom of the quarry.
- ❖ Constant vigilance is being maintained on the conditions of benches with special reference to accumulation of water and development of cracks.

10.2.1.5.2 Over Burden Dumps:

The high overburden dumps may cause landslides. High overburden dumps created at the quarry edge may cause sliding of the overburden dump or may cause failure of the pit slope due to excessive loading, thereby causing loss of life and property.

The following precautionary measures are being taken to ensure slope stability.

- ❖ The floor of internal dump is roughened before start of dumping.
- ❖ Hard OB is being dumped with height of decks restricted to 30m.
- ❖ Maximum height of external dump is restricted to 80m. The maximum height of internal dump will be restricted to 30m above ground level.

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34012/01/2015 - CPAM
2017

- Width of berm is kept at least 30m for stability & also for allowing safe machinery movement.
- Overall Slope will be 25.64^0 for external dump.
- Track Dozers are being deployed for shaping the dumps.
- Planting of trees was done to improve the stability of dumps to prevent erosion.
- A sturdy stone toe wall was built around the toe of each deck of dumps.
- Planting vegetation as early as possible over the overburden dump slopes.
- The drainage channels along the overburden dump toe are maintained to provide additional protection.

10.2.1.5 Inundation:

There is a remote chance of inundation of Jawaharkhani-5 OCP workings due to inrush of surface water in the rainy season since adequate pumping arrangements were made. The main precautions that are being taken to prevent inundation are as follows:

- Sufficient water garlands were provided to prevent inrush of surface water into the quarry from dump yards and catchments water from surface areas.
- Construction/strengthening of berms/bunds on surface along quarry boundary was done during every rainy season. Suitable monitoring system was established to take care of any contingencies.
- Proper drains were cut around the quarry to divert away the water during rainy season, from entering the quarry. The drains were connected to natural drainage system of the area. Sumps and pumps of adequate capacity were provided within the quarry.

10.2.2 Disaster Management:

In spite of rapid advancement in management and technology, disasters in mining mainly due to fire, explosion, inundation, failure of working benches and failure of dump slopes occur sporadically all through the world.

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Consequences of disaster are enormous in terms of loss of lives and property. The loss of morale and public image, further create an awkward situation for the mine concerned as well as the entire company.

A sound Disaster Management Plan (DMP) to minimize the consequences of the disaster and to restore the normal operation at the earliest must be formulated by each mine depending on site-specific conditions. The plan shall concentrate on three main aspects, viz. Prevention, Preparedness & Mitigation.

10.2.3.1 Prevention of Disasters:

Main tool to prevent any disaster to occur is having a sound Safety Management Plan. The major steps in a safety management are furnished below.

Steps in Safety Management Plan

STEP – 1 Management Role & System Risk Review

STEP – 2 Hazard identification & Risk Assessment

STEP – 3 Development of Risk Management action plan

STEP – 4 Safety system Audit

STEP – 5 Safety System review by monitoring committee

STEP – 6 Repetition of all the steps

Brief description about each step:

Step 1: Management Role & System Risk Review:

1. Review of management safety policy.

2. Review of management responsibility & commitment.

3. Review of the works by different committees

Step 2: Hazard identification & Risk Assessment:

The analysis of risk involves understanding the nature of the hazard; the nature of existing controls and recovery measures; assessing the likelihood of the hazard occurring; and the severity of its consequences should it occur.

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Dt. 05-10-2017

Consequences and likelihood are identified and combined to produce a level of risk. Consequences and likelihood may be estimated using statistical analysis and calculations.

Risk Score = Consequence x Exposure x Probability

Consequence is the size of loss or damage. In terms of health and safety, it is the degree of harm that could be caused to workers exposed to the hazard, the potential severity of injuries or ill health and / or the number of persons who could be potentially affected.

Exposure is percentage of time personnel are present.

Probability is chance that they will be harmed.

Step 3: Development of Risk Management Action Plan:

The preparation of a Risk Management Plan (RMP) requires risk assessment in the mine. Risk assessment is a process of logically assessing the risks involved in an activity to determine the actions necessary to reduce control and or manage the risks. Risk management aims to reduce the likelihood and impact of mishaps of all kinds. In the mining industry, with its inherent potential for major accidents which could injure or kill many people, damage the environment, cause serious loss of production and hence profit, there is a particular need for a sound approach to the process of risk management.

Step 4: Safety system Audit:

1. In this step we have to audit the safety status of the mine.
2. Regular safety auditing to be established in the mine.
3. Basing on the above audit, preparation & formulation of COPs & SOPs whenever necessary.
4. Decide control operations
5. Document procedure for each control
6. Fixing up of responsibilities

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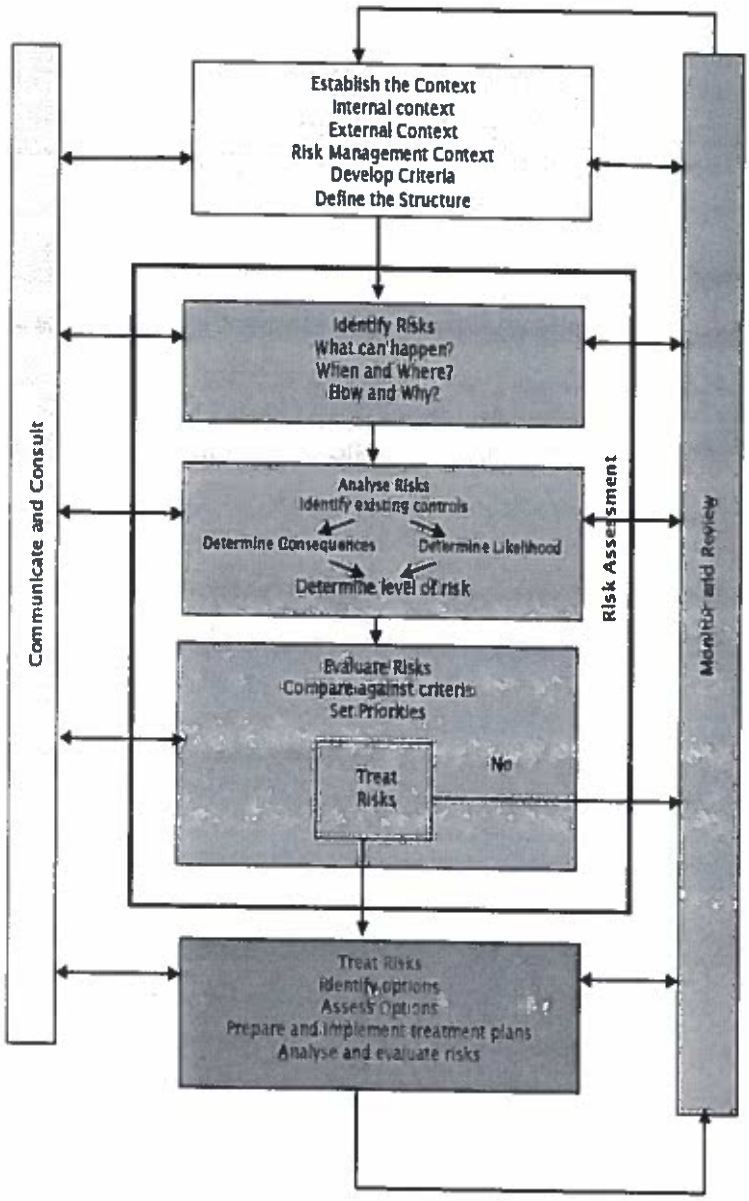
Step 5: Safety System Review by Monitoring Committee:

All steps in the risk management process should be monitored and subject to review. For each stage adequate records should be kept to demonstrate how decisions were made and what the outcome of the process Review the audit reports in statutory forums & non statutory Forums in mine & are level from time to time and very frequently to motivate the workmen about safety.

Detailed Flow Chart of Risk Management Process in Detail



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10.2.3.2 Preparedness for Disasters:

When a disaster occurs in a mine, the situation has to be dealt quickly. The first few hours after occurrence of disaster are very crucial. If the key persons at the frontline react quickly and act in a organized manner as per the advance planning in the initial moments after the occurrence of disaster, many lives can be saved. Decisions taken on the spur of the moment will not bring in as good results as properly planned procedures will. Advance planning is the most logical way of minimizing the time losses in emergency. Advance planning and preparation has two aspects, namely,

- ❖ Creating a Disaster Management Committee (DMC) that should go into operation immediately on the occurrence of a disaster, and
- ❖ Building up of physical facilities that may be needed to cope up with any disaster.

After any disaster, the nature and importance is such that the situation demands that presence of senior officers of the Company, Director of Mines Safety, senior leaders of the trade union and State authorities. The basic role of Disaster Management committee will be handling of the situation that is, planning the strategy to deal with the situation, giving necessary guidance to conduct the rescue and recovery operation. The DMC will also be dealing VIPs and public relations in addition to other support activities to deal with the situation.

The authorized persons involved in disaster management plan are immediately required to take up the allotted positions and start playing assigned roles. For this purpose Mock rehearsals will be conducted regularly. Further the safety gadgets/materials required in case of emergency are listed and stock of such materials in adequate quantities is kept at central locations near to the mines.

10.2.3.3 Disaster Management Plan (Mitigative Measures):

There are three phases in dealing with a disaster, namely:

- ❖ The first is information stage-when information is sent to various agencies;
- ❖ The second is assessment stage – when the effects of the disaster, the resources required to mitigate the consequence, and the manner of conducting rescue, recovery and rehabilitation is assessed; and
- ❖ The third is action stage – when action is started.

The three stages are not distinctly separate but have certain amount of overlap.

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10.2.3.4 Information Stage:

Duty persons employed in the mine:

If any person discovers or learns of any dangerous incident, he should immediately inform the surface telephone operator / Manway Clerk or the nearest available official who must at once report it to the telephone operator/ Manway Clerk.

Duty of Telephone Operator / Manway Clerk.:

Upon receiving information of an incident, the telephone operator / manway clerk shall immediately inform the Manager or the Official present at the time. In the event of an incident requiring rescue services, he must inform the Rescue Station without delay.

The Manway Clerk while receiving the information by phone should gather the information regarding the place of accident, number of persons involved, nature of help required and record the same with name of the person who informed and pass on the same to the Manager and wait for further information from the underground. He should not leave the place for any purpose whatsoever.

In case the phones are not working, he should send the information through a special messenger who is available on the surface preferable in writing without leaving the Manway. In the absence of the Manager, he should pass on the information at the mine to the senior most officer available at the mine.

For this purpose, all man way clerks should be properly trained to react immediately after the incident with minimum time loss. Guidelines for reaction at the time of disaster should be framed and it shall be inculcated to him. He should have a prioritized list of persons to be called with their telephone numbers.

Immediate Response of the Manager:

On receiving the information, he should inform the Agent and rush to the mine and personally assess the situation by contacting the Supervisor over telephone. He should then communicate the GM and Nodal Officers to initiate DMP.

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Dt. 05-10-2017

Appointment of Nodal Officers:

GM of the Area should nominate two senior officers by name as Nodal Officers to communicate the disaster message to various authorities. The two senior officers, preferably one is Area Safety Officer and the other is SO TO GM. Two more senior officers shall also be nominated as alternative officers.

Role of Nodal Officers

Nodal Officer 1, i.e., Area Safety Officer will inform to the following authorities:

- GM (SAFETY)
- All the Directors
- SO TO C&MD
- DGMS Authorities
- District Magistrate
- District Collector
- Superintendent of Police of District level
- Mine level and Area level Union delegates, belonging to Recognised and Representative Unions
- Company level Union members, belonging to Recognised and Representative Unions.
- Press.

Nodal Officer 2, i.e., SO TO GM will inform the following:

- Rescue Station
- Local Hospital In-charge
- CMS
- Transport
- Stores Officer
- Area E&M engineer
- Area Survey Officer
- Area Personnel Dept. In-charge
- Area Finance Dept In-charge
- Regional Level Mining Technical expert
- Local Police Inspector

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Dt. 05-10-2017

The two Nodal Officers will have separate individual tasks. Soon after receiving the information, they should proceed to the mine. The Nodal Officers should continuously go on giving half hourly updated information to GM (Safety), the members of Disaster Management Committee, all the Directors of the Company, DGMS Authorities, SO to C&MD, District Magistrate, District Collector, Superintendent of Police, until they arrive at the site.

Mock drills are the best tool for assessing preparedness of the key functionaries in case of disaster & also it will help them correct their mistakes & increase their preparedness. Mock drills have to be conducted regularly involving all key functionaries.

10.2.3.5 Assessment and Dealing:

Role of Supervisor:

In the First Stage, the supervisor or official should immediately take necessary steps in case of danger to evacuate the persons who are likely to be affected in the area and from other areas via escape routes to surface.

Role of the Manager:

After reporting to Area General Manager based on first-hand information gathered at the mine, he should ensure the arrival of rescue personnel. The services of rescue trained persons available at the mines should be utilized till the rescue brigade members arrive. He should inspect the affected site either alone or along with the Area General Manager and Rescue Superintendent.

Role of the Area General Manager:

Soon after receiving the information, The Area General Manager should make a quick visit to assess the situation and give necessary guidance to Agent/Manager and Regional Technical Expert. He should ensure functions of the Core Committee.

The Area GM will assess the gravity of the situation. The Manager will assess the requirement of men and material. The Superintendent of Rescue Station will assess the rescue requirement.

After assessment, the Area General Manager and Superintendent of Rescue Station should take active participation with Disaster Management Committee DMC members to draw the line of action.

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In a Disaster Management Committee meeting, the Area GM should ensure the formation of Control Rooms and Supporting Committees by verifying the check list.

The dealing of disaster should be carried out as per the written guidelines given by DMC. A senior most officer of SCCL will be authorized by DMC to oversee the rescue and recovery operation and check whether complied as per the written guidelines received.

As far as possible, the Manager and Agent of the affected mine should not be encouraged to undertake rescue and recovery works directly, as they will be subjected to high stress and strain. They also should be provided good security arrangements. Their services can be utilized in the form of technical support with regard to the mine.

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CHAPTER 11

TRANSPORT OF COAL, MEN & MATERIAL

11.1 Transport Coal & OB

The blasted coal is being lifted by shovels & loaded into coal dumpers. Rear Dumpers (Coal Body) of 35 Tonne capacity are being used to transport the Coal. 2 Nos. of 500 TPH feeder breakers receive the ROM coal and reduce it to (-) 200mm size. From this CHP, crushed coal is being directly issued to customers through road dispatch or to Yellandu CHP for rail dispatch. Total OB being removed by outsourcing agency. Overburden is being transported by Volvo Trucks (outsourcing) from OB Benches to the dump yard.

11.2 Transport Men & Material

11.2.1 Transportation of Men:

The transportation of manpower to and from working places is being done by mini buses/vans.

11.2.2 Transportation of Material:

The main materials required in the opencast project are as below:

- Explosives
- Spare parts pertaining to the various equipment
- Oils and lubricants for daily maintenance of various equipment
- Diesel oil

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SME (Site mixed emulsion) explosive is being used in all opencast projects. This is being carried to the blasting site in explosive carriers of type approved by the DGMS. Other accessories required for blasting will be carried in separate containers as per the rules and regulations imposed by DGMS.

Separate trucks are being maintained to transport the spare parts and material required for break down maintenance of various equipments to reduce the equipment breakdown hours. In addition to this for regular maintenance of equipment, separate vans with oil and lubricants filling arrangements were made.

Diesel operated HEMM will be used in this mine and these HEMM consume lot of diesel for its movement and operation. Hence, instead of bringing the equipment for diesel filling at fuel station, it is economical and safe to bring the diesel to the HEMM and fill them. For this purpose diesel bowers are being used to fill the fuel into the equipment.

In addition to the above mentioned equipment, Cranes of different capacities are being used to load material on to trucks. Further, for transportation of heavy materials, transport trailers will be used.

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CHAPTER 12

INFRASTRUCTURE FACILITIES PROPOSED & THEIR LOCATION

12.1 Infrastructure Facilities

JK - 5 Opencast mine is an operating mine in Yellandu Area of SCCL. Hence Required Service buildings for the mine were already constructed. SCCL provided the necessary infrastructure for the operation of the mine and for the well-being of its workforce. The infrastructure provided by the company also improved the social and economic status of the local community. The existing infrastructure is catering to the needs of the mine.

The existing infrastructure of Jawaharkhani-5 OCP is furnished below:

- Source of power.
- Connecting road and communication systems.
- Well-established Township.
- Guest houses, Schools and Hospitals
- Office buildings, service buildings, workshops, canteen, rest shelter stores, lamp cabin etc are already available at Jawaharkhani-5 Opencast Project.

No additional infrastructure is proposed in this proposal. The details of the existing infrastructure are given below:

12.1.1 Office Buildings:

Office buildings for statutory persons like Agent, Colliery Manager, Colliery Engineer, Mine surveyor, General shift Dy. Managers, Shift Under managers and other supervisors, like technicians & staff are available at west part of the project.

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12.1.2 Service Buildings

The following service buildings are available.

- Project Office
- Mine site office
- First Aid Room.
- Pit Head bath & Toilets.
- Muster booking office (Manway)
- Stores Office.
- Canteen-cum- Rest Shelter.
- Dumper repair complex.
- Dumper daily maintenance shop.
- Dozer & face equipment repair complex.
- Dozer washing station.
- E&M repair complex.
- POL store.
- Store yard.
- Scrap yard.
- Structural yard.
- Service buildings for CHP.
- Fire Fighting Station.

12.1.3 Work Shop

The following workshop facilities are provided at the Project area.

- ❖ Electrical Repair Shop
- ❖ Radiator Repair shop
- ❖ Smithy Shop
- ❖ Welding and Structural shop
- ❖ Dumper repair shop
- ❖ Face Equipment repair shop
- ❖ Washing Station

12.2 Township and Housing Satisfaction

Yellandu area has well established residential colonies and other required amenities. The housing satisfaction in this area is about 100%, hence there is no requirement of additional residential facilities.

12.3 Water Supply

The source of water for the project is the water pumped out from the proposed opencast mine. Seepage water is collected in the sumps created in the dip most area of the proposed quarry. The water will be pumped to the surface and treated by RO system before it is used for drinking. The inflow of water into JK-5OCP is 2864 m^3/day. Of this, 807 m^3/day is for mine requirement (dust suppression and HEMM washing), 113 m^3/day is for work shop and 160 m^3/day for plantation and 50 m^3/day for domestic consumption at the project. The balance 1734 m^3/day of surplus water is let out into the local tanks and streams for use of the local people for their agricultural needs. This acts as constant source of recharge to the groundwater regime and improves the water levels around the mine.

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12.4 Power Supply and Energy Consumption

The source of power for the project is from 33 KV sub-station of TS Transco, Yellandu. This sub-station is having sufficient spare capacity to meet the power requirement of expansion project also. The power requirement for this project is about 1.303 MVA.

Two Transformers of 33/3.3 KV of 1.5 MVA capacity (1 No standby) feed power to various loads. The Sub-station is established near the entry of the quarry.

From this Sub-station, 3.3 KV overhead transmission line is laid along the edge of the quarry to feed power to the equipment inside the quarry. The surface loads of workshop, stores etc., are fed by distribution transformers.

The system of power supply at all the voltages in the project i.e., 3.3 KV, 550 V and 230 V is by earthing neutral as per statutory regulations.

12.5 Distribution Network:

Two Transformers of 33/3.3 KV of 1.5 MVA capacity (1 No standby) feed power to various loads. The Sub-station is established near the entry of the quarry.

From this Sub-station, 3.3 KV overhead transmission line is laid along the edge of the quarry to feed power to the equipment inside the quarry. The surface loads of workshop, stores etc., are fed by distribution transformers.

The system of power supply at all the voltages in the project i.e., 3.3 KV, 550 V and 230 V is by earthing neutral as per statutory regulations.

12.6 Illumination:

The working areas of the quarry and haul road etc are illuminated with energy efficient lamps mounted on 14 m high towers installed along the edge of the quarry. The dump yards are illuminated with 2 Nos diesel operated generators with 14m height mobile lighting towers. 10 Nos. 25 KVA, lighting transformers are provided to feed the lighting loads to the quarry etc. The power supply for illumination of roads, stores, workshop etc., will be drawn from 500 KVA, 3.3 kV/ 440V transformers installed at the Sub-station.

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12.7 Communication:

Adequate communication system for different production and service units was available through mobile wireless sets for efficient communication.

12.8 Energy Conservation

The following important points for proper utilization of energy have been considered while selecting the machinery for various purposes of the project.

12.8.1 Power Factor Improvement

The improvement of the power factor of the system will reduce the losses of energy and maximum demand of the project. Hence, suitable capacitor banks have been provided on the secondary side of the power transformers for improvement of the power factor.

12.8.2 Energy Meters

Energy meters were fitted separately to the main feeders. This helps in measuring the power consumption by various groups of machinery and to bring awareness and take necessary steps for proper improvement of the system.

12.8.3 Selection of High Voltage Equipment and Transmission

Power is transmitted from the Sub-station to the high voltage machinery and distribution transformers at 3.3 kV through short and convenient routes. Transmission of power and operation of machinery at high voltage will reduce the loss of energy.

12.8.4 Selection and Adjustments of Transformer Loads

Transformer cores made of steel of high silicon content and of thin laminations is used for minimizing the constant losses i.e., core or iron losses since the transformers always be working irrespective of the amount of load connected to it i.e., on varying load and no load conditions.

12.8.5 L.T. Motors

The L.T. Motors are being operated at 550 V. The supply to these motors is fed from unitized transformers.

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12.8.6 Illumination

The lighting at the quarry is arranged with suitable energy efficient Sodium Vapor lamps. For street lighting in the colony etc Fluorescent tube lights/M.V. Lamps/Sodium Vapor Lamps are being used.

12.8.7 Efficiency

Care is being taken to select only the high efficiency equipment and machinery to effect saving in energy consumption.

12.8.8 Publicity & Propaganda:

The Philosophy of conserving power is inculcated in people by suitable circulars, posters etc., so as to be prompt in switching off lights, fans, air coolers, air conditioners etc in cabins, offices and other departments whenever not needed.

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CHAPTER 13

LAND REQUIREMENT

13.1. Land Ownership and Occupancy:

All figures in ha Table 13.1

Sl. No.	Land Ownership	Land Required	Land Under Possession	Bal. Land to be Acquired	Total
1	**Forest land**	**Nil**	**Nil**	**Nil**	**Nil**
2	**Non-forest land**				
a)	Private Land	253.40	253.40	Nil	253.40
b)	Govt Land	236.74	236.74	Nil	236.74
	Total:	**490.14**	**490.14**	**Nil**	**490.14**

13.2 Pre-Mining Land Use Pattern:

Total land within the project boundary of JK-5 Opencast Mine is 490.14 ha, there is no forest land involved in this project. The pre-mining land use pattern in the total mine take area is as furnished in table 13.2.

All figures in ha Table 13.2

Land owner ship	Land use	Extent (Ha)
Tenancy/Private Land	Agricultural	18.23
	Township	26.55
	Grazing /other	-
	Barren	208.62
	Road	-
	Sub Total	**253.40**
Government Land	Agriculture Land	-
	Township	-
	Grazing /other	225.75
	Road	7.57
	Water body	3.42
	Sub Total	**236.74**
Forest land		**Nil**
	Grand Total:	**490.14**

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13.3. Present Land Use Pattern (Land Use During Mining):

The present land use during mining in the JK - 5 OC Mine is furnished in table 13.3

All figures in Ha Table 13.3

Sl. No.	Description	Total Land
1	Quarry area	149.95
2	External dump yard	195.56
3	Safe barrier, Road and drainage around quarry and external dump yard.	101.72
4	Roads and Infrastructure area	18.18
5	Road diversion	7.41
6	Top soil dump	17.32
	Total Land:	**490.14**

Earlier approved Mining Plan envisaged to use 266.81 ha voids of JK OC and 24.81 ha external dump for dumping of OB.
In this proposal, entire external dump area of 24.81 ha is avoided and planned entire dumping in the 266.81 ha JK OC voids to avoid further degradation of land. Hence, the project area has been reduced from 514.95 ha to 490.14 ha.

13.4. Proposed End Land Use Status:

The proposed land use status at the end of project life is furnished in table 13.4:

(All figures in Ha) Table 13.4

Sl. No.	Type	Total Area	Reclaimed area		Un-Reclaimed Area	
			Plantation	Others	Plantation During Post Closure	Others
1	**Excavation/Quarry Area:**					
	(a) Backfilled Area	42.27	42.27			
	(b) Excavated Void	107.68	-			107.68
	Sub-Total	**149.95**	**42.27**			**107.68**
2	Topsoil dump	**17.32**	-		**17.32**	
3	External Dump	**195.56**	**174.59**			**20.97**
4	Safe barrier & drain along the quarry & external dump.	101.72	34.63	26.78	40.31	
5	Road & Infrastructure area (Service Buildings and CHP)	18.18	-		18.18	-
6	Road diversion	7.410	-	7.410	-	-
	Grand Total:	**490.14**	**251.49**	**34.19**	**75.81**	**128.65**

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13.5. Proposed Post Closure Land Use Status

The proposed Post Closure land use status of Jawaharkhani-5 OC Mine is furnished in table 13.5:

(All figures in Ha) **Table 13.5**

Sl.No.	Type	Total Area	Plantation	Water body	Public/ Company use
1	Excavation / Quarry area				
	(a) Backfilled area	42.27	42.27		
	(b) Excavated void	107.68		107.68	
	Sub-Total	**149.95**	**42.27**	**107.68**	
2	Top soil dump	17.32	17.32		
3	External dump	195.56	174.59	20.97	
4	Safe barrier, roads, drainage around quarry and external dump yard.	101.72	74.94	8.82	17.96
5	Road diversion	7.41			7.41
6	Roads & Infrastructure area	18.18	18.18		
	Grand Total	**490.14**	**327.30**	**137.47**	**25.37**

13.6. Consolidated Land Use Status:

The consolidated land use status of JK-5 Opencast Mine is furnished at the end of the chapter as table No:13.6

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13.6.1 Land Use Summary

Total Mine Take Area -490.14 ha (Total NFL)

- **Disturbed land : 490.14 ha.**
- **Out of the total land,**
  - 327.30 ha Reclaimed & Plantation Done.
  - 137.47 ha left as Water reservoir.
  - 25.37 ha left for public/company use (Roads etc.,).

13.7. Details of Mining Lease:

13.7.1 Details about Mining Lease Area of the Project:

The JK-5 Opencast Mine is covered under single Mining leases namely 1st renewal of Yellandu Additional Mining Lease. The details of the Mining lease is furnished hereunder:

- **1st renewal of Yellandu Additional Mining Lease** granted vide G.O.Ms. No.278 I&C Dept, dated 23.10.2007, valid up to 14.04.2024. This ML area covers 1741.00 ha and 490.14 ha of Jawaharkhani-5 OC Project fall in this lease.

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Consolidated land use status of JK - 5 Opencast Mine (Table No: 13.6)

Pre Mining Land Use (in ha)			Type	Land use (During Mining) (in ha)	Land Use (End of Life) (in ha)	Land Use (Post Closure) (in ha)								
						Agriculture land	Plantation	Water Body	Public/ Company Use	Water Harvesting	Dimantle d area	Forest Land (Returned)	Un disturbed	Total
Tenancy/ Private	Agricultural	18.23	Excavation Area-	149.95										
	Township	26.55	Backfilled Area		42.27		42.27							42.27
	Grazing		Excavated Void		107.68			107.68*						107.68
	Barren	208.62	Without plantation											
	Water Bodies		Top Soil Dump	17.32	17.32		17.32							17.32
	Road		External Dump	195.56	195.56		174.59	20.97						195.56
	Community		Safety Zone //Rationalization area Around Quarry & external dump yard	101.72	101.72		74.94	8.82	17.96					101.72
	Village		Road diversion	7.41	7.41				7.41					7.41
	Sub-Total	263.40												
Govt Non Forest	Agricultural		Roads & Infrastructure area	18.18	18.18		18.18							18.18
	Township		Garland drains Including Settling Pond											
	Grazing /other	225.75	Embankment											
	Road	7.67	Green Belt											
	Water body	3.42	Pit head power plant											
	Other		Resettlement											
	Sub-Total	236.74	Transmission Lines											
Forest	Reserve		Township Area/Colony											
	Protected		Other Purposes											
	C-J-B-J		Undisturbed/ Non-Forest Land/ MR for UG											
	Sub-Total		Undisturbed/ Forest Land/ MR for UG											
		490.14	*TOTAL:*	490.14	490.14		327.30	137.47	25.37					490.14

* 107.68 ha will be left as Water reservoir (i.e. two final voids V1:23.64 M.Cum and V2:32.33 M.Cum)

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CHAPTER 14

ENVIRONMENT MANAGEMENT PLAN

14.1.0 General:

The existing JK-5 Opencast Mine forms part of existing JK-5 Incline block, which is situated in the Northern part of the Yellandu coal-belt between 21 Incline block and Yellandu OC (also called Jawahar Khani OC-JK OC). The JK-5 OCP covers an area of 1.4995 Sq. Km. The block is bound by North Latitudes 17° 33' 59"' to 17° 35' 25"' and East Longitudes 80° 18' 51" to 80° 19' 51", and is covered in Survey of India Toposheet No. 65C/6. The present opencast project (up to 120m.depth of Queen seam) is covering an area of 4.90 sq.km (490.14 Ha.). The total project area covered under the single mining lease i.e. 1st renewal of Yellandu Additional Mining Lease (1741 Ha) of SCCL. The project covers an area of 490.14 ha.

Environmental Clearance was also obtained for Jawaharkhani -5 Opencast Project vide letter No. J-11015/31/2013-IA-II (M), Dated 03.03.2016 for rated capacity of 2.5 MTPA.

14.2.0 Salient Features of the Project Area:

The Jawaharkhani 5 Opencast Project is an operating mine and covers a total area of 490.14 ha. The following operations in the open cast mine have an impact on environment with regard to land use, air quality, water quality and ecology.

- Drilling in overburden (OB) and coal seams.
- Blasting of OB and coal seams.
- Excavation of OB and coal.
- Loading of OB and coal in to dumpers by excavators.
- Transportation of OB and coal by dumpers.
- Dumping of OB in dump yards and coal into feeder breakers respectively.
- Pit head coal handling arrangements.etc.
- Intersection of aquifers.

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14.2.1 Core Zone:

JK-5 OC Block is of plain to undulatory terrain sloping towards North. The topographic elevation of the block area varies from 235 m above MSL on the rise side of the property to 201 m above MSL near the main incline of JK-5 Incline. The average slope of the block is about 27m/Km towards North North-West to South South-East. Some part of the Yellandu Town is falling on the rise side of the Quarry Area. The Karepalli Road & Coal Road to CHP exist over the block.

Yellandu town is 37 Km due North West of Bhadradri district head quarters and a road links the two towns. The nearest rail head is the 'Singareni Collieries railway Station' the terminus of the branch line from Dornakal Junction. The state capital Hyderabad is connected both by rail and road and is 262 Km. from Yellandu.

14.2.2 Rehabilitation and Resettlement:

The project is a running project and no R&R is involved in the project.

14.3.0 Environmental Impact Assessment:

Environmental impacts due to mining activity, on various environmental attributes, both direct and indirect, during operational and post-operational phases are discussed in this Chapter. The impacts due to mining operations commence from the exploration activities, extend through excavation and continue up to the post-closure operations with the nature and extent of impacts varying throughout the stages of mine development. The project is running project hence, the details of the Post Project Environmental data is enclosed hereunder.

14.3.1 Post Project Environmental Status

The details of the environmental monitoring data for the period December, 2017 – February, 2018 for various environmental attributes are furnished below:

14.3.2.1. Air Quality Monitoring

Parameters & Procedure

In accordance with MoEF Notification, GSR-742 (E), dt. 25.09.2000 and National Ambient Air Quality Standards, the concentration of Suspended Particulate Matter (PM_{10} and $PM_{2.5}$), Sulphur Dioxide (SO_2) and Oxides of Nitrogen (NO_x) is being monitored at work zone locations and also in nearby villages to assess the impact of mining operations on surrounding habitation.

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Respirable Dust Sampler is used for monitoring of PM_{10}, SO_2 and NO_x and Ambient Fine Dust Sampler is being used for monitoring of $PM_{2.5}$. SCCL is carrying out post-project environmental monitoring through EPTRI, Hyderabad, a CPCB recognized and NABL accredited laboratory. EPTRI has also established laboratories in SCCL mining areas for analyzing critical parameters in the field.

Frequency of Monitoring:

Air quality monitoring is being carried out at a frequency of once in a fortnight (24 hourly sampling) at the identified locations near the dust generating sources.

Post project Ambient Air quality monitoring stations:

S.No.	Station Code	Name of the Stations	Latitude	Longitude
CORE ZONE				
1	CA1	PO Office -JK-5 OCP	N 17°33' 57.4"	E 80°20' 12.4"
2	CA2	Osmanpit (Rajanagar)	N 17°37' 11.5"	E 80°18' 02.2"
3	CA3	PO Office - KOC-II	N 17°37' 29.4"	E 80°29' 09.9"
4	CA4	Site Office - KOC-II	N 17°37' 28.4"	E 80°29' 09.9"
BUFFER ZONE				
5	BA1	Yellandu Town	N 17°35' 53.6"	E 80°18' 53.1"
6	BA2	Tekulagudem Village	N 17°32' 42.7"	E 80°21' 13.5"
7	BA3	Usirikayalapalli Village	N 17°33' 05.4"	E 80°19' 22.4"
8	BA4	Motlagudem Village	N 17°34' 11.6"	E 80°21' 08.7"
9	BA5	Jangalapalli	N 17°55' 53.2"	E 80°49' 52.3"
10	BA6	Mittapalli	N 17°35'12.2"	E 80°49' 52.6"
11	BA7	Andugulagudem	N 17°35' 52.2"	E 80°49' 11.6"
12	BA8	Murutla	N 17°40' 27.1"	E 80°49' 24.9"

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Monitoring data:

The summary of the air quality monitoring data from December, 2017 – February, 2018 is as follows.

(All values in $\mu g/m^3$)

Table (A) Summary of Ambient Air Quality Data Monitoring at Yellandu area for (December, 2017 – February, 2018)

Location code	Name of the locations	PM_{10} ($\mu g/m^3$)			$PM_{2.5}$ ($\mu g/m^3$)			SO_2 ($\mu g/m^3$)			NO_2 ($\mu g/m^3$)		
Coal mine standards, GSR 742(E), Dated 25.09.2000		**250**			**-**			**120**			**120**		
Core Zone		**Min**	**Max**	**Avg**	**Min**	**Max**	**Avg**	**Min**	**Max**	**Avg**	**Min**	**Max**	**Avg**
CA1	PO Office JK-5 OCP	128.0	170.0	152.3	50.5	60.3	56.8	9.4	13.3	11.1	13.0	14.7	14.0
CA2	Osmanpit (Rajanagar)	73.0	87.0	80.0	33.3	42.7	39.8	9.9	11.2	10.4	12.3	13.9	13.2
CA3	PO Office - KOC-II	147.0	168.0	163.3	53.4	57.1	55.5	10.5	12.1	11.7	13.3	15.4	14.6
CA4	Site Office, KOC-II	151.0	174.0	165.3	55.5	62.3	59.5	11.4	12.4	12.1	14.0	16.2	15.3

-No standard was specified for PM2.5 in core zone

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Dt. 05-10-2017

Table (B) Summary of Ambient Air Quality Data Monitoring at Yellandu area for (December, 2017 – February, 2018)

Location code	Name of the locations	PM_{10} (µg/m³)			$PM_{2.5}$ (µg/m³)			SO_2 (µg/m³)			NO_2 (µg/m³)		
NAAQ Standards, CPCB, Dated 18.11.2009		100			60			80			80		
Buffer Zone		Min	Max	Avg	Min	Max	Avg	Min	Max	Avg	Min	Max	Avg
BA1	Yellandu Town	60.0	82.0	68.2	30.5	45.4	37.3	9.6	11.2	10.4	12.5	13.4	13.1
BA2	Tekulagudem Village	48.0	56.0	50.8	18.7	38.2	27.3	9.3	9.9	9.6	10.2	14.6	12.0
BA3	Usirikayalapalli Village	52.0	66.0	59.5	25.5	38.8	32.8	9.6	11.5	10.9	12.4	14.4	13.4
BA4	Motlagudem Village	48.0	61.0	53.8	22.2	37.1	28.1	9.2	10.9	9.6	10.3	14.8	12.4
BA5	Jangalapalli Village	41.0	57.0	50.8	19.5	28.9	24.0	8.6	9.6	9.3	10.1	13.8	11.4
BA6	Mittapalli Village	45.0	56.0	51.7	19.8	27.0	22.7	9.2	10.4	9.8	10.0	14.0	11.8
BA7	Andugulagudem Village	56.0	72.0	64.2	20.1	38.3	29.4	8.7	10.4	9.8	10.2	13.2	12.4
BA8	Murutla Village	46.0	54.0	50.8	20.7	24.7	22.0	9.1	9.9	9.6	11.0	13.8	12.1

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Summary of Ambient Air Quality Data: The air quality data monitored at the work zone locations and surrounding residential areas indicate that PM_{10} concentration is within the stipulated limits at all locations. The $PM_{2.5}$ concentration is within the stipulated limits at all locations. The SO_2 and NO_x levels are well within the limits at all the locations.

14.3.2.2. Water Quality

The impact of the mining activities on the water environment was assessed by studying the quality of groundwater and surface water bodies is the study area. The sampling locations were selected considering their proximity to the project site. A total of 7 water samples i.e., 5 samples from surface and 2 samples from groundwater were collected and analyzed for various physico-chemical and bacteriological parameters. The locations of air quality monitoring stations in the core and buffer zones of proposed project are furnished in table 14.1.

Table - 14.1 Surface & Underground Water Sampling Locations

S.No.	Sampling code	Date of sampling	Sampling Location	Latitude	Longitude
1.	SW-1	11.02.2018	Tank Near KOCP-II & KOC III	N 17°37'32.8"	E 80°29'03.1"
2.	SW-2	11.02.2018	Murreru Vagu U/S	N 17°38'35.9"	E 80°27'14.7"
3.	SW-3	11.02.2018	Murreru Vagu D/S	N 17°34'00.0"	E 80°33'24.7"
4.	SW-4	11.02.2018	Diverted Nallah near KOC-II	N 17°37'29.2"	E 80°29'05.5"
5.	SW-5	11.02.2018	Tank near Lalithapuram	N 17°33'57.1"	E 80°20'36.3"

S.No.	Sampling code	Date of sampling	Sampling Location	Latitude	Longitude
1	GW-1	11.02.2018	Motlagudem Village	N 17°34'16.1"	E 80°20'58.2"
2	GW-2	11.02.2018	Koyagudem Village	N 17°37'57.9"	E 80°27'34.0"

The analytical results of surface water, ground water and effluent water samples are given in the Tables, 14.2 to 14.3.

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Table: 14.2: SURFACE WATER DATA FOR THE PERIOD Dec' 2017 To Feb' 2018

Physical-Chemical and Bacteriological Characteristics of Surface Water at Selected Locations in the Study Area

S.No.	Parameters	Unit	Test Method	Tolerance Limits IS: 2296-1982	CPCB Water quality Criteria			RESULT				
				Class C	Class A	Class B	Class C	SW-1 (Tank near KOCP-II & KOC III)	SW-2 (Murreru Vagu U/S)	SW-3 (Murreru Vagu D/S)	SW-4 (Diverted Nallah near KOC-II)	SW-5 (Tank near Lalithapuram)
1.	pH	-	4500-H^+B	6.5-8.5	6.5-8.5	6.5-8.5	6.5 - 9	7.7	8.0	7.9	7.5	7.9
2.	Temperature	°C	2550. B	-	-	-	-	25.2	25.0	25.1	25.0	25.8
3.	Turbidity	NTU	2130. B	-	-	-	-	1.2	1.8	1.1	1.0	1.02
4.	Electrical Conductivity	µmhos/cm	2510-B	-	-	-	-	1390	1330	1400	1350	780
5.	Total Dissolved Solids	mg/L	2540.C	500	2000	-	-	800	785	855	810	480
6.	Total Suspended Solids at 105° C	mg/L	2540. D	1500	-	-	-	14	16	19	15	14
7.	Dissolved Oxygen	mg/L	4500-O.C	4	6 mg/l or more	5 mg/l or more	4 mg/l or more	5.8	5.6	5.9	6.2	6.0
8.	Bio chemical Oxygen Demand for 3 days at 27° C	mg/L	IS: 3025	3	2 mg/l or less	3 mg/l or less	3 mg/l or less	4	5	3	4	5
9.	Total Coliforms	MPN/100mL	9221A & B	5000	50 or less	500 or less	5000 or less	110	79	94	1600	110
10.	Fecal Coliforms	MPN/100mL	9221 E	-	-	-	-	13	23	49	220	23
11.	*E. coli*	Presence or Absence/ MPN/100 mL	9221 F	-	-	-	-	Absent	Absent	Present	Present	Absent
12.	Chemical Oxygen Demand	mg/L	5220. D	-	-	-	-	30	40	30	40	40
13.	Chlorides as Cl^-	mg/L	4500-Cl^-.B	-	-	-	-	107	97	122	122	57
14	Nitrites as NO_2	mg/L	4500-NO_2^- .B	-	-	-	-	0.6	0.10	0.04	0.46	0.09
15.	Nitrates as NO_3	mg/L	PDA	50	-	-	-	22	1.3	0.67	13.2	3.5
16.	Sulphates as SO_4^{2-}	mg/L	4500-SO_4^{2-} .E	200	400	-	-	27	31	19	69	19

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S.No.	Parameters	Unit	Test Method	Tolerance Limits IS: 2296-1982	CPCB Water quality Criteria			RESULT				
				Class C	Class A	Class B	Class C	SW-1 (Tank near KOCP-II & KOC III)	SW-2 (Murreru Vagu U/S)	SW-3 (Murreru Vagu D/S)	SW-4 (Diverted Nallah near KOC-II)	SW-5 (Tank near Lalithapuram)
17.	Arsenic as As	mg/L	3120. B	0.01	-	-	-	BDL	BDL	BDL	BDL	BDL
18.	Lead as Pb	mg/L	3120. B	0.01	-	-	-	BDL	BDL	BDL	BDL	BDL
19.	Zinc as Zn	mg/L	3120. B	5	-	-	-	0.2	0.16	0.17	0.19	0.17
20.	Cadmium as Cd	mg/L	3120. B	0.003	-	-	-	BDL	BDL	BDL	BDL	BDL
21.	Total Chromium as Cr	mg/L	3120. B	-	-	-	-	BDL	BDL	BDL	BDL	BDL
22.	Nickel as Ni	mg/L	3120. B	0.02	-	-	-	BDL	BDL	BDL	BDL	BDL
23.	Iron as Fe	mg/L	3120. B	50	-	-	-	1.51	2.73	0.6	1.25	0.6
24.	Copper as Cu	mg/L	3120-B	0.05	-	-	-	BDL	BDL	BDL	BDL	0.05
25.	Boron as B	mg/L	3120-B	1.0	-	-	-	0.08	0.06	0.05	0.06	0.07
26.	Colour	Pt-co	2120. B	300	-	-	-	5	<5	5	5	5
27.	Odour	TON	2150. B	-	-	-	-	No odour observed	No odour observed	No odour observed	No odour observed	No odour observed
28.	Ammonical Nitrogen as NH_3-N	mg/L	4500-NH_3-C	-	-	-	-	BDL	BDL	BDL	BDL	BDL
29.	Total Phosphates	mg/L	4500-P-D	-	-	-	-	BDL	BDL	BDL	BDL	BDL
30.	Oil & Grease	mg/L	5520. B	-	-	-	-	<1	<1	<1	<1	<1

NTU – Nephelometric Turbidity Unit; TON – Threshold Odour Number; BDL – Below Detection Limit, Detection Limit – BOD – 3 mg/L; Ammonical Nitrogen – 5 mg/L; Total Phosphates – 0.02mg/L.

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Ref. 34012/01/2015-CPAM
Dt. 05-10-2017

GROUND WATER DATA FOR THE PERIOD Oct' 2017 TO Mar' 2018

Physico-Chemical, Bacteriological Characteristics of Groundwater Collected within the Study Area

Organoleptic and Physical Parameters

S.No	Parameters	Unit	Test Method	IS: 10500 Requirement (Acceptable Limit)	IS: 10500 Permissible Limits	RESULT	
						GW-1 (Motlagudem)	GW-2 (Koyagudem Village)
1.	Colour	Pt-co-	2120. B	5	15	<5	5
2.	Odour	TON	2150. B	Agreeable	Agreeable	No odour observed	No odour observed
3.	pH	-	4500-H^+B	6.5 to 8.5	No relaxation	7.4	8.0
4.	Taste	FTN	2160. B	Agreeable	Agreeable	No flavor observed	No flavor observed
5.	Turbidity	NTU	2130. B	1	5	0.9	0.86
6.	Total Dissolved Solids at 180°C	mg/L	2540.C	500	2000	**1170**	275

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Dt. 05-10-2017

General Parameters Concerning Substances Undesirable in Excessive Amounts

S.No.	Parameters	Unit	Test Method	IS: 10500 Requirement (Acceptable Limit)	IS: 10500 Permissible Limits	Result	
						GW-1 (Motlagudem)	GW-2 (Koyagudem Village)
1	Aluminium as Al	mg/L	3120-B	0.03	0.2	BDL	BDL
2	Anionic Detergents (as MBAS)	mg/L	IS:13428:2005K	0.2	1.0	<0.2	<0.2
3	Barium as Ba	mg/L	3120. B	0.7	No relaxation	0.27	0.9
4	Boron as B	mg/L	3120-B	0.5	1.0	BDL	BDL
5	Calcium as Ca	mg/L	3500-Ca.B	75	200	80	72
6	Chlorides as Cl^-	mg/L	4500-Cl^-.B	250	1000	310	35
7	Copper as Cu	mg/L	3120-B	0.05	1.5	BDL	BDL
8	Fluoride as F^-	mg/L	4500-F^-.C	1.0	1.5	0.468	0.219
9	Residual free chlorine	mg/L	4500-Cl^-.B	0.2	1.0	BDL	BDL
10	Iron as Fe	mg/L	3120-B	0.3	No relaxation	0.30	0.28
11	Magnesium as Mg	mg/L	3500-Mg.B	30	100	18	21
12	Manganese as Mn	mg/L	3120-B	0.1	0.3	BDL	BDL
13	Mineral oil	mg/L	IS:3025 (part 39)	0.5	No relaxation	Absent	Absent
14	Nitrates as NO_3	mg/L	4500-NO_3^-.B	45	No relaxation	59	5
15	Phenolic compounds as C_6H_5OH	mg/L	5530-D	0.001	0.002	BDL	BDL
16	Selenium as Se	mg/L	3120-B	0.01	No relaxation	BDL	BDL
17	Silver as Ag	mg/L	3120. B	0.1	No relaxation	BDL	BDL
18	Sulphates as SO_4^{2-}	mg/L	4500-SO_4^{2-}.E	200	400	58	14
19	Sulfide as S^{2-}	mg/L	4500. S^{2-}- G	-	-	BDL	BDL
20	Total Alkalinity as $CaCO_3$	mg/L	2320. B	200	600	530	147
21	Total Hardness as $CaCO_3$	mg/L	2340. C	200	600	500	135
22	Zinc as Zn	mg/L	3120-B	5	15	0.14	0.29

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Ref. 34012/01/2015-CPAM
Dt. 05-10-2017

Parameters Concerning Toxic Substances

S.No.	Parameters	Unit	Test Method	IS: 10500 Requirement (Acceptable Limit)	IS: 10500 Permissible Limits	RESULT	
						GW-1 (Motlagudem)	GW-2 (Koyagudem Village)
1	Cadmium as Cd	mg/L	3120-B	0.003	No relaxation	BDL	BDL
2	Cyanide as CN-	mg/L	4500-CN`.F	0.05	No relaxation	BDL	BDL
3	Lead as Pb	mg/L	3120-B	0.01	No relaxation	BDL	BDL
4	Mercury as Hg	µg/L	3500-Hg.B	0.001	No relaxation	BDL	BDL
5	Molybdenum as Mo	mg/L	3120. B	0.07	No relaxation	BDL	BDL
6	Nickel as Ni	mg/L	3120-B	0.02	No relaxation	BDL	BDL
7	**Pesticides:** α–BHC, β-BHC, γ-BHC, δ-BHC, o,p-DDT, p,p'–DDT, Endosulfan, β- Endosulfan, Aldrin, Dieldrin	µg/L	6630. D	Absent	0.001	ND	ND
	2,4-D, Carboryl (Carbonate) Malathion Methyl Parathion Anilophos, Chloropyriphos	Qualitative analysis	6630. D	Absent	0.001	ND	ND
8	**Polyaromatic Hydrocarbons (PAH's):** Acenaphthene, Acenaphthylene, Anthracene, B(a)A, B(a)P, B(b)F, B(k)F, Pyrene, Dibenz (a,h) anthracene, Fluoranthene, Fluorene, Indeno (1,2,3-(d) Pyrene, Naphthalene, Phenanthrene, Pyrene, Methyl Naphthalene	µg/L	6440.C	--	--	ND	ND
9	Total Arsenic as As	mg/L	3120-B	0.01	0.05	BDL	BDL
10	Total Chromium as Cr	mg/L	3120-B	0.05	No relaxation	BDL	BDL

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Bacteriological Quality of Drinking water

S.No.	Parameters	Unit	Test Method	IS: 10500 Requirement (Acceptable Limit)	IS: 10500 Permissible Limits	RESULT	
						GW-1 (Motlagudem)	GW-2 (Koyagudem Village)
1	*E. coli*	Presence or Absence/ 100 mL	9221 F	-	-	Absent	Absent
2	Total Coliforms	MPN/100 mL	9221A & B	-	-	<1.8	<1.8
3	Fecal Coliforms	MPN/100 mL	9221 E	-	-	<1.8	<1.8

Water Quality Monitoring–MINARS/27/2007-2008

S.No.	Parameters	Unit	Test Method	IS: 10500 Requirement (Acceptable Limit)	IS: 10500 Permissible Limits	RESULT	
						GW-1 (Motlagudem)	GW-2 (Koyagudem Village)
1	Electrical Conductivity	µmhos/cm	2510-B	-	-	1950	468
2	Orthophosphates	mg/L	4500-P-D	-	-	BDL	BDL
3	Chemical Oxygen Demand	mg/L	5220. D	-	-	10	10
4	Nitrites as NO_2	mg/L	4500-NO_2^-.B	-	-	0.29	BDL
5	Sodium Na	mg/L	3500 Na. B	-	-	297	28
6	Potassium as K	mg/L	3500. K.B	-	-	3.4	1.3

NTU – Nephelometric Turbidity Unit; TON – Threshold Odour Number; FTN – Flavor Threshold Number; BDL – Below Detection Limit, Detection Limit – Phenols – 0.1 mg/L; Mercury – 20 µg/L; Cyanide – 0.05 mg/L Hex. Chromium – 0.05 mg/L; Copper – 0.02 mg/L; Manganese – 0.01 mg/L; Cadmium – 0.01 mg/L; Selenium – 0.04 mg/L; Arsenic –0.04 mg/L; Lead –

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MINE DISCHARGE (EFFLUENT) QUALITY

S.No.	Date of Sampling	pH	TSS at 105^0C	TDS at 180^0C	COD	BOD	Oil & Grease
	Unit	--	mg/L	mg/L	mg/L	mg/l	mg/L
	Test Method	4500-H^+B	2540-D	2540-C	5220-D	IS 3025	5520-B
	MoEF GSR 742 (E) and GSR 801(E) Effluent Standards for Coal mines	5.5 to 9.0	100	--	250	30	10
1.	15.12.2017	7.4	9	760	19	2	<1
2.	31.12.2017	7.6	7	750	14	1	<1
3.	15.01.2018	7.4	5	1050	13	2	<1
4.	30.01.2018	7.6	18	660	17	2	1.2
5.	15.02.2018	7.4	15	860	18	3	1.3
6.	28.02.2018	7.4	9	690	15	4	1.0

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Sl.No.	Date of Sampling	pH	TSS at 105°C	TDS at 180°C	COD	BOD	Oil & Grease
Unit		--	mg/L	mg/L	mg/L	mg/l	mg/L
Test Method		4500-H+B	2540-D	2540-C	5220-D	IS 3025	5520-B
MoEF GSR 742 (E) and GSR 801(E) Effluent Standards for coal mines		5.5 to 9.0	100	--	250	30	10
1.	15.12.2017	7.1	9	660	26	3	2.0
2.	31.12.2017	7.2	16	680	32	7	2.5
3.	15.01.2018	7.6	7	800	27	8	2.8
4.	30.01.2018	7.3	20	720	22	3	3.1
5.	15.02.2018	7.5	10	740	28	8	3.4
6.	28.02.2018	7.2	23	660	34	7	3.2

Summary of water Quality Data: The water quality data monitored i.e. surface water and ground water at different locations and effluents from mine are within the stipulated limits at all locations.

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14.3.2 Noise Level Monitoring:: Monitoring Data: The summary of noise quality data is as furnished below. The detailed noise quality data monitored from Dec' 2017 to Feb' 2018 .

Code	Name of the Location	Standard limits of Noise		December 1st Fortnight			December 2nd Fortnight		
				Date of monitoring	Noise levels In dB (A)		Date of monitoring	Noise levels In dB (A)	
		Day time	Night time	Date of Sampling	Leq Day	Leq Night	Date of Sampling	Leq Day	Leq Night
Core Zone									
CN 1	JK OC Base Workshop	75	70	10.12.2017	71.2	59.8	26.12.2017	70.1	59.9
CN 2	JK OC Site Office	75	70	10.12.2017	67.3	60.0	26.12.2017	66.5	60.3
Buffer Zone									
BN 1	Sitharampuram Village	55	45	11.12.2017	49.1	40.0	27.12.2017	48.2	40.2
BN 2	Usirikayalapalli Village	55	45	11.12.2017	50.9	40.8	27.12.2017	50.4	40.3
BN 3	Mittapalli Village	55	45	12.12.2017	45.5	35.1	28.12.2017	45.2	35.0
BN 4	Murutla Village	55	45	13.12.2017	42.6	35.3	29.12.2017	42.2	35.5

Note: 1. Daytime is reckoned in between 6 a.m and 10 p.m
Night time is reckoned in between 10 p.m and 6 a.m

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Ref-34012/01/2015 - CPAM
Dt. 05-10-2017

Code	Name of the Location	Standard limits of Noise		February1st Fortnight			February 2nd Fortnight		
				Date of monitoring	Noise levels in dB (A)		Date of monitoring	Noise levels in dB (A)	
		Day time	Night time	Date of Sampling	Leq Day	Leq Night	Date of Sampling	Leq Day	Leq Night
Core Zone									
CN 1	JK OC Base Workshop	75	70	10.02.2018	65.8	48.7	23.02.2018	67.2	52.8
CN 2	JK OC Site Office	75	70	10.02.2018	60.2	49.5	23.02.2018	66.4	51.2
Buffer Zone									
BN 1	Sitharampuram Village	55	45	11.02.2018	45.2	36.6	24.02.2018	45.2	32.7
BN 2	Usirikayalapalli Village	55	45	11.02.2018	48.6	38.7	24.02.2018	46.8	35.8
BN 3	Mittapalli Village	55	45	10.02.2018	42.5	34.8	25.02.2018	45.1	36.2
BN 4	Murutla Village	55	45	12.02.2018	46.4	35.2	27.02.2018	44.7	35.5

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Dt. 05-10-2017

14.3.3.1. Summary of Noise Quality Data:

The details of hourly readings for 24 hours period, monitored at the six locations are furnished in the above Tables. Maximum value of Leq Day I the core zone is 71.20 dBA at base workshop and minimum is 67.3 dBA at JK-5 OCP site office. From the data collected it is seen that the noise levels in terms of Leq (day) and Leq (night) are well within the standards stipulated at all the locations.

14.4.0. Time Bound Action

An Environmental Management Plan is a site-specific time bound action plan developed to ensure that all necessary measures are identified and implemented at a timely manner in order to protect the environment and comply with environmental legislation. The measures that are being undertaken by SCCL to mitigate the environmental impacts due to the project are described hereunder.

14.4.1. Air Pollution Control:

The following measures are being taken to mitigate the fugitive dust generated due to different operations -

- To avoid dust generation from the drilling operations, wet-drilling methods are being adopted.
- Appropriate explosives (NONELS) are being used for blasting. Overcharging of blast holes will be avoided.
- The volume of dust rising from dumps by the action of wind is being controlled significantly by planting grass on slopes and plants on dumps soon after their formation.
- Coal and OB transport roads are the major source of dust in the mine. To overcome the problems of dust generation, the following steps are being taken -
  - Permanent roads like road leading to the coal handling plant, permanent internal roads at site office etc. were black topped.
  - Water spraying on haul roads and permanent transport routes is being done at required frequencies.

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- All roads leading to the project are being manually swept regularly.
- Coal dumpers are being wetted by water sprinklers on surface.
- Avenue plantation along roads.
- Coal is being loaded in to trucks to optimum level.
- Coal trucks were fully covered with tarpaulin sheet to avoid coal spillage and resultant dust pollution during transport.

❖ Water spraying at coal tipplers parking yard by pipe line arrangements.

❖ Effective dust suppression measures were taken up at Coal Handling Plant (CHP). Crusher house was enclosed to the extent possible and dust suppression arrangements were made at suitable locations in the CHP. All conveyors, screens, crusher etc. were provided with covers to avoid fugitive dust during operation. Some of the measures adopted at CHP in order to control dust emission include:

- Effective water spraying at crushing points (hopers), transfer points.
- All crushing points and transfer points have closed covers.
- Height of fall was minimized at all coal transfer points.
- Internal lining of chutes and bins was done to take care of abrasion & dust.
- Continuous water spraying arrangements were made for dust suppression.
- Laying of concrete Pavement around bunkers in CHP
- Continuous water spraying arrangements such as Mist spraying was provided for dust suppression.

❖ The exhaust emissions from HEMM containing CO, SO_x & NO_x was controlled by strictly adhering to the scheduled maintenance that includes periodical tuning of engines.

❖ Taking up plantation around the quarry and OB dumps in three rows, which serve as a barrier to prevent the dispersion of dust.

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Dt. 05-10-2017

14.4.2. Water Pollution Control:

During quarry operations, strata water which seeps in to the quarry area will be pumped out as mine discharge. A part of the mine discharge water is being utilized for meeting water requirement of the mine like dust suppression, washing of HEMM, plantation etc. After meeting the mine requirements, the excess water is being let out into nearby nallah/tank after necessary treatment.

The excess water from opencast mining activity, if discharged without treatment, causes deterioration of quality of receiving water body mainly due to the presence of suspended solids in mine discharge water. Storm water will cause soil erosion and siltation of watercourses, when suitable measures are not taken.

The control measures being implemented in the JK-5 OC Mine for controlling water pollution are as follow:

- ❖ Creation of water storage areas in the quarry for settlement of suspended solids before pumping water out of the mine.
- ❖ Water running through dumps is expected to get mixed with loose overburden and associated material. Garland drains, check dams and sedimentation tanks were constructed around the OB dump and the lease area to reduce soil erosion and arrest suspended solids before discharging the run-off water into the natural water regime as well as to prevent storm water from entering the lease area.
- ❖ In addition to the above, the dump slopes were formed with suitable inclination so that the water falling over the dump will gravitate down without causing soil erosion. Regular cleaning of drains being done for de-silting the same. Reclaimed / back filled area was properly graded and kept slightly sloping against mine workings so that water does not flow into the mine workings.
- ❖ Construction of septic tanks followed by soak pits for treating waste water generated from the mine office.
- ❖ To avoid the flow of surface water towards and into the quarry, suitable precautionary measure like diverting seasonal nallahs and provision of garland drains all along quarry peripheral were taken up.
- ❖ To prevent surface and ground water contamination by oil/grease and sewage waste, the measures are as furnished below.

- Leak proof containers being used for storage and transportation of oil/ grease.
- All the steps were taken at the store to avoid oil spillages.
- Oil grease being handled on impervious area. Any wash off from the oil / grease handling area or workshop is being drained through impervious drains, collected in specially constructed pits and treated appropriately before releasing it into natural drains.
- A washing platform was provided for washing HEMM and the waste water is being collected in Effluent Treatment Plant. The treated water is being re-used for dust suppression and cleaning purpose etc. This provision was made available for contractor vehicles also.

❖ The surface and ground water in and around the project, loading plant and infrastructure are regularly tested.

❖ All stacking / loading areas are provided with proper garland drains equipped with baffles to prevent wash offs from reaching the downstream natural drains.

14.4.3. Noise, Vibration and Fly Rock Control:

14.4.3.1. Noise Control:

The noise levels in the mining premises are being maintained within limits prescribed by DGMS. The following strategy is adopted for controlling the generation of undesirable noise -

❖ Prevention at source,

❖ Isolation of source and

❖ Administrative control

Blasting in opencast mines in particular is of interrupted type activity and the event takes place only once or twice in a day during mid-day. Other associated opencast activities are also in general interrupted type like drilling and movement of HEMM. Some general precautions that are being taken for noise reduction are listed below:

- ❖ Creation of green belts of dense foliage in three rows between mine areas and residential colonies which acts as noise attenuator.
- ❖ Proper maintenance of machinery (including transport vehicles) including fine tuning of engines to reduce noise.
- ❖ Protective devices like acoustic wool, ear plugs and ear muffs were provided to the workers working in HEMM where noise levels will be above 90 dB (A).
- ❖ Controlled blasting techniques using milli-second delay detonators & relays are being adopted in the proposed OC mine for minimizing noise.
- ❖ Sound and dust proof cabins were provided in the machines like dozers, shovels, dumpers, feeder breakers at CHP etc.
- ❖ In CHP, all machine mountings have in their foundations anti-vibration pads/sheets for reducing the vibration and thereby noise. All transfer chutes and hoppers have wear resistant rubber or any suitable wear resistant liners of various thicknesses as per design requirement and their suitability.

14.4.3.2. Ground Vibration Control:

Blasting in mining areas give rise to ground vibrations that may cause damage to nearby structures. Fly rock is another problem that deserves attention. DGMS circular No.7 dated. 29.8.1997 stipulates permissible standards for blast induced ground vibrations. Based on the ground vibration studies proper care has been taken during blasting operations. The following precautions are being taken for controlling ground vibrations at the project.

- ❖ Controlled blasting techniques are being adopted in this project for reducing blast vibrations substantially. The experience gained in other OC mines gainfully utilized to keep the Peak Particle Velocity (PPV) within limits. In practice, this is kept much less than 10 mm/sec.
- ❖ Further, charge per delay is being regulated to minimize blast vibrations.
- ❖ Optimum delay sequence and stem to column ratio is maintained to minimize the fly rock distance and ground vibration intensity.
- ❖ Basing on the distance of the nearest sensitive areas from the epicenter of the blast, charge weight altered to meet the stipulated standards.

- ❖ Design of optimum blast hole geometry considering bench height, diameter of hole, type of explosive, nature of rock, level of fragmentation required etc.
- ❖ The total charge/blast is divided into several parts so as to keep minimum explosive per delay i.e. use of milli-second delay detonators & relays.
- ❖ Avoiding concentration of explosive by using deck charging.

14.4.3.3. Fly Rock Control:

It is a known fact that all blasts more or less produce fly rock. These occur when explosive energy vents violently into the atmosphere and propels rock fragments to a long distance. The causes of fly rock are mainly attributed to the poor blast design, inadequate stemming column, geology of the site, irregular shape of the face, inaccurate drilling, excessive explosive, long water column in holes, loose stones on face or on the surface blasting area, and strong wind. However, certain preventive measures are being taken to minimize the risks arising from flying fragments. These are:

- ❖ Muffled blasting is being done wherever any blasting is to be taken within 100m from the structures if any.
- ❖ In loose and fractured rock mass, low-density explosives are being used.
- ❖ Proper burden and spacing maintained according to the bench height and diameter of holes.
- ❖ Length of stemming column maintained greater than 0.6 times the burden.
- ❖ It is ensured, as far as possible, that the holes to be located beyond weak zones.
- ❖ All loose pieces of rock from the blasting site are cleared before charging.
- ❖ Warning signals: An audible warning signal is being given, fifteen minutes before actual firing of blast to enable persons to move out of danger zone. For this purpose, a set of sirens/hooters are provided at appropriate places.
- ❖ Blasting shelters are provided in close proximity to the site of blasting for taking shelter during blasting in order to protect the personnel engaged in blasting operations.

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Dt. 05-10-2017

14.4.4. Soil and Land Degradation Control:

Any mining activity alters the land use pattern in the lease area. In order to minimise the adverse effects, the following measures are being undertaken in the Jawaharkhani-5 OC mine:

- ❖ Plantation on over burden dumps.
- ❖ Plantation along the boundary of the lease area so as to minimise the visual impact.
- ❖ Topsoil excavated from the site was preserved separately at predetermined stable area where it will not be disturbed or be exposed to excessive water, wind erosion and contaminants for spreading subsequently on dumps for plantation.
- ❖ Back filling of the de-coaled area concurrently with the mining operations.

14.4.5. Forest and Wild Life Conservation

There is no forest land covered in this project area.

14.4.6. Socio Economic Development:

The project didn't involve any Rehabilitation and Resettlement. No significant changes have been visualized in the traditional way of life and occupation of the local people in coal mining areas. The local people are rather benefited due to the provision of more infrastructure facilities provided by the management.

14.5.0. Year-Wise Proposal for Reclamation of Land Affected.

The table indicating technical and biological reclamation is checked and furnished and at all relevant pages.

Following dumping strategy adopted in the JK - 5 Opencast Mine for stage-wise stabilization of land.

The following design criteria have been considered for waste dumps.

- ❖ Separate spoil dumps for topsoil and Hard OB
- ❖ Maximum height of topsoil dump is to be 10m.
- ❖ Hard OB to be dumped in 30m high decks.

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- ❖ 30 m berm width for allowing safe machinery movement.
- ❖ Dump slope for each deck to be at natural angle of repose of 37^0 and overall slope angle will be 28^0.
- ❖ Maximum height of external dump is 60m above ground level.
- ❖ Internal dump is planned upto ground level.
- ❖ Track dozers are deployed for shaping the dumps.

Overburden that will be excavated throughout the life of the project is 110.20 Mm^3. Out of 110.20 Mm^3, 72.95 Mm^3 of OB already extracted (72.00 Mm^3 dumped in the external dump yard and 0.702 Mm^3 dumped in the internal dump yard and the balance 0.248 Mm^3 of topsoil is stored in the temporary storage yard at the dip side of the quarry). Remaining 37.25 Mm^3 of OB will be accommodated in the internal dump yard. Percentages of external and internal dumping will be 63.12% and 36.88% respectively.. Stage wise details of technical reclamation is furnished in table 14.15 below.

Table 14.15

Cumulative area in ha

Year/Stage		Land Degraded area (ha)				Technically Reclaimed Area (ha)			
		Excavation	Dump (External+ Top Soil)	Infra structure/ Others	Total	Backfill	Dump (External + Top Soil)	Others	Total
Upto 31.03.2018		102.29	212.88	127.31	442.48	-	174.59	37.51	212.10
Y-1	2018-19	114.01	212.88	127.31	454.20	-	174.59	43.03	217.62
Y-2	2019-20	133.89	212.88	127.31	474.08	-	174.59	47.33	221.92
Y-3	2020-21	149.95	212.88	127.31	490.14	42.27	191.91	127.31	361.49
Post Closure									
Y-6	2023-24	149.95	212.88	127.31	490.14	42.27	191.91	255.96	490.14

14.5.1. Dump Yards:

It is proposed to accommodate hard overburden and top soil in the following dump yards during the life of the JK-5 OC mine.

14.5.1.1. External Dump Yard:

About 72.00 Mm^3 i.e. 63.12% of total OB was already dumped in the external dump yard. Maximum height of external dump yard is 60m from ground level. The dumping of OB in the external dump yard was already completed. The area of the external dump yard is

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Ref. 3402/01/2015 - CPAM

195.56 ha. About 2.44 $Mm^3$of top soil was already spread over the finished decks of external dump yard and 0.569 Mm^3 of top soil is proposed to spread over the finished decks of external dump during the balance life of the project.

14.5.1.2. Internal Dump Yard:

In the JK-5 OC Mine about 0.702 Mm^3 of hard overburden was already dumped in the internal dump yard up to 31.03.2018. About 37.25 Mm^3 of OB is envisaged to be back-filled in the quarry area up to ground level. Total 0.611 Mm^3 of Topsoil will be spread over the finished decks of the internal dump yards in which about 0.363 Mm^3 of topsoil is proposed to be spread up to end of mining operations and the balance 0.248 Mm^3 of topsoil is proposed to spread during the post closure period of the mine.

14.5.1.3. Top Soil Storage Yard:

A total of 2.688 Mm^3 of top soil was already removed from the project area. Out of the total top soil removed, 2.44 Mm^3 was already spread over the finished decks of external Dump yard. The balance 0.248 Mm^3 of topsoil is stored in the temporary storage yard at the dip side of the quarry. Maximum height of temporary top soil storage yard is 5m.

The details of the Topsoil (Cumulative) are given in the table below:

Table: Topsoil Management

Table 14.5.1

Year/ Stage		*Top Soil Removal in Cumulative (Mm^3)*	*Top Soil Used in Cumulative "Mm^3"*				
			Embankment	*Spreading over the backfilled area*	*Spreading over the OB Dump area*	*Using for Green Belt Area*	*Total utilised*
Upto 31.03.2018		*2.688*			*2.440*		*2.440*
Y-1	*2018-19*	*2.938*			*2.690*		*2.690*
Y-2	*2019-20*	*3.472*		*0.338*	*2.886*		*3.224*
Y-3	*2020-21*	*3.620*		*0.363*	*3.009*		*3.372*
Post Closure							
Y-6	*2023-24*	*3.620*		*0.611*	*3.009*		*3.620*

*Note: At present 0.248 Mm^3 of Topsoil is stored in the temporary

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14.5.2. Stage Wise OB Management:

Table 14.16

Year/Stage		Cumulative OB Removal			External Dump (Cumulative)		Internal Dump/ Backfilling		Embankment (Mm3)	
		Top Soil	Hard OB	Total	Hard OB	Top Soil	Hard OB	Top Soil	Hard OB	Top Soil
Upto 31.03.2018		2.688	70.262	72.950	69.56	2.440	0.702	-		
Y-1	2018 - 19	2.938	82.99	85.928	69.56	2.690	13.43	-		
Y-2	2019 – 20	3.472	97.477	100.949	69.56	2.886	27.92	0.338		
Y-3	2020 – 21	3.620	106.580	110.200	69.56	3.009	37.02	0.363		
Post Closure										
Y-6	2023-24	3.620	106.580	110.200	69.56	3.009	37.02	0.611		

14.5.3. Post-Closure Land Use Status of the Project:

Total mine take area for JK - 5 OC Mine is 490.14 ha, which consists of 149.95 ha of surface excavation area. Post closure land use details are furnished in table 14.18.

Area in ha

Table 14.18

Sl.No.	Type	Total Area	Plantation	Water body	Public/ Company use
1	Excavation / Quarry area				
	(a) Backfilled area	42.27	42.27		
	(b) Excavated void	107.68		107.68	
	Sub-Total	**149.95**	**42.27**	**107.68**	
2	Top soil dump	17.32	17.32		
3	External dump	195.56	174.59	*20.97	
4	Safe barrier, roads, drainage around quarry and external dump yard.	101.72	74.94	8.82	17.96
5	Road diversion	7.41			7.41
6	Roads & Infrastructure area	18.18	18.18		
	Grand Total	**490.14**	**327.30**	**137.47**	**25.37**

* 20.97 ha out of 174.59 ha void of earlier of JK OCP earmarked for external dumping of JK-5 OC Mine was left un utilized and remains as water body.

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Ref. 34012/01/2015-CPAM
Dt. 05-10-2017

14.5.4. Final void

Two final voids (V2:31.97 ha - 23.64 Mm^3, V3: 75.71 ha - 32.33 Mm^3) are left by optimizing the OB dumping strategy. The maximum depth of two final voids are 120m. The final voids at the end of the mining operations will be left as Water reservoir.

14.6.0. Year wise Programme of Afforestation including Stabilization & Vegetation of Dumps:

The table indicating technical and biological reclamation is checked and furnished and at all relevant pages.

The total mine take area of JK-5 OC mine is 490.14 ha, out of which afforestation will be done in phased manner in an area of 327.30 ha which includes plantation over the dump yards, block plantation and avenue plantation. The details of stage wise afforestation programme (Biological Reclamation) are furnished in table 14.19.

Table 14.19

Year/Stage		Biologically Reclaimed Area (ha)					Forest Land (Return)	Un Disturbed/ to be left for public/ Company use	Total
		Agriculture	Plantation	Water Body	To be left for Public/ Company Use	Total			
Upto 31.03.2018		-	119.40	-	-	119.40	-	-	119.40
Y-1	2018-19	-	151.60	-	-	151.60	-	-	151.60
Y-2	2019-20	-	190.05	-	-	190.05	-	-	190.05
Y-3	2020-21	-	251.49	-	-	251.49	-	-	251.49
Post Closure									
Y- 6	2023-24	-	327.30	137.47	25.37	490.14	-	-	490.14

14.7.0 Monitoring Schedules of Different Environmental Components

14.7.1 Air Quality Monitoring:

Air quality monitoring is essential for evaluation of the effectiveness of abatement programme and development of appropriate control measures. SCCL is monitoring ambient air quality in and around the opencast project as per the frequency stipulated by MoEF & CC and appropriate air pollution control measures in order to ensure that the concentration of PM_{10}, $PM_{2.5}$, SO_2 and NO_x are within the limits.

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Ref 34012/01/2015-CPAM

A preliminary field survey conducted to collect information on sources of air pollution, topography, population distribution, meteorological conditions etc., for establishing a network of stations in core and buffer zone of the project for ambient air quality monitoring.

Ministry of Environment and Forests & Climate Change (MoEF & CC) has stipulated environmental standards for coal mines vide GSR-742 (E), dt. 25.09.2000. These standards are being followed for core zone i.e. area within the mine boundary.

14.7.1.1 Parameters:

As per MoEF & CC guidelines, the concentration of Suspended Particulate Matter (PM_{10} and $PM_{2.5}$), Sulphur Dioxide (SO_2) and Oxides of Nitrogen (NO_x) are monitored in downwind direction at a distance of 500 m from the dust generating sources. SCCL is monitoring ambient air quality in the nearby villages to assess the impact of mining operations on surrounding habitation.

14.7.1.2 Frequency of Monitoring:

MoEF & CC stipulated load-based frequency for monitoring of ambient air quality in coal mining areas as furnished below -

- Air quality monitoring shall be carried out at a frequency of once in a fortnight (24 hourly sampling) at the identified locations near the dust generating sources.
- As a result of monthly monitoring, if it is found that the concentration of the pollutants is less than the 50% of the specified standards for three consecutive months, then the sampling frequency may be shifted to two days in a quarter year.
- In case the value exceeds the specified standards, the air quality sampling shall be done twice in a week. If the results of four consecutive weeks indicate that the concentration of pollutants is within the specified standards, then fortnightly monitoring may be reverted to.

14.7.1.3 Methodology:

Respirable dust sampler with gaseous sampling attachment is used for monitoring of air quality for parameters viz., PM_{10}, $PM_{2.5}$, SO_2 and NO_x with a sampling frequency of 24 hours duration. Sampling and analysis is carried out as per IS-5182:1999, for measurement of air pollution. PM_{10} and $PM_{2.5}$ will be analyzed gravimetrically, SO_2 analyzed by Improved West and Gaeke method and NO_x will be analyzed as per Modified Jacob & Hochheiser (Na-Aresnite) method.

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14.7.1.4 Ambient Air Quality Standards:

The air quality standards prescribed by MoEF for coal mines vide Notification No. GSR 742(E), Dt: 25.09.2000 are furnished in table 14.20.

Table 14.20

Category	Pollutant	Time weighted Average	Concentration in Ambient Air	Method of Measurement
New Coal Mines	SPM (> 10µm in size)	Annual Average	360µg/m^3	Respirable Particulate Matter Sampler
		24 hours	500 µg/m^3	
	RPM (< 10µm in size)	Annual Average	180µg/m^3	Respirable Particulate Matter Sampler
		24 hours	250µg/m^3	
	Sulphur Dioxide (SO_2)	Annual Average	80µg/m^3	Improved West & Gaeke Method
		24 hours	120µg/m^3	Ultraviolet Fluorescence Method
	Oxide of Nitrogen as NO_2	Annual Average	80µg/m^3	Jacob & Hochheiser Modified (Na-Aresnic)
		24 hours	120µg/m^3	Gas phase Chemilumine Scence

Note: Annual Arithmetic Mean for the measurements taken in a year has to be arrived out following the guidelines for frequency of sampling and Annual Arithmetic Mean of 24 - hourly values shall be met 92% of the time in a year. However, 8% of the time it may exceed but not on two consecutive days.

In case of any residential or commercial or industrial place falling within or beyond 500 m. of any dust generating sources, the National Ambient Air Quality Standards are made applicable.

14.7.1.5 National Ambient Air Quality Standards:

New National Ambient Air Quality Standards vide G.S.R. 826 (E) dated 18th November 2009 were prepared in exercise of the powers conferred by section 6 and section 25 of the Environment (Protection) Act, 1986. These standards are applicable for stations monitored in the buffer zone. The National Ambient Air Quality Standards are furnished in table 14.21.

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Ref. 34012/01/2015 - CPAM

Table 14.21

Sl. No.	Pollutant	Time weighted average	Concentration in Ambient Air		Method of measurement
			Industrial, Residential, Rural and Other Area	Ecologically Sensitive Area (notified by Central Govt.)	
1.	Sulphur Dioxide SO_2, µg/m^3	Annual *	50	20	- Improved West and Geake - Ultraviolet Fluorescence
		24 hours**	80	80	
2.	Nitrogen Dioxide NO_2, µg/m^3	Annual *	40	30	- Modified Jacob & Hochheiser (Non Arsenite) - Chemiluminescence
		24 hours**	80	80	
3.	PM_{10} µg/m^3	Annual *	60	60	- Gravimetric - TOEM - Beta attenuation
		24 hours**	100	100	
4.	$PM_{2.5}$ µg/m^3	Annual *	40	40	- Gravimetric - TOEM - Beta attenuation
		24 hours**	60	60	
5.	Ozone (O_3) µg/m^3	8 hours **	100	100	- UV Photometric - Chemiluminescence - Chemical Method
		1 hour **	180	180	
6.	Lead (Pb) µg/m^3	Annual *	0.5	0.5	- ASS / ICP method after sampling on EPM 2000 or equivalent filter paper - ED-XRF using Teflon filter
		24 hours**	1.0	1.0	
7.	Carbon Monoxide (CO) mg/m^3	8 hours **	2	2	- Non dispersive Infra RED (NDIR) Spectroscopy
		1 hour **	4	4	
8.	Ammonia (NH_3) µg/m^3	Annual *	100	100	- Chemiluminescence - -Indophenol blue method
		24 hours**	400	400	
9.	Benzene (C_6H_6) µg/m^3	Annual *	5	5	- Gas chromatography based on continuous analyzer - Adsorption and Desorption followed by GC analysis.
10.	Benzo (a) Pyrene (BaP) Particulate phase only ng/m^3	Annual *	1	1	- Solvent extraction followed by HPLC / GC analysis
11.	Arsenic (As) ng/m^3	Annual *	6	6	- AAS/ICP method after sampling on EPM 2000 or equivalent filter paper

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Ref. 3402/01/2015-CPAM
Dt. 05-10-2017

Sl. No.	Pollutant	Time weighted average	Concentration in Ambient Air		Method of measurement
			Industrial, Residential, Rural and Other Area	Ecologically Sensitive Area (notified by Central Govt.)	
12.	Nickel (Ni) ng/m^3	Annual *	20	20	- AAS/ICP method after sampling on EPM 2000 or equivalent filter paper

* Annual arithmetic mean of minimum 104 measurements in a year at a particular site taken twice a week 24 hourly at uniform intervals.

** 24 hourly or 8 hourly or 1 hourly monitoring values, as applicable, shall be complied with 98% of the times in a year. 2% of the time, they may exceed the limits but not on two consecutive days of monitoring.

Note: Whenever and wherever monitoring results on two consecutive days of monitoring exceed the limits specified above for the respective category, it shall be considered adequate reason to institute regular or continuous monitoring and further investigation.

14.7.2 Water Quality Monitoring:

Water quality monitoring involves periodical assessment of quality of mine discharge water, treated workshop effluents, CHP effluents, treated colony effluents, ground water and surface water.

The following parameters are periodically monitored in effluents in a coal mining industry as per the Environmental Standards for coalmines, GSR - 742 (E), dated 25.09.2000.

14.7.2.1 Parameters:

i. pH

ii. Total Suspended Solids

iii. Chemical Oxygen Demand

iv. Oil & Grease

All the parameters as given in Part - A of General Standards for Discharge of Environmental Pollutants, GSR 801 (E) EPA 1986 prescribed by CPCB will be analyzed for all the effluents, in addition to the above parameters, once in a year for assessing the overall quality of effluents.

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14.7.2.2 Frequency of Monitoring:

Monitoring of waste water samples for four parameters shall be done at a frequency of once in a fortnight.

14.7.2.3 Methodology:

The sample collection, procedures for sample preservation and methods of analysis is being followed as per standard methods of water and waste water analysis, American Water Works Association (AWWA), American Public Health Association (APHA).

14.7.2.4 Standards:

The standards prescribed by MoEF & CC for effluent water samples are as follows:

- ❖ pH - 5.5 to 9.0
- ❖ Chemical Oxygen Demand (COD) - 250 mg/l
- ❖ Total Suspended Solids (TSS) - 100 mg/l, 200 mg/l(Land for irrigation)
- ❖ Oil & Grease (O & G) - 10 mg/l

In addition to the above, the following standards will be followed for complete analysis of surface and ground water samples, once in a quarter year.

14.7.2.5 Surface Water:

CPCB Guidelines for water quality monitoring- MINARS / 27/2007-08.

14.7.2.6 Ground Water:

CPCB Guidelines for water quality monitoring- MINARS /27/ 2007-08

14.7.2.7 Monitoring of Phreatic Surface Levels:

Phreatic surface levels will be monitored throughout the life of the project by a hydro-geologist to study the impact of mining operations on ground water regime. A net work of observation wells were identified for monitoring of phreatic surface levels. The trend of ground water level fluctuations are monitored by recording of phreatic surface levels during pre-monsoon and post-monsoon seasons.

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Ref. 34012/01/2015 - CPAM
Dt. 05-10-2017

14.7.3 Noise Level Monitoring:

Noise level monitoring is carried out for achieving the following objectives -

- ❖ To compare sound levels with the values specified in noise regulations
- ❖ To determine the need and extent of noise control of various noise generating sources
- ❖ Correlation of noise levels with community response to noise levels

Noise level monitoring is carried out at work zone in opencast workings to assess the occupational noise exposure levels. Noise levels are monitored at noise generating sources like operation of HEMM, coal handling arrangements, maintenance of workshop and nearby villages to assess the noise levels and their propagation for taking necessary control measures at the source.

14.7.3.1 Parameters:

The noise levels will be measured in dB(A) Leq values, where dB(A) denotes the time weighted average of the level of sound in decibels on scale A, which is relatable to human hearing.

14.7.3.2 Frequency of Monitoring:

Monitoring frequency for noise levels will be once in a fortnight. MoEF & CC has stipulated that noise levels have to be monitored between 6.00 AM to 10.00 PM for day time and 10.00 PM to 6.00 AM for night time.

14.7.3.3 Methodology and Instrumentation:

Precision integrated sound level meters are used for monitoring of Leq noise levels in dB (A) scale at the work place and also in the surrounding villages.

14.7.3.4 Standards:

MoEF & CC has stipulated noise level standards for coalmines as follows:

Time duration:	6.00 A.M- 10.00P.M	10.00P.M-6.00A.M
Noise Level:	Leq 75 dB (A)	Leq 70 dB (A)

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Ref. 34012/01/2015-CPAM

MoEF & CC has also stipulated noise quality standards in Noise Pollution (Regulation and Control) Rules, 2000. MoEF & CC stipulated in GSR 742 (E), dated. 25.09.2000 that occupational exposure levels of noise as prescribed by DGMS should also be followed at work environment.

14.7.3.5 Noise Quality Standards:

Noise quality standards as per MoEF & CC stipulated in GSR 742 (E), dated. 25.09.2000 are furnished in table 14.22.

Table 14.22

Area Code	Category of Area / Zone	Limits in dB(A) Leq *	
		Day Time	Night Time
(A)	Industrial area	75	70
(B)	Commercial area	65	55
(C)	Residential area	55	45
(D)	Silence Zone	50	40

DGMS stipulated, vide Circular No. 18 of 1975, the following noise level standards for attainment in work environment:

- A warning limit of 85 dB(A) is set below which there will be little risk to an unprotected ear for an eight hour exposure.
- The danger limit value of 90 dB(A), above which hearing impairment and deafness may result from an unprotected ear.
- A worker should not be allowed to enter, without appropriate ear protection, an area in which the noise level is 115 dB(A) or more.
- Personal protective equipment shall be worn, if here are single isolated outbursts of noise which can go above 130 dB(A) "impulse" or 120 dB(A) "Fast".
- Workers will not be allowed to enter an area where the noise level exceeds 140 dB (A).

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Ref. 3401201/2015-CPAM
Dt. 05-10-2017

14.7.4 Blast Vibration Monitoring:

Blasting operations result in ground vibrations which may damage the nearby structures. Based on the ground vibration studies conducted earlier, proper care will be taken while carrying out blasting operations. The following control measures are being taken in the JK-5 Opencast Mine to reduce the blast vibrations.

- ❖ Basing on the distance of sensitive areas from the epicenter of the blast, the charge weight altered to contain the Peak Particle Velocities within the stipulated standards.

- ❖ Optimum delay sequence and stem to column ratio be maintained to minimize the fly rock distance and ground vibration intensity.

14.7.4.1 Blast Vibration Study Methodology and Instrumentation:

Director General of Mines Safety (DGMS), Dhanbad, has stipulated vide Circular No. 7 of 1997 dt. 29.08.1997, guidelines for monitoring of blast induced ground vibrations for preventing damage to surface structures. The transducer shall be placed near the structure on the solid undisturbed ground and shall be placed well in contact with the ground. For structural response, the transducers shall be placed horizontally over the wall, floors and ceiling.

The air overpressure and vibration measuring instruments are used for monitoring of impacts due to blasting operations. The blasting personnel are trained in the operation of equipment so that observations can be made during regular blasting operations.

14.7.4.2 Parameters:

The Peak Particle Velocity (PPV) has so far been considered the best criteria for evaluating blast vibrations in terms of potential to cause damage. The PPV is measured in mm/sec and air overpressure is measured in dB(A).

14.7.4.3 Frequency of Monitoring:

The ground vibrations and air overpressure are monitored regularly during blasting operations for continuous supervision of blasting methodology for compliance.

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Ref. 34012/01/2015-CPAM
Dt. 05-10-2017

14.7.4.4 Permissible Standards:

DGMS has stipulated permissible limits for blast induced ground vibrations in mining areas. Depending on the type of structures and the dominant excitation, DGMS has stipulated that the PPV on the ground adjacent to the structure shall not exceed the values furnished in table 14.23.

The PPV at the foundation level of structures in mm/s. **Table 14.23**

Type of structure		Dominant Excitation frequency, Hz		
		< 8 Hz	8-25 Hz	> 25 Hz
(A) Buildings/Structures not belonging to the owner				
i	Domestic houses / structures (kuchha brick & cement)	5	10	15
ii	Industrial Buildings (RCC & Framed Structures)	10	20	25
iii	Objects of historical importance & sensitive structures	2	5	10
(B) Buildings belonging to the owner with limited span of life				
i	Domestic houses / structures (kuchha brick & cement)	10	15	25
ii	Industrial Buildings (RCC & Framed Structures)	15	25	50

14.7.5 Vehicular Emission Monitoring:

Vehicular exhaust emissions for the HEMM of the project is being monitored for smoke density in Hatridge Units (%HU) and Light Absorption Coefficient (k/m)

14.7.5.1 Frequency:

Monitoring Frequency for these parameters shall be once in six months.

14.7.5.2 Heavy metals in coal and particulate matter:

Analysis of coal and particulate matter for the presence of heavy metals such as Hg, Pb, Cd, Cr, Ni, As etc. will be done.

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Ref. 34012/01/2015-CPAM
Dt. 05-10-2017

14.7.5.3 Frequency:

Monitoring Frequency for these parameters shall be once in six months for particulate matter and once in a year for coal samples.

14.7.5.4 Monitoring Programme of Post Project Environmental Status:

The summarized monitoring programme of post-project environmental status around the project is furnished in table 14.24.

Parameter to be monitored **Table 14.24**

Monitoring Programme	location	Monitoring		Remarks
		Sampling duration	Frequency	
Meteorological Parameters - (Temperature, wind speed and direction, relative humidity, etc)	One station in the mining area.	24 hours	Continuous	Install weather monitoring station in the mining area
Ambient Air Quality monitoring of PM_{10}, $PM_{2.5}$, SO_2 and NO_x	One station in the project site and at least three in nearby residential, commercial or industrial areas – one in the upwind and two stations on the downwind directions.	24 hours	Twice a week/ fortnight/ two times in a quarter year depending on the pollution load.	Respirable dust sampler
Noise	3 stations – one station in project site and two in the nearby villages.	24 hours	Once in fortnight	Precision integrated sound level meter
Monitoring of blast induced ground vibrations	Around the project area.	--	Regularly during blasting operations	Ground Vibration and Air over pressure monitoring instrument
Water samples	Samples from the mine discharge, workshop effluents, nearby water bodies and ground water samples from the nearby villages.	--	Once in fortnight for the critical 4 parameters as specified in GSR 742(E) and one sample every year for all the optional parameters as given in GSR 801 (E). IS-2296-1982 for Surface water and BIS 10500 : 1991 for Ground water.	Phyiso-chemical and instrumental methods of analysis
Phreatic surface level	Different observation wells around the project site.	One time	Pre- monsoon and Post- monsoon.	Manually

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Ref. 34012/01/2015-CPAM

14.7.6 Monitoring of Phase-Wise Reclamation Programme:

Project-level environment management committee periodically inspect the progress of reclamation activities at the project concurrent with the mining operations. Project officer ensure that the reclamation programme as envisaged in the approved EMP is implemented in the project. Corporate Environment Department oversee the progress of reclamation activities at the project and compliance status of Environmental Clearance conditions as stipulated by MoEF & CC in respect of land reclamation.

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Ref. 34012/01/2015 - CPAM

CHAPTER 15

FINAL MINE CLOSURE PLAN

15.1.0 Introduction:

The Final Mine Closure Plan is prepared based on the guidelines issued by the ministry of coal vide letter no. 55011-01-2009- CPAM dated 7th January, 2013.

The Final Mine Closure activities start towards the end of mine life and may continue even after the reserves are exhausted and/or mining is discontinued till the mining area is restored to an acceptable level to create a self sustained ecosystem. As the mine is going to be closed on account of depletion of all extractable reserves within three years from 2018-19, the Final Mine closure Plan prepared and submitted for approval.

Various objectives of the mine closure planning are as follows:

- To allow sustainable and productive after-use of the site, which is acceptable to both the mine owner and the regulatory authorities.
- To eliminate environmental damage and thereby encourage environmental sustainability.
- To protect the flora and fauna of the area.
- To protect public health and safety.
- To minimize adverse socio-economic impacts.

Various agencies affected due to mine closure need to be identified and they can be as follows:

The Company	:	Management, Employees.
The Community	:	All stake holders such as local business men, service providers, and landholders, neighbors, nearby residents, local Government, NGOs and community groups.
The State	:	The State Government, the Central Government and Government organizations.

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Ref. 34012/01/2015 - CPAM
Dt. 05-10-2017

Name of the Mine owner:

The owner is a Public Sector Company with a share holding of 51% and 49% by Govt. of Telangana and Central Governments respectively.

Address: The Singareni Collieries Company Limited,
P.O. Kothagudem Collieries - 507 101.
Dist: Bhadradri Kothagudem
State: Telangana

15.1.1 Reasons for Closure:

Generally, the mine will be closed after exhaustion of economically recoverable coal in the leasehold area. The mine may be closed on account of other unforeseen reasons i.e., Force majeure or government directions etc for which information and notice shall be sent to concerned government authorities and departments. The Jawaharkhani-5 OCP was started in the year 2012-13 and since then coal reserves to an extent of 13.15 Mt was extracted upto 31.03.2018. The balance extractable reserves of this mine are 9.34 Mt which will be extracted within 3 years from 2018-19. As such on account of exhaustion of extractable reserves, the JK - 5 Opencast mine is proposed for closure.

The Final Mine Closure Plan showing the details of excavation area, internal and external OB dumping with final void is shown in Plate No. XIX.

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Dt. 05-10-2017

15.1.2 Statutory Obligations:

Statutory obligations and their compliance status is shown in the tabular form as furnished below in the Table 15.1.

Sl.No.	Statutory obligations	Approved Capacity (Mty)	Compliance
1	Mining Plan (II Revision) & Mine Closure Plan of JK-5 OPENCAST Project (514.95 ha) (Ref. No.13016 / 20 / 2005 - CA - II, dated 15th Sep, 2015)	2.5	Exceeded the production during 2015-16, 2016-17 & 2017-18 by 2.514 Mt, 2.692 Mt & 2.962 Mt respectively. The excess production was achieved from within the approved Mining Plan boundary and same mining lease area.
2	Yellandu Additional Mining Lease (1741 ha) (G.O.Ms.No: 278 (I&C dept), dated:23.10.2007)	Valid from 15.04.2004 to 14.04.2024	Operated within the ML and not encroached into the adjoining areas.
3	Environmental Clearance (514.95 ha) (Lr.No:11015 \31\ 2013-1A-II (M), dated.03-03-2016)	2.5	Exceeded the production during 2015-16, 2016-17 & 2017-18 by 2.514 Mt, 2.692 Mt & 2.962 Mt respectively and submitted application for obtaining EC as per notification S.O.804(E), dated 14th March, 2017. Further, SCCL has already submitted affidavit to MoEF&CC for obtaining EC for the enhanced capacity.
4	Consent for Operation (Order No. 17072998391, dtd.03/01/2018)	2.5 & Valid upto 31st December, 2022.	Exceeded the production during 2015-16, 2016-17 & 2017-18 by 2.514 Mt, 2.692 Mt & 2.962 Mt respectively. Further, SCCL has already submitted affidavit to MoEF&CC for obtaining EC for the enhanced capacity.
5	Ground water Clearance (No. 12674/Hg.II(1)/06, dtd: 10/07/2007)	All conditions	Being Implemented

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DL 05-10-2017

15.1.3 Closure Plan Preparation:

The Final Mine Closure Plan is to be submitted to Ministry of coal for approval at least five years before the intended final closure of the mine. The final mine closure plan consists of details of cost estimates & time bound schedules for various mine closure activities and the details of the escrow account.

Name & Address of Applicant:

The Singareni Collieries Company Limited,
P.O. Kothagudem Collieries - 507 101.
Dist: Bhadradri Kothagudem
State: Telangana
Phones:

Chairman & Managing Director	- 245601 (08744)
Hyderabad Office	- 23393746 (040)
Director (Planning & Projects)	- 242602 (08744)
Director (Operations)	- 242328 (08744)
Chief General Manager (CP&BD)	- 242602 (08744)
General Manager (Project Planning)	- 242395 (08744)

Name & Address of Recognized Qualified Person

SHAIK MADAR,
First Class Mine Manager's Certificate Holder
& working as Additional Manager,
Project Planning Department;
Registration No: 34012/01/2015-CPAM,
Date of grant of RQP : 05.10.2017,
Validity: 10 years from 05-10-2017.

Base Dates:

Date of preparation of Mining Plan including Final Mine Closure Plan - June, 2019
(After Incorporating Clarifications to the Observations Made by Technical Members of the Standing Committee to Mining Plan Including Mine Closure Plan, April-2019)

Base date of estimation of reserves	- April, 2018
Base date of estimation of life	- April, 2018
WPI considered for estimation of mine closure cost	- April, 2018

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Ref. 34012/01/2015 - CPAM
Dt. 05-10-2017

15.2.0 Schemes/Proposals to be Implemented for Reclamation & Rehabilitation of Affected Area: Not applicable.

15.2.1 Stage wise Overburden (Hard OB and Top Soil) Dumping Programme:

Details are furnished at para No. 14.5.2 & para No. 14.5.3 of Chapter 14.

15.2.2 The Progressive Greenbelt Development Programme:

Details are furnished at para No. 14.6.0 of Chapter 14.

15.2.3 Selection of Species and Plantation Care:

15.2.3.1 Species Selection:

The selection of species was evaluated through the detailed flora and fauna study as a part of base line studies in EIA/EMP preparation. The plant species that are native to the area and to achieve self sustained ecosystem are preferred in the plantation programme.

15.2.3.2 Post Plantation Care:

Investment on reclamation would be futile without adequate and timely aftercare. Aftercare includes weeding, soil working, mulching, fertilizing, and if possible, irrigation to promote better growth of the planted seedlings. The vegetated area will be and being protected from grazing and browsing of animals until the plants are above the level of damage. Wherever necessary, fencing will be erected on the boundaries of reclaimed areas.

15.2.4 Post-Closure Land Use Status of the Project:

Details are furnished at para No.14.5.3 of Chapter 14.

15.2.5 Final Closure (Final Void):]

Two final voids (V2:31.97 ha - 23.64 Mm^3, V3: 75.71 ha - 32.33 Mm^3) are left by optimizing the OB dumping strategy. The maximum depth of two final voids are 120m. The final voids at the end of the mining operations will be left as Water reservoir.

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Ref. 34012/01/2015-CPAM
Dt. 05-10-2017

15.2.6 Rehabilitation and Resettlement (R&R):

No Rehabilitation and Resettlement is involved in this project.

15.3.0 Management of Surface & Ground Water, Ambient Air indicating Existing Quality, Corrective measures Proposed to Meet the Standards:

15.3.1 Management of Surface & Ground Water:

Details are furnished at para No. 14.4.2 of Chapter 14.

15.3.2 Management of Ambient Air Quality:

Details are furnished at para No. 14.4.1 of Chapter 14.

15.4.0 Overburden Management:

OB management, the details are furnished in para of 5.6.5 of chapter 5.

There is no presence/possibility of presence of toxic or hazardous elements in the waste material.

15.5.0 Top Soil Management:

A total of 2.688 Mm^3 of top soil was already removed from the project area. Out of the total top soil removed, 2.44 Mm^3 was already spread over the finished decks of external Dump yard. The balance 0.248 Mm^3 of topsoil is stored in the temporary storage yard at the dip side of the quarry. Maximum height of temporary top soil storage yard is 5 m. Details are furnished in Para 5.6.6.4 of Chapter 5.

15.6.0 Management of Coal Rejects from Washery:

This is not applicable since washing/beneficiation of coal is not envisaged in this Project.

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Ref. 34012/01/2015-CPAM
Dt. 05-10-2017

15.7.0 **Time Schedule for Final Closure Activities:** The JK-5 Opencast Mine is an operating mine and Rs.31.89 Crores expenditure has already incurred as against provision of Rs. 29.51 Crore as per Approved Mining Plan (II Revision) & Mine Closure Plan of JK-5 Opencast Project. The cost of Mine closure Activities is furnished in Table No. 15.2 under the following heads:

A. Head- B. Progressive Closure Activities
B. Head- C. Post Closure Activities

The cost of activities to be undertaken for Final Closure of Mine is estimated and now indicated as Rs.68.832 Crores and furnished below and at all relevant pages. Further, provisioning for mine closure cost envisaged at para 15.7.0 & Checklist Annexure - G are reconciled and furnished below and at all relevant pages.

Table 15.2: Cost of Activities to be taken up for closure of the Mine

Head	Activity	Unit	Quantity	Rate Rs. / Unit	Amount "Rs. In Cr"
A. Progressive Closure Activities	*Water quality management*	*Year*	*3*	*10121000*	*3.036*
	Air quality management	*Year*	*3*	*15700000*	*4.710*
	Waste Management	*Mm^3*	*4*	*100000000*	*40.000*
	Barbed wire fencing around the Pit	*m*	*5800*	*772*	*0.448*
	Top Soil Management	*Mm^3*	*0.932*	*42500000*	*3.961*
	Technical and Biological Reclamation of Mined out of land and OB Dump	*ha*	*132.09*	*35000*	*0.462*
	Toe Wall around the dump	*m*	*2320*	*4800*	*1.114*
	Garland drain around Quarry	*m*	*3140*	*214*	*0.067*
	Garland Drain around the dump	*m*	*2850*	*214*	*0.061*
	Sub-Total (A):				***53.859***

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Ref. 34012/01/2015 - CPAM
Dt. 05-10-2017

Head	Activity	Unit	Quanti ty	Rate Rs. / Unit	Amount "Rs. In Cr"
B. Post Closure Activities					
Dismantling of Infrastructur e & Disposal/ rehabilitation of Mining machinery	Dismantling of workshop	No	1	16500000	1.650
	Dismantling of Office Buildings & Infrastructure	No	1	23000000	2.300
	Dismantling of CHP	No	1	14400000	1.440
	Dismantling of Pumps and Pipes/ other facilities	No	6	700000	0.420
	Dismantling of Power lines	km	17	480000	0.816
Safety and Security	Barbed wire fencing around the Pit	m	4480	772	0.346
	Toe Wall around the dump	m	7120	960	0.684
	Garland drain around quarry	m	11340	40	0.045
	Garland Drain around the dump	m	7650	40	0.031
Technical and Biological Reclamation of Mined out of land and OB Dump	Top Soil management	Mm^3	0.248	42500000	1.054
	*OB Re-handling for backfilling	Mm^3	0.5	20000000	1.000
	Terracing, blanketing with Soil and vegetation of External OB Dump	ha	33.00	35000	0.116
	Landscaping and Plantation	ha	75.81	35000	0.265
Post Closure Management and Supervision	Power Cost	Year	3	6000000	1.800
	Post Mining Water quality management	Year	3	2030000	0.609
	Post Mining Air quality management	Year	3	3390000	1.017
	Manpower Cost and supervision	No	3	4599000	1.380
	Sub-Total (B):				**14.973**
Grand Total (A+B):					**68.832**

*** OB Re-handling for backfilling is for Technical Reclamation for OB dumps/Final void.**

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Ref. 34012/01/2015 - CPAM
Dt. 05-10-2017

15.8.0 Decommissioning of Mining Machineries, Surface Structures and Plants Etc.

15.8.1 Decommissioning of Mining Machineries:

JK-5 OC Mine machinery will be disposed/shifted to other mines after closure of the mine.

- Heavy equipment & machinery of like Shovels, Dumpers, Dozers, Graders etc with left over life will be utilized in the adjacent project. The equipments which have completed their life will be disposed properly. During rehabilitation, particular attention shall be made towards equipment & machinery to detect any hydrocarbon contamination if applicable, remedial action will be taken accordingly.
- The CHP will be retained and used for adjacent project. The Belt conveyors, crushers etc. will be used in the adjacent project.
- Water pipelines and sewage lines etc. will be removed from the site after proper checking to avoid land contamination for post mining land use. The access roads and electric transmission lines will be kept in position for public use.

The detail on Disposal of Mining Machinery is provided below Table.

Sl. No	*Machinery*	*Units*	*No of Units*	*Remarks*
1	*35 T Dumper*	*No.s*	*14*	*will be disposed and used for future proposed adjoining OC mines.*
2	*Water Sprinkler*	*No.s*	*2*	*will be disposed and used for future proposed adjoining OC mines.*
3	*5 Cum shovels*	*No.s*	*1*	*will be disposed and used for future proposed adjoining OC mines.*
4	*3 Cum shovels*	*No.s*	*1*	*will be disposed and used for future proposed adjoining OC mines.*
5	*1 Cum Shovel*	*No.s*	*1*	*will be disposed and used for future proposed adjoining OC mines.*
6	*Drill*	*No.s*	*2*	*will be disposed and used for future proposed adjoining OC mines.*
7	*Dozer*	*No.s*	*3*	*will be disposed and used for future proposed adjoining OC mines.*
8	*Motor Grader*	*No.s*	*2*	*will be disposed and used for future proposed adjoining OC mines.*

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Dt 05-10-2017

9	Loader	No.s	2	will be disposed and used for future proposed adjoining OC mines.
10	Mobile Cranes	No.s	4	will be disposed and used for future proposed adjoining OC mines.
11	ForkLifter	No.s	1	will be disposed and used for future proposed adjoining OC mines.
12	Tyre Handler	No.s	1	will be disposed and used for future proposed adjoining OC mines.
13	Supporting Equipment	No.s	6	will be disposed and used for future proposed adjoining OC mines.
14	Sub Station equipment	Lot	1	will be disposed and used for future proposed adjoining OC mines.
15	OHT & LT Lines	KM	10	will be disposed and used for future proposed adjoining OC mines.
16	Communication & Networking	Lot	1	will be disposed and used for future proposed adjoining OC mines.
17	Pumps	No.s	6	will be disposed and used for future proposed adjoining OC mines.
18	Cables	KM	20	will be disposed and used for future proposed adjoining OC mines.
19	Pipe ranges	KM	20	will be disposed and used for future proposed adjoining OC mines.
20	Crushers	Nos	2	will be disposed and used for future proposed adjoining OC mines.
21	Belt Conveyor Drive	Nos	4	will be disposed and used for future proposed adjoining OC mines.
22	Belt Structure & Belting	KM	1	will be disposed and used for future proposed adjoining OC mines.
23	Preweigh Bin complete with gantry	Nos	1	will be disposed and used for future proposed adjoining OC mines.
24	Weigh Bridge	Nos	1	will be disposed and used for future proposed adjoining OC mines.
25	Workshops Equipment	Lot	1	will be disposed and used for future proposed adjoining OC mines.

15.8.2 Dismantling of Surface Infrastructure/Plants:

Detailed post mining infrastructure retention and proposed decommissioning is provided with provision in place of lump sum provision as this is final MCP and furnished below table.

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Ref. 34012/01/2015 - CPAM
Dt. 05-10-2017

The proposed infrastructural facilities for the JK-5 Opencast Mine are detailed at Chapter 12. The infrastructure proposed shall be maintained up to the end of the life of the mine. Proper maintenance of infrastructure shall be carried out for their physical stability.

Details of dismantling of Surface infrastructure/Plants is furnished hereunder

Sl.No.	Description	Area (Sq.m)	Type of Structure	Demolished/ Retained
1	Project Office	394.35	RCC	Demolished
2	First Aid Room	16.555	Shed	Demolished
3	Pit Head bath & Toilets	69.686	Shed	Demolished
4	Muster booking office (Manway)	33.8	RCC	Demolished
5	Stores Office	15.624	Shed	Demolished
12	Canteen-cum- Rest Shelter	281.114	RCC & shed	Demolished
13	Work shop			
a	Dumper repair complex	511	Shed	Demolished
b	Dumper daily maintenance shop	72.8	Shed	Demolished
c	Dozer & face equipment repair complex	511.0	Shed	Demolished
d	Dozer washing station	24.031	Shed	Demolished
e	E&M repair complex	877.68	Shed	Demolished
14	Stores	1053.824	Shed	Demolished
15	Service buildings for CHP	139.12	Shed	Demolished
16	CHP	1672.10	Shed	removed and used for Rompedu OC mine
12	Any other	1313.075	RCC & Shed	Demolished

15.9.0 Safety & Security:

The following safety and security measures are proposed.
Safety Measures for final void until the backfilling by the future proposal:

- Filling of OB wherever required
- Clearing of Boulders
- Pitching of slopes
- Gently sloping & Stabilizing the high wall benches

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Ref. 34012/01/2015-CPAM
Dt. 05-10-2017

- Gently Sloping, Stabilizing and reclaiming the internal dump slopes with plantation
- Providing grasses water ways along slopes and benches
- Planting Hedge rows on slopes
- Grass mixture cladding on slopes, wherever required
- Peripheral fencing around the void

❖ Barbed wire fencing as per regulatory standards will be constructed around the restricted areas within the mine lease hold area and ensure that access to the area is totally sealed off.

❖ All access roads will be condemned and embankment with OB will be built. All surface openings to underground workings will be backfilled and leveled to blend in with the surrounding topography, or will be concrete-capped. These options will be meeting regulatory standards.

❖ Trained security personnel will be posted to guard the area as per requirement to prevent unauthorized entry of men and other cattle. Only authorized personnel will be allowed to carry out abandonment and post-project monitoring activities.

❖ Till the protective measures are completed and the area allowed/opened for general public, sufficient supervision is kept in three shifts and the area will be well protected.

15.10.0 Economic Repercussions of Closure of Mine:

The applicant, the Singareni Collieries Company Limited (SCCL), having the distinction of being the first Government-owned coal company in India, has been engaged in coal mining activity for well over a century. Being the only coal company in south India, SCCL holds Mining Leases for coal in Khammam, Bhadradri-Kothagudem, Jayashanker-Bhupalpalli, Peddapalli, Mancherial and Kumram Bheem districts of Telangana State. Singareni Collieries Company Limited is operating 29 nos. of Underground Mines and 19 No. of Opencast Mines as on date. Further, it is proposed to start a new Opencast Mine namely Rompedu Opencast Mine.

In view of above facts about SCCL, there will not be any manpower retrenchment and socio-economic impact on local population due to closure of the of mines in SCCL command area.

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Dt. 05-10-2017

15.11.0 Abandonment Cost

Mining Plan(II Revision) & Mine Closure Plan of JK - 5 Opencast Project was approved in the year 2015 for a rated capacity of 2.50 Mty with a project area of 514.94 ha. Accordingly, for the JK - 5 Opencast Mine, an escrow account bearing no. 62461156145 was opened, tripartite escrow agreement was executed and the year wise amounts have been deposited as per schedule. So far, Rs. 29.51 Crore was deposited in the escrow account, the details of which are furnished below.

Year	Amount (Rs. Crores)
2013-14	5.34
2014-15	5.61
2015-16	5.89
2016-17	6.18
2017-18	6.49
Total	**29.51**

In the year 2018-19, the 80% of already deposited Rs. 29.51 Crore will be claimed by SCCL. Balance 20% of deposited amount will be claimed after closure of the project.

The present proposal is for expansion of existing JK - 5 Opencast Mine from 2.5 Mty to 3.5 Mty with a life of 3 Years from 2018-19.

For the present proposal, Mine closure cost is estimated as per the clause 5.2 of guidelines for preparation of Mine closure plan issued by Ministry of Coal. The amount is calculated as per the guidelines circulated by the MoC for the project area. While calculating, the amount is revised as per the whole sale price index (WPI) prevailing at the time of Mine closure plan preparation.

The source for WPI is RBI website.	
WPI during August-2009	:129.60
WPI during April-2018	**:183.14**
Closure cost per Ha at August-2009 price level	:6 Lakh Rs
Escalation Rate of Closure Cost	:1.40%
Closure Cost Per ha as on April 2018	:8.479 Lakh Rs
The Project Area	:490.14 ha

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Ref. 34012/01/2015 - CPAM
Dt. 05-10-2017

As per the estimation, the Mine closure cost to be deposited in the Escrow Account is Rs 41.56 Crores. As per the guidelines the amount shall be divided by the balance life of the project to arrive at the annual closure cost and shall be escalated at the rate of 5 % every year from the year of deposition of amount in Escrow account till final year. The Annual Mine Closure Cost for the balance life from the year 2018-19 (Compounded @5% annually) is furnished below. The total Mine closure cost after compounding annually @5% is Rs. 43.670 Crores. However, an amount of Rs. 29.51 Crores was already deposited in the Escrow account. Hence, the balance amount to be deposited in the Escrow account is Rs. 14.160 Crores.

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				Aug-09	129.60
WPI as on base date	Base Year 11-12	156.13	April, 2018	117.30	183.14
Escalation rate of Closure cost					1.41

	UG	OC
Base Rate of Closure Cost "Rs. Crs./Ha"	0.00	0.06
Closure Cost "Rs. Crs/Ha"	0.00	0.08479
Project Area in ha		490.14
Mine Closure Cost per ha basis "Rs. in Crs"	0.00	41.56
Rate of componding of Annual Closure Cost		5.00%
Life of the project "in Yrs"		3
Annual Closure Cost "Rs. in Crs"	0.000	13.853
Amount to be deposited into Escrow Account after		43.670
Amount deposited into Escrow Account "Rs. in Crs"		29.510
Net Amount to be depostied into Escrow Account "Rs. in Crs"		14.160

Amount to be deposited into Escrow Account annually ("Rs. in Crs")					
Year	OC	UG	Total	Deposited upto Mar, 18	Balance to be Deposited
0		0			
1	13.853	0.000	13.853	29.51	0.000
2	14.545	0.000	14.545	0	0.000
3	15.272	0.000	15.272	0	14.160
Total	43.670	0.000	43.670	29.510	14.160

After approval of this Mining Plan (III Revision) including Final Mine Closure Plan of JK-5 Opencast Project, the existing escrow agreement bearing no: 62461156145 will be modified accordingly.

15.12.0 Financial Assurance:

Mining will be carried out in a phased manner initiating afforestation/reclamation work in the mined-out area of the first phase while commencing the mining in the second phase i.e. continuation of mining activities from one phase to other indicating the sequence of operations depending on the geo-mining conditions of the mine. Up to 80% of the total deposited amount including interest accrued in the ESCROW account will be released

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Ref. 34012/01/2015 - CPAM
DL 05-10-2017

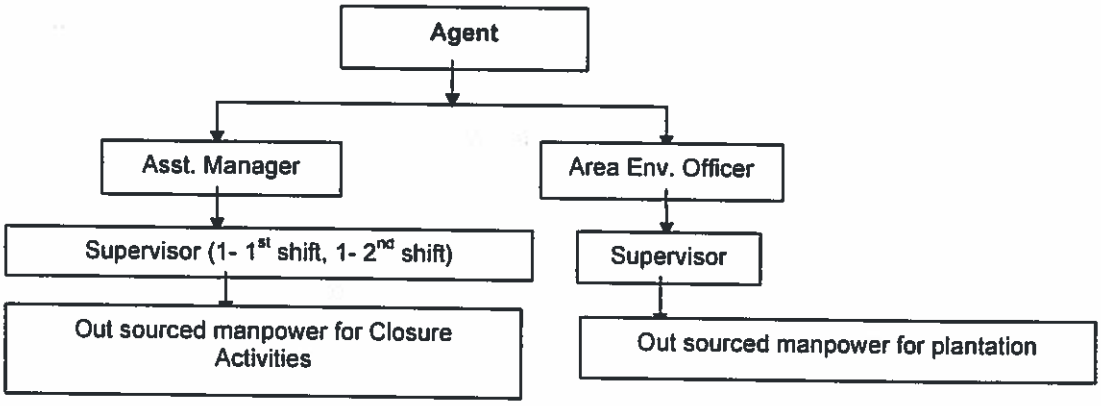
after every five years in line with the periodic examination of the Closure Plan as per Para 15.1.3. The amount released equal to expenditure incurred on the Progressive mine closure in past five years or 80% whichever is less. The balance amount at the end of the final Mine Closure will be released to mine owner/leaseholder on compliance of all provisions of Closure Plan duly signed by the lessee to the effect that said closure of mine complied all statutory rules, regulations, orders made by the Central or State Government, statutory organizations, court etc. and duly certified by the Coal Controller. An agreement, specifying the detailed terms and conditions of operating the Escrow account, was already executed amongst the SCCL, the Coal Controller and the concerned bank in order to affect the above.

15.13.0 Responsibility of Mine Owner:

It is the responsibility of the SCCL to ensure that the protective measures contained in the Final Mine Closure Plan are carried out in accordance with the approved Mine Closure Plan.

The owner (SCCL) shall submit to the coal controller a yearly report before 1st July of every year setting forth the extent of protective and rehabilitative works carried out as envisaged in the approved Final Mine Closure Plan.

Organization chart for management of Final Mine Closure activities is furnished below:



The owner (SCCL) submits to the Coal Controller a yearly report before 1st July of every year setting-forth the extent of protective and rehabilitative works carried-out as envisaged in the Approved Final Mine Closure Plan.

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Ref. 34012/01/2015-CPAM
Dt. 05-10-2017

15.13.1 PROVISION FOR FINAL MINE CLOSURE:

After the closure of the mine, SCCL will obtain a mine closure certificate from the Coal controller to the effect that the protective, reclamation and rehabilitation works in accordance with the approved Mine Closure Plan/ Final Mine Closure Plan have been carried out for surrendering the reclaimed land to the concerned state Government.

The balance amount at the end of the final Mine Closure shall be released to mine owner on compliance of all provisions of Closure Plan duly signed by the mine owner to the effect that said closure of mine complied with all statutory rules, regulations, orders made by the Central or State Government, statutory organizations, court etc. and duly certified by the Coal Controller. The details of estimated extractable coal reserves and coal actually mined out will be given.

If the Coal Controller has reasonable grounds for believing that the protective, reclamation and rehabilitation measures as envisaged in the approved mine closure plan in respect of which financial assurance was given has not been or will not be carried out in accordance with mine closure plan, either fully or partially, the Coal controller shall give the mine owner a written notice of his intention to issue the orders for forfeiting the sum assured at least thirty days prior to the date of the order to be issued after giving an opportunity to be heard.

****

Plan Prepared by me

(SHAIK MADAR)
Recognised Qualified Person U/R 22(C
of Mineral Concession Rules 1960 b
Ministry of Coal, Govt of India.
Ref. 3-0012/01/2015 - CPAM
DL 05-10-2017

H.ANNEXURES

Annexure 1

The Singareni Collieries Company Limited

(A Government Company)
Kothagudem Collieries – 507 101,
Bhadradri Kothagudem Dist., Telangana
CIN : U10102TG1920SGC000571, Website: scclmines.com

Phone No: 08744-242873
Fax No.08744-242393
cosecy@scclmines.com

Ref No: CRP / CS / 54 / 1175 Date: 04 . 12 .2018

GM (P P)

The extract of Minute No.547:5.3 of Board of Directors meeting held on 28.11.2018 at Hyderabad is furnished below:

Sub: Approval for 7 Mining plans (including Mine Closure Plans) for submission to Ministry of Coal, GoI for approval.

5:3.1 The Board considered the note placed before it together with mining plans and mine closure plans.

5:3.2 Director (P&P) informed that the proposal has been considered by the Technical Committee in the 4/2018 meeting held on 28.11.2018 at 10.00 AM. The Committee advised that the word 'Regularisation' shall not be used for mining plan including mine closure plan proposals of GKOC, JKOC & MOCP as the plans are proposed to be submitted for approval for enhanced capacity. Accordingly, the Committee recommended to the Board for approval of 7 mining plan including mine closure plan proposals viz. Naini Coal Mine, RG OC-III Expansion Mine, MNG OC Mine, RG OC-V Mine, GK OC Expansion Mine, JK-5 OC Mine and Medapalli OC Expansion Mine for submission to MoC, GoI.

5:3.3 After deliberation, as recommended by the Technical Committee in the 4/2018 meeting held on 28.11.2018, the Board accorded approval to the following proposals:

(a) Mining Plans including Mine Closure Plans for 7 projects viz. Naini Coal Mine, RG OC-III Expansion Mine, MNG OC Mine, RG OC-V Mine, GK OC Expansion Mine, JK-5 OC Mine and Medapalli OC Expansion Mine (a copy each of which is initialed by Chief (CA) & CS for the purpose of identification) as detailed in the note at a Mine Closure Cost as mentioned below:

Contd... 2

Plan Prepared by me

(SHAIK MADAR)
Recognised Qualified Person U/R 22(C of Mineral Concession Rules 1960 by Ministry of Coal, Govt. of India.
Ref. 34012/01/2015 - CPAM
Dt. 05-10-2017

The Singareni Collieries Company Limited

(A Government Company)
Kothagudem Collieries – 507 101.
Bhadradri Kothagudem Dist., Telangana.
CIN : U10102TG1920SGC000571. Website: scclmines.com

Phone No: 08744-242873
Fax No 08744-242393
cosecy@scclmines.com

Ref No: CRP / CS / 54 / 11745

Date: 11.12.2018.

Sl No.	Name of the project	Earlier approved mine closure cost considering WPI as on December, 2013 (Rs. crore)	Modified Cost (Rs. crore)	Remarks
1	Naini Coal Mine	-	217.400	New Proposal
2	RG OC-III Expansion Mine	270.04	232.911	Life is reduced due to enhancement of capacity and also WPI increased.
3	MNG OC Mine	66.73	65.316	Life is reduced due to enhancement of capacity and also WPI increased.
4	RG OC -V Mine	26.68	182.259	Underground to Opencast conversion.
5	GK OC Expansion Mine	87.64	80.008	Life is reduced due to enhancement of capacity and also WPI increased
6	JK - 5 OC Mine	50.99	43.298	Life is reduced due to enhancement of capacity and also WPI increased
7	Medapalli OC Expansion Mine	118.86	101.19	Life is reduced due to enhancement of capacity and also WPI increased
	Total :	624.94	922.943	

b) to authorise C&MD/Director (P&P) to approve modifications to the technical parameters of the above Mining Plans (Including Mine Closure Plan) as may be suggested by MoC, GoI, if any, during the approval process.

Action taken / status of implementation on each point of the above minute may be intimated to the undersigned at the earliest as per the guidelines issued by the C&MD vide circular No.CRP/CS/58/200 dt.22.3.2002 for apprising the same to the Board in the next meeting.

Chief (CA) &
Company Secretary

Copy to:

GM(CP&P)
GM(F&A)

Plan Prepared by me

(SHAIK MADAR)
Recognised Qualified Person U/R 22(C of Mineral Concession Rules 1960 by Ministry of Coal, Govt. of India.
Ref. 34012/01/2015 - CPAM
Dt. 05-10-2017

ANNEXURE - 1A

THE SINGARENI COLLIERIES COMPANY LIMITED
(A Government Company)

Ref:CRP/CS/54/780

3rd November, 2014.

The extract of Minute No.525:5:9 of Board of Directors Meeting held on 28.10.2014 at Hyderabad is furnished below:

Item No. 525:5:9

Sub: Authorization to C&MD for revision of Mine Closure Cost for all existing & new mines at the time of deposit of amount in Escrow Account to the latest WPI.

5:9.1 The Board considered the note placed before it.

5:9.2 After deliberation, the Board accorded approval for authorizing C&MD to revise the Mine Closure Costs of all existing and new mines for which Mine Closure Plan/ Cost was already approved / to be approved by the Board / Govt. of India, to the latest WPI if required, at the time of deposit of amount into Escrow Account pursuant to the guidelines issued by Ministry of Coal in this regard.

3/11/2014
(J.Rama Krishna)
GM(C.A)&Company Secretary

Address: Singareni Bhavan, Red Hills, PB No.18, Khairathabad (Po), HYDERABAD – 500 004.
Tel.No.040-23328271, Fax.No 040-23307653

Prepared by me

(SHAIK MADAR)
Recognised Qualified Person U/R 22(C of Mineral Concession Rules 1960 by Ministry of Coal, Govt. of India,
Ref. 34012/01/2015 - CPAM
Dt. 05-10-2017

ANNEXURE-V

GOVERNMENT OF TELANGANA
DEPARTMENT OF MINES AND GEOLOGY::HYDERABAD

Lr.No.9025/R1-1/2018 Dated:26.07.2018.

From:
B.R.V.Susheel Kumar, B.E. (Mining).
Director of Mines and Geology,
8th Floor, B.R.K.R. Offices Building,
Hyderabad

To,
The Chairman & Managing Director,
The Singareni Collieries Company Ltd.

Sir,

Sub: Mines and Quarries - "Mining Plan and Mine Closure Plan of Jawahar Khani Mining Lease extent is falling within the sanctioned mining lease - Regarding.

Ref: Ref.No. CRP/EST/M/001/546 , 18.07.2018 from Corporate Estates Dept.

*****

Apropos to the subject and reference cited, based on the request by M/s Singareni Collieries Company Ltd, (SCCL), the Mining plan prepared by Singareni Collieries Company Ltd for approval by the Ministry of Coal has been examined and noticed that the conduct of mining operations as authenticated and certified by M/s Singareni Collieries Company Ltd (SCCL) is located within the extent of Mining Lease granted and executed.

In the circumstances stated, this is to certify that the following Mine of M/s Singareni Collieries Company Limited (SCCL) is covered in the sanctioned mining lease area approved by the Government as detailed below

Name of the Mine	Name of the Mining Lease & Lease Area in Ha in which the Mine is covered	Project extent (Hect)
Mining Plan (III Revision) & Final Mine Closure Plan of Jawahar Khani -5 Opencost Project (JK-5 OPC)	1st renewal of Yellandu Additional Mining Lease for 1741 Ha., sanctioned Vide G.O Ms No.278, dt.23.10.2007 (Valid up to 14.04.2024).	490.14 Ha

The above Certificate is issued at the request of M/s Singareni Collieries Company Limited (SCCL) to submit it to Ministry of Coal, Government of India for the purpose of considering approval of proposed "Mining Plan (III Revision) and Final Mine Closure Plan Jawahar Khani.

Yours faithfully
Sd/- B.R.V. SUSHEEL KUMAR
DIRECTOR OF MINES AND GEOLOGY

//ATTESTED//
For DIRECTOR OF MINES AND GEOLOGY

Submitted Copy to
The Secretary, Coal Ministry of Coal, GoI, New Delhi.
The Special Chief Secretary, Energy Department, Govt. of Telangana State,
The Prl. Secretary, I&C, Government of Telangana State.

Plan Prepared by me

(SHAIK MADAR)
Recognised Qualified Person U/R 22(C of Mineral Concession Rules 1960 by Ministry of Coal, Govt of India.
Ref 34012/01/2015-CPAM
Dt 05-10-2017

Annexure - 2A

Annexure - 2A

Sl.No.	Mining Lease	Jawaharkhani-5 opencast project Area covered in the Lease
1	1st RENEWAL OF YELLANDU ADDITIONAL MINING LEASE	490.14 Ha.
	Total Project Area	490.14 Ha.

THE SINGARENI COLLIERIES COMPANY LIMITED
(A GOVERNMENT COMPANY)
DEPARTMENT OF PROJECT PLANNING
ISO - 9001:2015 Certified
YELLANDU AREA

PLAN SHOWING THE 1st RENEWAL OF YELLANDU ADDITIONAL MINING LEASE AND JAWAHAR KHANI-5 OPENCAST PROJECT BOUNDARY

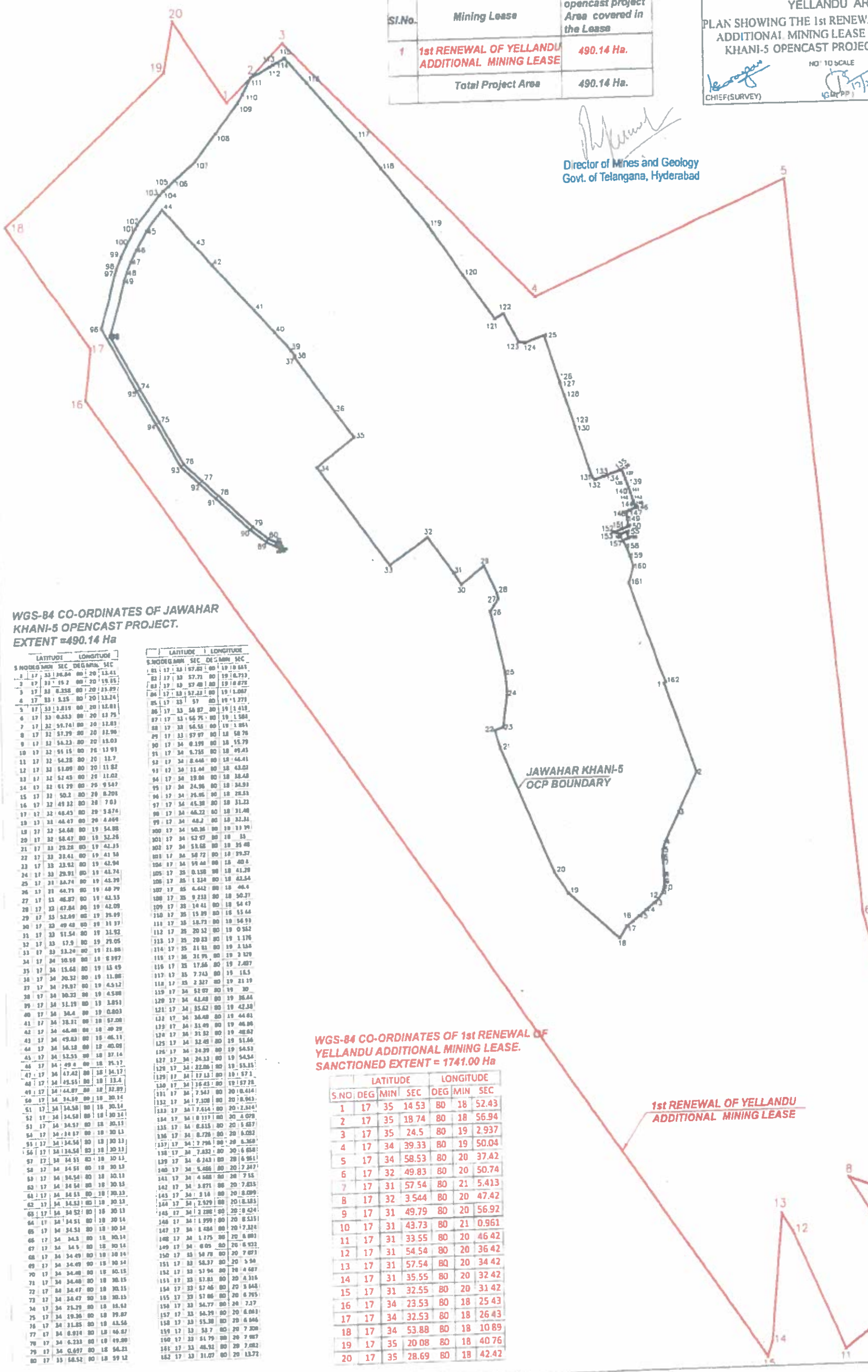
NOT TO SCALE

CHIEF(SURVEY) | (GM PP) | GM(ESTATES)

Director of Mines and Geology
Govt. of Telangana, Hyderabad

Plan Prepared by me

(SHAIK MADAR)
Recognised Qualified Person U/R 22(C) of Mineral Concession Rules 1960 by Ministry of Coal, Govt. of India.
Ref. No. [illegible]/2015-CPAM



WGS-84 CO-ORDINATES OF JAWAHAR KHANI-5 OPENCAST PROJECT.
EXTENT =490.14 Ha

S.NO	LATITUDE DEG	MIN	SEC	LONGITUDE DEG	MIN	SEC
1	17	33	36.84	80	20	13.41
2	17	33	19.2	80	20	19.85
3	17	33	8.358	80	20	23.89
4	17	33	5.35	80	20	13.24
5	17	33	1.819	80	20	12.81
6	17	33	0.553	80	20	13.75
7	17	32	59.74	80	20	12.83
8	17	32	57.39	80	20	12.96
9	17	32	54.23	80	20	11.03
10	17	32	51.15	80	20	13.91
11	17	32	54.28	80	20	12.7
12	17	32	51.09	80	20	11.82
13	17	32	52.45	80	20	11.02
14	17	32	51.29	80	20	9.547
15	17	32	50.2	80	20	8.201
16	17	32	49.32	80	20	7.03
17	17	32	48.45	80	20	5.676
18	17	32	46.47	80	20	4.869
19	17	32	54.68	80	19	54.88
20	17	32	56.47	80	19	52.26
21	17	33	29.28	80	19	42.35
22	17	33	28.61	80	19	41.56
23	17	33	23.92	80	19	42.94
24	17	33	29.91	80	19	43.74
25	17	33	34.74	80	19	45.39
26	17	33	44.71	80	19	48.79
27	17	33	46.87	80	19	42.33
28	17	33	47.84	80	19	42.09
29	17	33	52.99	80	19	39.99
30	17	33	49.48	80	19	31.37
31	17	33	51.54	80	19	31.92
32	17	33	57.9	80	19	29.05
33	17	33	53.24	80	19	21.88
34	17	34	10.58	80	19	9.997
35	17	34	15.64	80	19	15.49
36	17	34	20.32	80	19	11.88
37	17	34	29.97	80	19	4.512
38	17	34	30.22	80	19	4.598
39	17	34	31.19	80	19	3.851
40	17	34	34.4	80	19	0.803
41	17	34	38.31	80	18	57.08
42	17	34	44.08	80	18	49.29
43	17	34	49.83	80	18	46.11
44	17	34	56.18	80	18	40.09
45	17	34	52.55	80	18	37.14
46	17	34	49.4	80	18	35.17
47	17	34	47.42	80	18	34.17
48	17	34	45.55	80	18	33.4
49	17	34	44.07	80	18	32.87
50	17	34	34.59	80	18	30.14
51	17	34	34.58	80	18	30.14
52	17	34	34.58	80	18	30.14
53	17	34	34.57	80	18	30.13
54	17	34	34.57	80	18	30.13
55	17	34	34.56	80	18	30.13
56	17	34	34.56	80	18	30.13
57	17	34	34.55	80	18	30.13
58	17	34	34.55	80	18	30.13
59	17	34	34.54	80	18	30.13
60	17	34	34.54	80	18	30.13
61	17	34	34.53	80	18	30.13
62	17	34	34.53	80	18	30.13
63	17	34	34.52	80	18	30.13
64	17	34	34.51	80	18	30.14
65	17	34	34.51	80	18	30.14
66	17	34	34.5	80	18	30.14
67	17	34	34.5	80	18	30.14
68	17	34	34.49	80	18	30.14
69	17	34	34.49	80	18	30.14
70	17	34	34.48	80	18	30.15
71	17	34	34.48	80	18	30.15
72	17	34	34.47	80	18	30.15
73	17	34	34.47	80	18	30.15
74	17	34	25.29	80	18	16.53
75	17	34	19.36	80	18	09.87
76	17	34	11.85	80	18	43.56
77	17	34	6.916	80	18	46.67
78	17	34	6.233	80	18	49.99
79	17	34	0.697	80	18	54.21
80	17	33	58.52	80	18	59.12

S.NO	LATITUDE DEG	MIN	SEC	LONGITUDE DEG	MIN	SEC
81	17	33	57.83	80	19	0.665
82	17	33	57.71	80	19	0.713
83	17	33	57.48	80	19	0.872
84	17	33	57.23	80	19	1.067
85	17	33	57	80	19	1.271
86	17	33	56.87	80	19	1.419
87	17	33	56.75	80	19	1.504
88	17	33	56.55	80	19	1.654
89	17	33	57.97	80	18	58.76
90	17	34	0.199	80	18	55.79
91	17	34	5.755	80	18	49.43
92	17	34	8.446	80	18	46.41
93	17	34	11.44	80	18	43.02
94	17	34	19.84	80	18	38.48
95	17	34	24.96	80	18	34.93
96	17	34	31.05	80	18	28.53
97	17	34	45.38	80	18	31.23
98	17	34	46.32	80	18	31.48
99	17	34	48.2	80	18	32.31
100	17	34	50.36	80	18	33.39
101	17	34	52.97	80	18	35
102	17	34	53.68	80	18	35.48
103	17	34	56.72	80	18	39.57
104	17	34	59.44	80	18	40.6
105	17	35	0.158	80	18	41.39
106	17	35	1.334	80	18	43.54
107	17	35	4.442	80	18	46.6
108	17	35	9.233	80	18	50.31
109	17	35	14.41	80	18	54.47
110	17	35	15.39	80	18	55.44
111	17	35	18.73	80	18	56.99
112	17	35	20.52	80	19	0.562
113	17	35	20.83	80	19	1.176
114	17	35	21.51	80	19	2.156
115	17	35	21.75	80	19	2.329
116	17	35	17.66	80	19	7.497
117	17	35	7.743	80	19	16.5
118	17	35	2.327	80	19	21.19
119	17	34	52.07	80	19	30
120	17	34	43.48	80	19	36.44
121	17	34	35.62	80	19	42.38
122	17	34	34.48	80	19	44.61
123	17	34	31.49	80	19	46.86
124	17	34	31.52	80	19	48.62
125	17	34	32.48	80	19	51.66
126	17	34	34.39	80	19	54.53
127	17	34	34.33	80	19	54.54
128	17	34	32.86	80	19	55.15
129	17	34	17.13	80	19	57.1
130	17	34	16.43	80	19	57.78
131	17	34	7.543	80	20	0.414
132	17	34	7.108	80	20	0.943
133	17	34	7.614	80	20	2.344
134	17	34	8.117	80	20	4.078
135	17	34	8.515	80	20	5.687
136	17	34	8.726	80	20	6.082
137	17	34	7.796	80	20	6.368
138	17	34	7.832	80	20	6.658
139	17	34	6.243	80	20	6.961
140	17	34	5.466	80	20	7.247
141	17	34	4.668	80	20	7.55
142	17	34	3.871	80	20	7.835
143	17	34	3.16	80	20	8.099
144	17	34	2.579	80	20	8.185
145	17	34	2.288	80	20	8.424
146	17	34	1.999	80	20	8.515
147	17	34	1.486	80	20	7.326
148	17	34	1.275	80	20	6.993
149	17	34	0.69	80	20	6.922
150	17	33	54.78	80	20	7.073
151	17	33	53.37	80	20	5.94
152	17	33	53.94	80	20	4.667
153	17	33	57.81	80	20	4.316
154	17	33	57.46	80	20	5.648
155	17	33	57.06	80	20	6.765
156	17	33	56.77	80	20	7.17
157	17	33	56.39	80	20	6.083
158	17	33	55.38	80	20	6.646
159	17	33	53.7	80	20	7.308
160	17	33	51.79	80	20	7.987
161	17	33	48.91	80	20	7.082
162	17	33	31.07	80	20	13.72

WGS-84 CO-ORDINATES OF 1st RENEWAL OF YELLANDU ADDITIONAL MINING LEASE.
SANCTIONED EXTENT = 1741.00 Ha

S.NO	LATITUDE DEG	MIN	SEC	LONGITUDE DEG	MIN	SEC
1	17	35	14.53	80	18	52.43
2	17	35	18.74	80	18	56.94
3	17	35	24.5	80	19	2.937
4	17	34	39.33	80	19	50.04
5	17	34	58.53	80	20	37.42
6	17	32	49.83	80	20	50.74
7	17	31	57.54	80	21	5.413
8	17	32	3.544	80	20	47.42
9	17	31	49.79	80	20	56.92
10	17	31	43.73	80	21	0.961
11	17	31	33.55	80	20	46 42
12	17	31	54.54	80	20	36 42
13	17	31	57.54	80	20	34 42
14	17	31	35.55	80	20	32 42
15	17	31	32.55	80	20	31 42
16	17	34	23.53	80	18	25 43
17	17	34	32.53	80	18	26 43
18	17	34	53.88	80	18	10 89
19	17	35	20 08	80	18	40 76
20	17	35	28.69	80	18	42.42

Plan Prepared by me

(SHAIK MADAR)
Recognised Qualified Person U/R 22(C) of Mineral Concession Rules 1960 by Ministry of Coal, Govt. of India.
Ref. No. [illegible]/2015-CPAM

Annexure - 2B

No.13016/20/2005-CA-II
Government of India
Ministry of Coal

Shastri Bhavan, New Delhi, the 10th April, 2006.
27th

To

The Director (Planning & Project),
Singareni Collieries Company Limited,
Kothagudem Collieries,
Bhadrachalam Road Rly. Station,
Khammam District (A.P.).

Sub : Mining Plan in respect of Yellandu Additional Mining Lease for Renewal over an extent of 1741.00 Ha. – Yellandu Area of SCCL – Regarding.

Sir,

I am directed to refer to your letter No.CRP/PP/F/602/1069 dated 9.9.2005 and to forward herewith two copies of the approved mining plan of Yellandu Additional Mining Lease for renewal over an extent of 1741 ha. – Yellandu Area of SCCL (dated September, 2005) to be read along with clarifications dated February, 2006 submitted by SCCL with the following conditions :-

i) The mining company would take appropriate action so that coal reserves in the balance area of Yellandu Additional Mining Lease, for which renewal is not sought by the company, are not sterilized.

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

Yours faithfully,

27/4/06

(Alice Kujur)
Under Secretary to the Government of India

Encl : as above.

CRP PP
1275
9/5

Plan Prepared by me

(SHAIK MADAR)
Recognised Qualified Person U/R 22(C of Mineral Concession Rules 1960 by Ministry of Coal, Govt. of India.
Ref. 34012/01/2015-CPAM
Dt. 05-10-2017

01126492938

Annexure - 2C

No.13016/20/2007-CA-II
Government of India
Ministry of Coal

New Delhi, dated 23.07.2009

To,

Director (Planning & Projects)
Singareni Collieries Company Limited,
Kothagudem Collieries,
Andhra Pradesh.

Sub : Approval of Mining Plans in respect of (i) Addendum-2 to Revised Mining Plan for Part of Yellandu Additional Mining Lease (JK-5 Opencast Project) dated November 2008 and (ii) Revised Mining Plan for Part of Deep mining area Ramagundam (RG OC-II Extension Project) dated Dec.2008 of SCCL

Sir,

I am directed to refer to your letters dated 28.11.2008 and 19.01.2009 on the subject mentioned above and to convey approval of the Mining Plans in respect of (i) Addendum-2 to Revised Mining Plan for Part of Yellandu Additional Mining Lease (JK-5 Opencast Project) and (ii) Revised Mining Plan for Part of Deep mining area Ramagundam (RG OC-II Extension Project) of SCCL under Section 5 (2) (b) of the MMDR Act, 1957 by the Central Government with following conditions:

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

(ii) Mining lease to be acquired shall not encroach into any other coal block.

(iii) The approval of the Mining Plan is without prejudice to the requirement of approvals from competent/prescribed authority under the relevant rules/regulations etc. Two copies each of the approved mining plan are enclosed herewith.

Yours faithfully,
23/7/09
(Alice Kujur)
Under Secretary to the Government of India

Encl : As above.

Copy to: File No.13016/3/2009-CA-II.

Plan Prepared by me

(SHAIK MADAR)
Recognised Qualified Person U/R 22(C of Mineral Concession Rules 1960 by Ministry of Coal, Govt. of India.
Ref 34012/01/2015-CPAM
Dt. 05-10-2017

Annexure - 2D

No.13016/20/2005-CA-II
Government of India
Ministry of Coal

New Delhi, dated 15th September, 2015

To

CGM (Corporate Planning & Projects)
The Singareni Collieries Company Limited,
Kothagudem Collieries – 507 101.
Bhadrachalam Road Rly Station,
Khammam District.
Telangana -507 101.

Sub: Approval of Mining Plan and Mine Closure Plan of JK-5 opencast Project (March, 2014) for JK-5 OCP Block, Yellandu Coal Belt, Godavari Valley Coalfield, District Khamman, Andhra Pradesh of M/s. SCCL.

Sir,

I am directed to refer to SCCL's letter No. CRP/PP/F/602/2014/205 dated 08.03.2015 on the subject mentioned above and to convey approval for Mining Plan and Mine Closure Plan of JK-5 opencast Project (March, 2014) for JK-5 OCP Block, Yellandu Coal Belt, Godavari Valley Coalfield, District Khamman Andhra Pradesh in respect of M/s. SCCL under Section 5(2)(b) of the MMDR Act, 1957 by the Central Government with the following Conditions:

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

(ii) Mining lease of this block shall not encroach into any other coal block.

(iii) The approval of the Mining Plan/Mine Closure Plan is without prejudice to the requirement of approvals from competent prescribed authority under the relevant rules/ regulations, etc.

2. Two copies of the above approved mining plan are enclosed herewith.

Yours faithfully,

18/9/15

(R.K.P.Dawani)
Section Officer

Encl : as above.

Plan prepared by me

(SHAIK MADAR)
Recognised Qualified Person U/R 22(C of Mineral Concession Rules 1960 by Ministry of Coal, Govt. of India
Ref. 34012/01/2015 - CPAM
Dt. 05-10-2017

ANNEXURE-3

File No.34012/1/2015-CPAM

No. No.34012/01/2015-CPAM
Government of India
Ministry of Coal

New Delhi, the 05th October, 2017

To	Director (Panning & Projects), Singareni Collieries Company Limited, Kothagudem Collieries -5071001, Bhadrachalam Road, Railway Station, Khammam District(Telengana) (E-Mail:projplng@yahoo.co.in)

Subject	Application from SCCL for seeking recognition to their Officers as RQP to prepare Mining Plans/Mine Closure Plans under Rule 22© of Mineral Concession Rule, 1960.

Sir,

I am directed to refer to your Ref. No. CRP/PP/F/602/911 dated 24.12.2015 on the above cited subject and to convey approval of the Central Government to the grant of recognition in favor of the following persons as competent person to prepare Mining Plan/ Mine Closure Plan for Coal/Lignite block(s) under Rule 22(c) of Mineral Concession Rule, 1960 for the assignment/ jobs undertaken by SCCL up to 10 years from the date of issue of this letter or duly perform to the Company.

(1) Shri M. Venkateshwarlu, SOM, P&P Department,
(2) Shri P. Surender Raju, Addl. Manager, P&P Department and
(3) Shri Shaik Madar, Addl. Manager, P&P Department.

2. RQP is required to comply with the provisions of all the concerned statutes, and guidelines/circulars of the Govt. issued from time to time in regard to preparation of Mining Plans/ Mine Closure Plans.

Yours Faithfully

Signature valid
Digitally signed by ANANDA KUMAR MANDAL
Date: 2017.10.06 16:19:51 IST
Reason: Approved

(A.K. Mandal)
Under Secretary to the Govt. of India
Ministry of Coal
Tel: 011-23073937

Copy to TD, NIC, Ministry of Coal for including in the list of RQP in Ministry of Coal's Web Site.

Plan Prepared by me

(SHAIK MADAR)
Recognised Qualified Person U/R 22(C of Mineral Concession Rules 1960 by Ministry of Coal, Govt. of India.
Ref. 34012/01/2015 - CPAM
Dt. 05-10-2017

Annexure 4

The Singareni Collieries Company Limited
(A Government Company)

Regd. Office:
Kothagudem Collieries-507 101,
Bhadrachalam Road Rly.Station,
Bhadradri District (Telangana)

Director (P&P) : 08744-242602
GM (CP&P) : 08744-243108
GM (PP) : 08744-242395
Fax :08744-244115/242305
E.Mail :gm_pp@scclmines.com

Ref.No. CRP/PP/ D/ 394/683

Date: 17-06.2019

CERTIFICATE

I hereby authorize, **SHAIK MADAR,** Additional Manager, who is the Recognized Qualified Person U/R 22(C) of Mineral Concession Rules 1960 by Ministry of Coal, Govt. of India vide Ref.No.34012/1/2015-CPAM, dated: 05.10.2017, to prepare the ***"Mining Plan (Including Final Mine Closure Plan) (3rd Revision/Modification) for JK - 5 Opencast Mine".***

(B. BHASKARA RAO)
Director (Planning & Projects)

...an Prepared by me

(SHAIK MADAR)
Recognised Qualified Person U/R 22(C
of Mineral Concession Rules 1960 by
Ministry of Coal, Govt. of India.
Ref. 34012/01/2015-CPAM
Dt. 05-10-2017

Annexure 5

CERTIFICATE OF ACCEPTANCE

Certified that I have been authorized by SCCL to prepare the ***""Mining Plan (Including Final Mine Closure Plan) (3rd Revision/Modification) for JK - 5 Opencast Mine"*** and I have accepted to formulate the same.

(SHAIK MADAR)
Additional Manager,
Recognized as Qualified Person,
U/R 22(C) of Mineral Concession
Rules 1960 by Ministry of coal,
Govt. of India,
Ref.No.34012/01/2015-CPAM,
Dated: 05-10-2017.

Kothagudem,
Date: 29.05.2019

Plan Prepared by me

(SHAIK MADAR)
Recognised Qualified Person U/R 22(C
of Mineral Concession Rules 1960 by
Ministry of Coal, Govt. of India,
Ref. 34012/01/2015 - CPAM
Dt. 05-10-2017

Annexure-6

CERTIFICATE

Certified that I have been duly authorized by the mining company to prepare Mining Plan on their behalf and that I have a valid recognition from MoC under MCR, 1960 to prepare **"Mining Plan (Including Final Mine Closure Plan) (3rd Revision/Modification) for JK - 5 Opencast Mine"**.

Certified that the provisions of all relevant rules and regulations made there under have been observed in the preparation of Mining Plan.

Plan prepared by me

(SHAIK MADAR)
Additional Manager,
Recognised as Qualified Person,
U/R 22(C) of Mineral Concession
Rules 1960 by Ministry of coal,
Govt. of India,
Ref.No.34012/01/2015-CPAM,
Dated: 05-10-2017.

Kothagudem,
Date: 29.05.2019.

Plan Prepared by me

(SHAIK MADAR)
Recognised Qualified Person U/R 22(C
of Mineral Concession Rules 1960 by
Ministry of Coal, Govt. of India.
Ref. 34012/01/2015 - CPAM
Dt. 05-10-2017

Annexure 7

CERTIFICATE

Certified that the ***"Mining Plan (Including Final Mine Closure Plan) (3rd Revision/Modification) for JK - 5 Opencast Mine"*** has been prepared considering the guidelines pertaining to the preparation of Mining Plan/Mine Closure Plan issued by MoC, GoI vide Ltr. No: 34011/(48)/2009-CPAM, dated:04.04.2011 and Ltr.No:55011-01-2009-CPAM, dt:07.01.2013 and wherever specific permission will be required, the applicant will approach the concerned authorities.

Plan prepared by me.

(SHAIK MADAR)
Additional Manager,
Recognised as Qualified Person,
U/R 22(C) of Mineral Concession
Rules 1960 by Ministry of coal,
Govt. of India,
Ref.No.34012/01/2015-CPAM,
Dated: 05-10-2017.

Kothaguedm
Date:29.05.2019.

Plan Prepared by me
(SHAIK MADAR)
Recognised Qualified Person U/R 22(C
of Mineral Concession Rules 1960 by
Ministry of Coal, Govt. of India.
Ref. 34012/01/2015 - CPAM
Dt. 05-10-2017

Annexure 8

CERTIFICATE

This is to certify that the ***"Mining Plan (Including Final Mine Closure Plan) (3rd Revision/Modification) for JK - 5 Opencast Mine"*** is prepared based on the Geological information provided in Geological Report on "**JK-5 OCP Block**" in **Yellandu Coal belt**.

Certified that I have verified the block area with the relevant plans supplied by Exploration Department, SCCL and area covered by the Mining Plan does not encroach on any other coal block.

(SHAIK MADAR)
Additional Manager,
Recognised as Qualified Person,
U/R 22(C) of Mineral Concession
Rules 1960 by Ministry of coal,
Govt. of India,
Ref.No.34012/01/2015-CPAM,
Dated: 05-10-2017.

Kothagudem,
Date:29.05.2019.

Plan Prepared by me

(SHAIK MADAR)
Recognised Qualified Person U/R 22(C
of Mineral Concession Rules 1960 by
Ministry of Coal, Govt. of India.
Ref. 34012/01/2015 - CPAM
Dt. 05-10-2017

Annexure 9

The Singareni Collieries Company Limited
(A Government Company)

Regd. Office:
Kothagudem Collieries-507 101,
Bhadrachalam Road Rly.Station,
Bhadradri District (Telangana)

Director (P&P) : 08744-242602
GM (CP&P) : 08744-243108
GM (PP) : 08744-242395
Fax :08744-244115/242305
E.Mail:gm_pp@scclmines.com

Ref.No. CRP/PP/ 0394/685 Date: 11.06.2019

CERTIFICATE

Certified that ***"Mining Plan (Including Final Mine Closure Plan) (3rd Revision/Modification) for JK - 5 Opencast Mine"*** has been prepared considering the guidelines pertaining to the preparation of Mining Plan/Mine Closure Plan issued by MoC, GoI, vide Lr. No. 34011/(48)/2009-CPAM, dated 04.04.2011 and Lr. No. 55011-01-2009-CPAM, dt. 07.01.2013 and wherever specific permission will be required, the applicant will approach the concerned authorities.

Certified that the mine will be developed as per the approval of the Mining Plan from Ministry of Coal and all other approvals, as required will be obtained from relevant authorities.

(B. BHASKARA RAO)
Director (Planning & Projects)

Plan Prepared by me

(SHAIK MADAR)
Recognised Qualified Person U/R 22(C of Mineral Concession Rules 1960 by Ministry of Coal, Govt. of India
Ref. 34012/01/2015 - CPAM
Dt. 05-10-2017

Annexure 10

CERTIFICATE

Certified that the project boundary considered for the "***Final Mine Closure Plan of JK - 5 Opencast Mine***" has been verified and found in coherence with the block boundary of the proposed ***"Mining Plan (Including Final Mine Closure Plan) (3rd Revision/Modification) for JK - 5 Opencast Mine"*** and no discrepancy has been found.

Plan prepared by me

(SHAIK MADAR)
Additional Manager,
Recognised as Qualified Person,
U/R 22(C) of Mineral Concession
Rules 1960 by Ministry of coal,
Govt. of India,
Ref.No.34012/01/2015-CPAM,
Dated: 05-10-2017.

Kothagudem,
Date: 11.06.2019

Plan Prepared by me

(SHAIK MADAR)
Recognised Qualified Person U/R 22(C
of Mineral Concession Rules 1960 by
Ministry of Coal, Govt. of India.
Ref. 34012/01/2015 - CPAM
Dt. 05-10-2017

Annexure 11

The Singareni Collieries Company Limited
(A Government Company)
CIN : U10102TG1920SGC000571

Regd. Office:
Kothagudem Collieries-507 101,
Bhadrachalam Road Rly.Station,
Bhadradri District (Telangana)

Director (P&P) : 08744-242602
GM (CP&P) : 08744-243108
GM (PP) : 08744-242395
Fax :08744-244115/242305
E.Mail :gm_pp@scclmines.com

Ref.No. CRP/PP/ D)394/684 Date:12.06.2019

CERTIFICATE

"Mining Plan (Including Final Mine Closure Plan) (3rd Revision/ Modification) for JK - 5 Opencast Mine" is prepared in accordance with the guidelines issued by Ministry of Coal.

The reclamation & rehabilitation work will be carried out in accordance with the approved mine closure plan and any modification /amendments which may be made in the Mine Closure Plan by Ministry of Coal, from time to time.

(B. BHASKARA RAO)
Director (Planning & Projects)

Plan Prepared by me

(SHAIK MADAR)
Recognised Qualified Person U/R 22(C of Mineral Concession Rules 1960 by Ministry of Coal Govt. of India.
Ref 34012/01/2015-CPAM
Dt. 05-10-2017

ANNEXURE- 12

GOVERNMENT OF ANDHRA PRADESH
ABSTRACT

Mines and Minerals – 1st Renewal of Mining Lease for Coal over an extent of 1741.00 Hectares (involving an extent of 71.50 Hectares of Forest Land) in Yellandu & Cheemalapadu of Kothagudem Mandal, Khammam District, for a further period of 20 years with effect from 15.04.2004, in favour of M/s Singareni Collieries Company Limited - Sanction - Orders - Issued.

INDUSTRIES AND COMMERCE (M-III) DEPARTMENT

G.O. Ms. No. 278

Dated the 23rd October, 2007.
Read the following:-

1) G.O. Ms. No. 1175, Ind & Com (M.III) Dept. Dt: 07.11.1972.
2) Govt., Memo. No. 3991/M-III(2)/2004-1, Dated29.06.2004.
3) From DMG, F.No. 11683/R6-2/2003, dated 19.08.2006.
4) From the GOI, Ministry of Coal, New Delhi, Lr.No.13016/20/2005-CA-11, dated 10/27.04.2006

ORDER:

In the G.O. 1st read above, the Government have sanctioned Mining Lease for Coal over an extent of 14 Sq. Miles in various S.Nos. in Yellandu Taluk of Khammam District for a perioc of 30 years in favour of M/s. Singareni Collieries Company Ltd.,

2. In the reference 2nd read above, Government have proposed to grant of 1st Renewal of Mining Lease for Coal over an extent of 1741.00 Hectares in Yellandu and Cheemapadu Mandal, Khammam District, for a further period of 20 years w.e.f. 15.04.2004, in favour of M/s Singareni Collieries Company Limited, subject to obtaining approval of Government of India and also subject to containing Forest Clearance and submission of Approved Mining Plan within 6 months from the date of receipt of the said memo. from the applicant company, under Rule 22 (4) of Mineral Concession Rules, 1960.

3. In the reference 3rd read above, the Director of Mines and Geology has sent proposals along with the Approved Mining Plan duly approved by the Ministry of Coal, Government of India, for grant of 1st Renewal of Mining Lease for Coal over an extent of 1741.00 Hectares (involving an extent of 71.50 Hectares of Forest Land) in Yellandu & Cheemalapadu of Kothagudem Mandal, Khammam District, for a further period of 20 years with effect from 15.04.2004, in favour of M/s Singareni Collieries Company Limited, while condoning the delay for submission of approved Mining Plan and duly obtaining the clearance from the Forest Department and prior permission of Government of India and also clearance from CFE of APPCB in accordance with the S.O. No. 60(E), dated 27.01.1994 and subject to satisfaction of M.C Rules, 1960 and MM(D&R) Act, 1957, subject to the provisions of Mines and Minerals (D&R) Act 1957.

4. Government, after careful examination of the matter, hereby grant a 1st Renewal of Mining Lease for Coal over an extent of 1741.00 Hectares (involving an extent of 71.50 Hectares of Forest Land) in Yellandu & Cheemalapadu of Kothagudem Mandal Khammam District, for a further period of 20 years with effect from 15.04.2004, in favour of M/s Singareni Collieries Company Limited, while condoning the delay in submission of approved Mining Plan, subject to obtaining the clearance from the Forest Department and prior Environmental Clearance from Government of India and also clearance of CFE from APPCB in accordance with S.O.No. 1533, dated 14.09.2006 and subject to satisfaction of M.C.Rules, 1960 and MM(D&R) Act, 1957, subject to the provisions of Mines and Minerals (D&R) Act, 1957, and rules made thereunder in general, also subject to the conditions in Form-K prescribed under the M.C. Rules, 1960 and to the additional conditions specified in the Appendix to this order.

5. The rates of royalty, dead rent, cess and surface rent and water charges shall

...2.

ANNEXURE- 12

be collectable as follows:

I. Rates of Royalty:

COAL ::

A. Coal produced in all States and Union Territories except the State of West Bengal.

(i) Group I Coals :

(a)	Coking coal Steel Grade I, Steel Grade II, Washery Grade-II	Two Hundred and fifty rupees only per tonne.
(b)	Hand Picked coal produced in the States of Arunachal Pradesh, Assam, Meghalaya and Nagaland.	

(ii) Group II Coals:

(a)	Coking coal Washery Grade -II Coking Coal Washery Grade-III	One hundred and sixty five rupees only per tonne.
(b)	Semi - Coking Coal Grade I Semi - Coking Coal Grade II	
(c)	Non-coking Coal Grade – A Non-coking Coal Grade – B	
(d)	Ungraded Run of Mine Coal produced in the State of Arunachal Pradesh, Assam, Meghalaya and Nagaland	

(iii) Group III Coals:

(a)	Coking coal Washery Grade-IV	One hundred and fifteen rupees only per tonne.
(b)	Non-coking Coal Grade - C	

(iv) Group IV Coals:

(a)	Non-Coking Coal Grade - D	Eighty five rupees only per tonne.
(b)	Non-Coking Coal Grade – E	

(v) Group V Coals:-

(a)	Non-Coking Coal Grade - F	Sixty five rupees only per tonne
(b)	Non-Coking Coal Grade – G	

Lignite : :Fifty rupees only per tonne.

(vi) Group-VI coals:

Coal produced in the State of Andhra Pradesh :Ninety rupees per tonne

Plan Prepared by me

(SHAIK MADAR)
Recognised Qualified Person U/R 22(C of Mineral Concession Rules 1960 by Ministry of Coal, Govt. of India.
Ref. 34012/01/2015 - CPAM
Dt. 05-10-2017

II. Dead rent:

Rates of dead rent in rupees per hectare per annum or as revised by Government from time to time.

First Two years of lease	3rd year onwards
100/-	400/-

III. Surface rent & water charges and also Cess. :: As fixed by the Government from time to time

6. The grantee should pay a deposit of Rs.10,000/- as prescribed under rule 32 of the Mineral Concession Rules, 1960 before the lease is actually executed.

7. The grantee should execute the lease deed within the time limit specified in Rule 31 of Mineral Concession Rules, 1960.

8. The terms and conditions referred to in paras 4-5 of this order are subject to such further modifications, additions and alterations as may be ordered before the Renewal lease deed is executed.

9. The Director of Mines and Geology is requested to take necessary further action for the execution of the 1st Renewal lease deed after satisfying himself that the grantee fulfils all the required provisions of the amended Act and Rules. As soon as the deed is executed, the date of such execution should be reported to the Government.

NOTE: The grant is liable for cancellation should it be found that it was grossly inequitable or was made under a mistake of fact or owing to misrepresentation or fraud or in excess of authority.

(BY ORDER AND IN THE NAME OF THE GOVERNOR OF ANDHRA PRADESH)

Y. SRILAKSHMI
SECRETARY TO GOVERNMENT

To
M/s Singareni Collieries Company Limited,
Kothagudem Collieries -507 101,
Khammam District (RPAD)
The Director of Mines and Geology, Hyderabad.[w.e: File & MP]
Copy to:
The Asst. Director of Mines and Geology, Kothagudem, Khammam District.
The District Collector, Khammam
The Secretary to Govt. of India, Ministry of Coal,
Government of India, New Delhi.
The Controller General, Indian Bureau of Mines, Nagpur.
The Director General of Mines Safety, Dhanbad, Bihar.
The Regional Controller of Mines, Koti, Hyderabad.
SF/SC

// FORWARDED :: BY ORDER //

SECTION OFFICER

Plan Prepared by me

(SHAIK MADAR)
Recognised Qualified Person U/R 22(C of Mineral Concession Rules 1960 by Ministry of Coal, Govt. of India.
Ref. 34012/01/2015 - CPAM
Dt. 05-10-2017

Annexure - 13

HYDROGEOLOGICAL ENVIRON OF
JK-5 OPENCAST PROJECT
YELLANDU COALBELT

Plan Prepared by me

(SHAIK MADAR)
Recognised Qualified Person U/R 22(C
of Mineral Concession Rules 1960 by
Ministry of Coal, Govt. of India.
Ref. 34012/01/2015 - CPAM
Dt. 05-10-2017

EXPLORATION DIVISION
THE SINGARENI COLLIERIES COMPANY LIMITED
(A Government Company)
Kothagudem Collieries

JUNE, 2013

Report prepared by

N. Srinivasa Rao, Dy GM (Hydrogeology)

Functional Area Expert (HG), NABET

and

R. Ramesh, Hydrogeologist

Plan Prepared by me

(SHAIK MADAR)
Recognised Qualified Person U/R 22(C)
of Mineral Concession Rules 1960 by
Ministry of Coal Govt. of India
Ref. 34012/01/2015 - CPAM
Dt. 05-10-2017

HYDROGEOLOGICAL ENVIRON OF
JK-5 OC EXPN. PROJECT
YELLANDU COALBELT

CONTENTS *PAGE NO*

Plan Prepared by me

(SHAIK MADAR)
Recognised Qualified Person U/R 22(C) of Mineral Concession Rules 1960 by Ministry of Coal, Govt. of India.
Ref. 34012/01/2015-CPAM
Dt. 05-10-2017

EXECUTIVE SUMMARY

I. General

1.	Project name	JK - 5 Opencast Project, Yellandu
2.	Location of the project	N. Latitudes 17°33'59" to 17°35'25" E. Longitudes 80°18'51" to 80°19'51
3.	Area of the project	5.14 sq. km.
4.	Geographical area of 10 km buffer zone	428.21 sq. km.

II. Rainfall (mm)

1.	Normal annual rainfall	1103.3mm
2.	Monsoon rainfall	80%
3.	Non-monsoon rainfall	20%
4.	Average number of rainy days	67

III. Hydrogeology

1.	Aquifer properties	
	a. Hydraulic conductivity:	10.73 m^2/ day
	b. Transmissivity:	$9.4x10^{-2}$ m/day
	c. Storativity:	$5.13x10^{-4}$
2.	Number of observation wells	16
3.	Depth to water levels, m bgl	
	a. Pre-monsoon	1.90m to 11.90m
	b. Post-monsoon	0.10m to 9.70 m

IV. Cropping

1.	Irrigation through ground water	
	a. Kharif	1874.0 ha
	b. Rabi	432.0 ha
2.	Irrigation through other sources	
	a. Kharif	1697.0 ha
	b. Rabi	13.0 ha

V. Ground water Resource Estimation (MCuM/ year)

1.	Annual ground water recharge	54.84
2.	Annual ground water draft	23.88
3.	Balance groundwater available	25.48
4.	Stage of groundwater development:	48.37%
5.	Categorisation of area	Safe

Prepared by me

(SHAIK MADAR)
Recognised Qualified Person U/R 22(C of Mineral Concession Rules 1960 by Ministry of Coal. Govt. of India.
Ref. 34012/01/2015-CPAM
Dt. 05-10-2017

HYDROGEOLOGICAL ENVIRON OF
JK-5 OPENCAST PROJECT
YELLANDU COALBELT

INTRODUCTION

The JK-5 Opencast forms part of existing JK-5 Inclines block, which is situated near Sudimalla, Usirikayalapalli Villages and falls in the Northern part of the Yellandu coal-belt between 21 Incline block and Yellandu OC. This block covers an area of 1.50 Sq.Km. The block is bound by N.Lat. $17^0$33'59" to $17^0$35'25" and E.Long. $80^0$18'51" to $80^0$19'51 falling in Survey of India topo sheet no. 65 C/6.

This is an existing project and is located at a distance of 2 km from Yellandu town ship. It was proposed to convert the underground workings of JK 5 Incline to opencast project up to a depth of 120m depth of Queen Seam with a life of 11 Years to extract 21.44 Mt of coal reserves.

The present proposal is to extract balance reserves 19.97 Mt of coal, upto a maximum depth of 120m, with enhanced rated capacity of 2.00 to 2.50 Mt per annum. The life of the project is estimated as 8 years.

The hydro geological environ within 10km radius from the edge of JK-5 OC Project (428.21 sq.km.) has been studied with the object of estimating the current gross ground water draft, net surplus water availability and the impact of the proposed project on ground water environ of the area. For this purpose, the groundwater potentiality of the study area has been estimated as per Ground Water resource Estimation Committee (GEC) -1997) methodology.

MORPHOLOGY

Physiography:

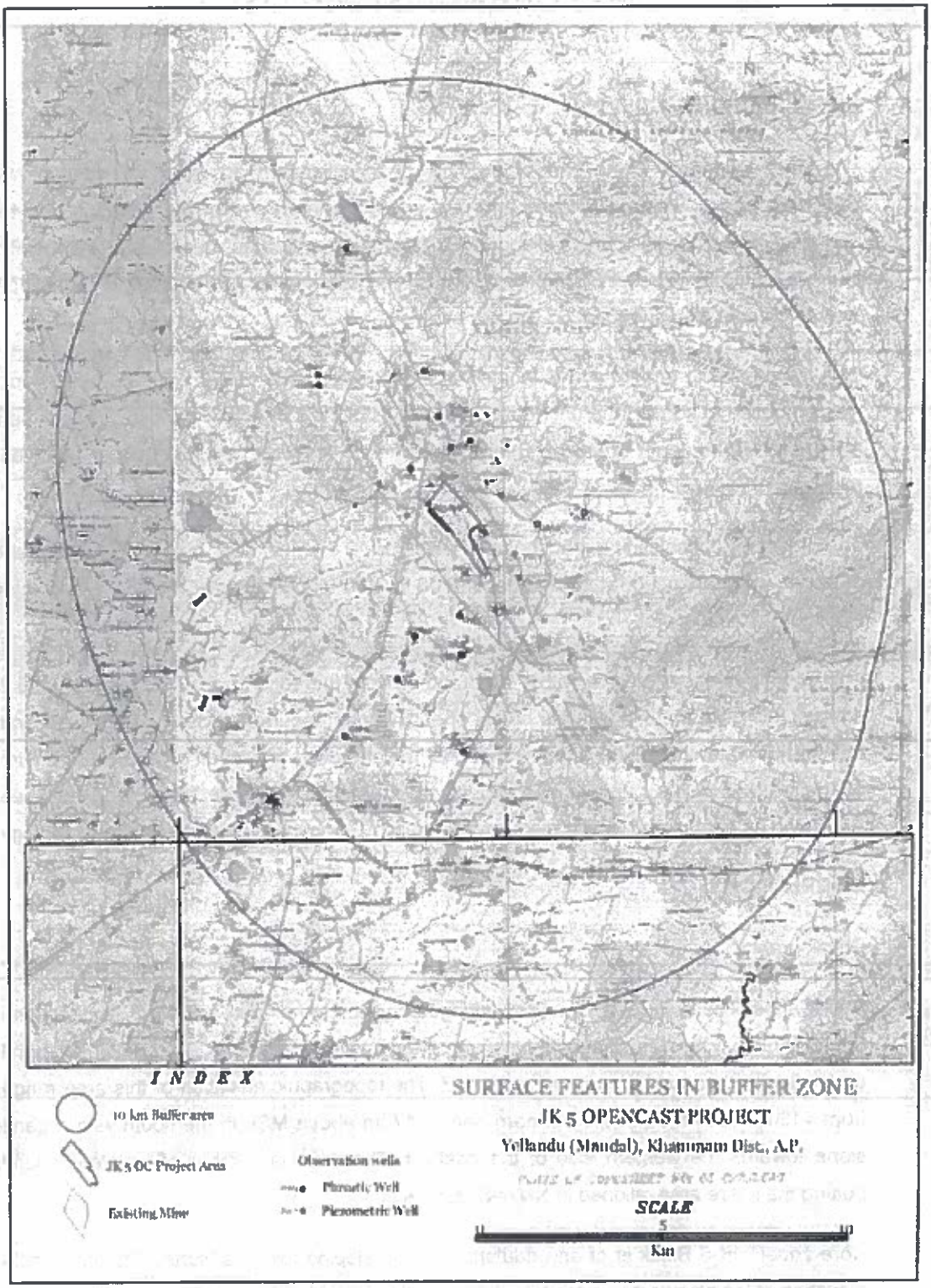
Buffer Zone: The area forms a narrow elongated valley trending in a NNW-SSE direction is bound by low lying hills of cuesta type with intervening depressions. The plains are gently undulating and poorly to moderately drained. The topographic elevation of this area ranges from 415m above MSL in the northern part to 170m above MSL in the south with a gentle slope towards the western side of the coalbelt. There are a number of isolated mounds dotting the entire area, aligned in NNW-SEE direction.

Core zone: JK-5 Block is of an undulatory terrain sloping towards North. The topographic elevation of the block area varies from 235m on the rise side of the property to 201m above

Report Prepared by me

(SHAIK MADAR)
Recognised Qualified Person U/R 22(C
of Mineral Concession Rules 1960 by
Ministry of Coal, Govt. of India.
Ref. 34012/01/2015-CPAM
Dt. 05-10-2017

Figure-1



Plan Prepared by me

(SHAIK MADAR)
Recognised Qualified Person U/R 22(C of Mineral Concession Rules 1960 by Ministry of Coal, Govt. of India.
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MSL near the main incline of JK-5 Inc. The average slope of the block is about 27m/km towards North North-West to South South-East.

Drainage:

There is no effective drainage developed in this area due to sandy soil cover and elevated ground. An ephemeral streamlet flows northwesterly and joins Bugga vagu in the north. The drainage density is 1.0 km/sq. km. The drainage is scantily developed within the block area.

Meteorology:

The area experiences typical tropical climate of a distinct hot summer from March to June with occasional dust storms, a good monsoon between July and September and a pleasant winter from November to February.

Rainfall: Daily rainfall data was collected from the nearest rain gauge station Yellandu, rainfall varies widely from 544 mm (2009) to 1710.8 mm (2008) with an average of 1099 mm. On average the SW monsoon contributes 80.20 % of rainfall, while the remaining monsoon rainfall is 19.80%. The maximum monthly rainfall is 799.6 mm (Sept '05). The annual rainfall and percentage of deviation from average rainfall in this area is given in table-1.

Table-1

Rainfall Data - Percent Deviation

Year	Rainfall in mm	% of deviation from avg. RF	Status
1963	1027.1	-6.5	Normal
1964	1102.7	0.3	Normal
1965	1052.3	-4.2	Normal
1966	868.8	-20.9	Deficit
1967	1300.7	18.4	Normal
1968	915.8	-16.7	Normal
1969	1460.3	32.9	Excess
1970	1086.0	-1.2	Normal
1971	1089.7	-0.8	Normal
1974	968.6	-11.9	Normal
1975	1197.1	8.9	Normal
1976	1267.6	15.3	Normal
1977	612.8	-44.2	Deficit
1978	1404.0	27.8	Excess
1979	557.6	-49.3	Deficit
1980	1176.4	7.0	Normal
1981	1273.7	15.9	Normal
1982	1110.0	1.0	Normal
1983	1612.6	46.7	Excess
1984	872.2	-20.6	Deficit
1985	932.6	-15.1	Normal
1986	976.8	-11.1	Normal
1987	1140.2	3.8	Normal
1988	1295.7	17.9	Normal
1989	1169.2	6.4	Normal

Plan Prepared by me

(SHAIK MADAR)
Recognised Qualified Person U/R 22(C of Mineral Concession Rules 1960 by Ministry of Coal, Govt. of India.
Ref 34012/01/2015-CPAM
Dt 05-10-2017

Year	Rainfall in mm	% of deviation from avg. RF	Status
1990	1036.0	-5.7	Normal
1991	961.2	-12.5	Normal
1992	884.4	-19.5	Normal
1993	1009.2	-8.2	Normal
1994	808.4	-26.4	Deficit
1995	1074.4	-2.2	Normal
1996	1013.2	-7.8	Normal
1997	901.1	-18.0	Normal
1998	1159.3	5.5	Normal
1999	1054.5	-4.0	Normal
2000	974.5	-11.3	Normal
2001	994.4	-9.5	Normal
2002	1138.4	3.6	Normal
2003	1432.8	30.4	Excess
2004	1394.0	26.8	Excess
2005	1690.2	53.8	Excess
2006	1471.6	33.9	Excess
2007	922.2	-16.1	Normal
2008	1710.8	55.7	Excess
2009	544.0	-50.5	Deficit
2011	913.4	-16.9	Normal
2012	1298	18.1	Normal
2013	1332	21.2	Excess
2014	566	-48.5	Deficit
2015	1219	11.0	Normal
2016	1161	5.6	Normal
2017	1012	-7.9	Normal

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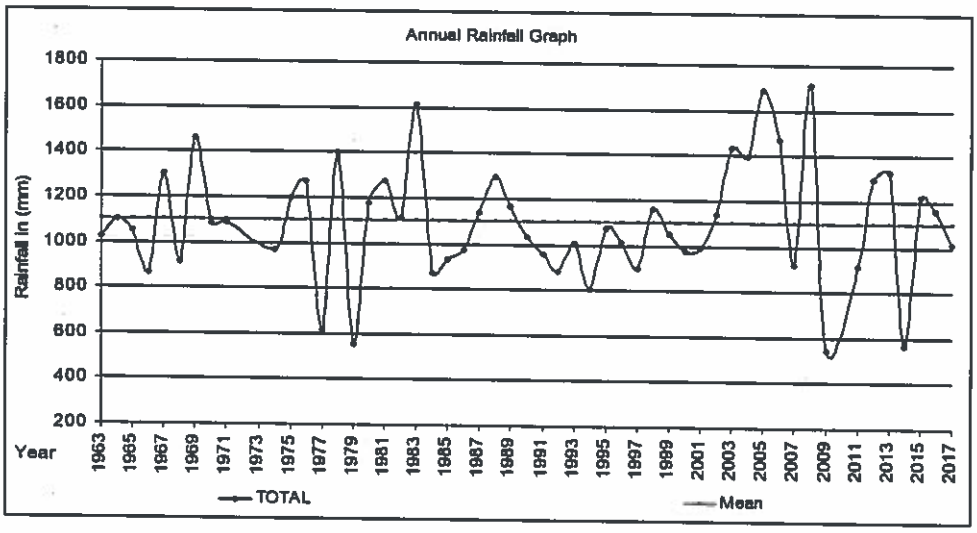
Dt. 05-10-2017

(Source: Meteorological department)

Annual rainfall data plot



LAND USE PATTERN

In the buffer zone of JK-5 OC Block, 18,526 ha covered by forest land. An area of 2,194 ha is barren and un-cultivable land, 3,136 ha is Land put to non agricultural uses, 2,171 ha are permanent pastures & grazing lands, 161 ha are Misc.tree crops, 342 ha area is fallow land. The total net area sown for Kharif is 12,319 ha and Rabi is 987 ha. Total irrigated area is 3,571 ha during Kharif season and 445 ha during Rabi season. The details are given below:

Season	Source of water	
	Surface water	Groundwater
Kharif (Ha)	1697	1874
Rabi (Ha)	13	432
Total (Ha)	1710	2306

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Mandal-wise, village-wise, season-wise and source wise cropping details:

Sl.No.	Mandal/Village	Kharif season			Rabi season		
		SW	GW	Total	SW	GW	Total
I Yellandu Mandal							
1	Rompaid	509	18	527	13	415	428
2	Sudimalla	175	72	247	11	142	153
3	Ragaboinagudem	200	75	275	8	74	82
4	Yellandu	0	5	5	0	20	20
II Singareni Mandal							
1	Madharam	290	355	645	0	52	52
2	Perupalle	586	687	1273	0	41	41
3	Usirikayalapalle	1345	890	2235	0	88	88
4	Singareni	295	465	760	0	45	45
5	Karepalle (Gate)	234	659	893	0	42	42
6	Viswanadhapalle	230	412	642	0	48	48
7	Komatlagudem	207	580	787	0	65	65
8	Manikyaram	122	413	535	0	35	35
Total area (in acres)		4193	4631	8824	32	1067	1099
Total Area in Ha		1697	1874	3571	13	432	445

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HYDROGEOLOGY

Groundwater occurs in both water table and semi-confined conditions in the buffer zone of the project area. The attitude of phreatic surface in this area is being monitored since 1997 on long term basis periodically. The depth to water varies over a wide range from 1.90 m to 11.90 m during pre-monsoon period and 0.10 m to 9.70 m during post - monsoon period. The water level fluctuation during 2012, on an average, is 0.9 m to 7.55m, with a net fluctuation of 2.67m. The depth of the open wells in this area varies from 5.50 to 12.0m with diameter varies from 1.0m to 4.0m. The attitude of phreatic surface is furnished in table-2 & Figure-3.

Six Piezometric wells were constructed at a distance of 300 and 600m from the edge of the JK-OCP. The depth to water varies from 3.40m to 15.08 in a year. The attitude of piezometric surface data is furnished in table-3 & Figure-4.

An Aquifer Performance Test (APT) is conducted in the nearby Koyagudem OC Block of Yellandu area. Since JK-5 OC Block is of similar hydro-geological environ, the aquifer performance test data of Koyagudem OC mine is used to assess the probable inflow of water into the workings of JK-5 OC Block.

From the Aquifer Performance Test conducted at Koyagudem OC, the hydraulic parameters are estimated to be:

Transmissivity : 10.73 m^2/ day
Hydraulic Conductivity: $9.4x10^{-2}$ m/day
Storativity : $5.13x10^{-4}$

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Dt. 05-10-2017

Table- 2

ATTITUDE OF PHREATIC SURFACE IN THE BUFFER AREA OF JK-5 OC EXPN. PROJECT

Well No.	Name of the village	Location	Owner's name	Total depth (m)	Geology	Depth to water (m)																		Nearest mine & dist. (km)
						Period	1997	1998	1999	2000	2001	2002	2003	2004	2005	2006	2007	2008	2009	2010	2011	2012	2013	
1	Sudimalla	Opp Sudimalla X road 17°34'50.83"N, 80°21'6.40"E	Govt Well	6.00	Gneisses	Winter													2.77	2.95	2.20	2.27	2.10	JK-OC
						Pre-monsoon												3.73	3.90	4.12	3.51	3.02	3.65	
						Monsoon												1.01	4.02	1.04	0.97	1.10		2.1
						Post-monsoon											1.06	1.49	2.80	1.00	2.25	1.50		
2	Alia thanda	In village entrance 17°33'37.37"N, 80°18'59.89"E	Lakhavath Beemudu	7.00	Barakar Fm.	Winter													3.46	5.50	3.95	1.72	2.20	JK-OC
						Pre-monsoon												5.90	5.53	5.54	5.83	3.26	3.70	
						Monsoon												0.95	6.39	1.47	1.31	1.00		0.3
						Post-monsoon											1.52	1.82	4.35	1.30	1.52	1.80		
3	Usirikayala palli	Near Misamma Temple 17°33'19.63"N, 80°19'13.62"	Bimla	9.00	Kamthi Fm.	Winter													5.51	7.20	5.50	6.05	5.20	JK-OC
						Pre-monsoon									8.00	6.33	8.23	8.16	6.73	8.64	6.39	6.55	6.80	
						Monsoon												5.20	7.29	6.70	5.75	5.80		1
						Post-monsoon									1.85	2.00	6.00	3.96	8.05	4.53	5.72	4.20		
4	Bhagya nagar thanda	Towards Karepalli 17°32'32.61"N, 80°18'21.40"E	Govt well	10.00	Kamthi Fm.	Winter													1.22	4.20	2.15	2.76	2.55	JK-OC
						Pre-monsoon												5.25	5.25	6.10	3.55	3.65	4.10	
						Monsoon												1.33	3.82	1.30	1.50	1.25		2.7
						Post-monsoon											1.86	2.03	3.60	1.35	2.43	2.00		
5	Strutt Pit Basthi	Opp CSP road 17°35'35.62"N, 80°18'42.66"E	P. Chandraiah	12.00	Barakar Fm.	Winter													8.50	10.90	7.80	10.35	9.30	JK-OC
						Pre-monsoon		10.45	9.40	9.62	9.42	11.50	11.80	10.54	10.90	10.60	11.07		10.38		9.85		11.90	
						Monsoon												5.38	10.65	7.53	7.50	8.30		1.1
						Post-monsoon	9.00	7.45	7.40	6.90	7.62	7.95	7.73	7.84	5.90	7.65	8.05	7.38	9.70	6.35	9.05	8.20		
6	Pathapusa palli	Village entrance 17°36'47.18"N, 80°17'12.08"E	D. Lakshmaiah	5.50	Barakar Fm.	Winter													0.96	1.00	0.30	0.60	1.00	21 Inc.
						Pre-monsoon		4.30	3.15	3.30	2.31	3.10	3.90	2.63	3.15	2.45	2.26	2.24	2.48	2.06	2.15	1.90	2.60	
						Monsoon												0.55	2.50	GL	GL	0.20		2.0
						Post-monsoon	1.60	1.40	1.40	1.30	0.30	1.30	0.10	0.10	0.50	0.96	1.10	0.90	0.85	0.90	0.86	1.00		
7	Pathapusa palli	Opp School 17°36'50.61"N, 80°17'11.86"E	D. Lakshmaiah	6.00	Barakar Fm.	Winter													3.23	3.37	2.50	3.00	2.90	21 Inc.
						Pre-monsoon		4.20	5.15	4.25	4.38	4.72	5.05	4.52	5.07	4.71	4.46	4.30	4.49	4.25	4.12	4.00	3.95	
						Monsoon												1.40	4.98	1.58	1.42	1.50		2.0
						Post-monsoon	1.90	2.20	1.90	1.85	1.97	2.00	2.03	2.06	1.90	1.98	1.79	2.27	3.00	1.54	2.55	2.40		
8	Rompedu	Gundala Pakhala jn. 17°38'33.09"N, 80°17'50.48"E	Govt Well	9.00	Pakhal Fm.	Winter													3.12	2.10	2.95	2.68	1.80	21 Inc.
						Pre-monsoon												3.05	6.51	5.58	4.95	5.11	4.00	
						Monsoon												0.61	6.10	0.70	0.50	0.65		2.5
						Post-monsoon											0.79	1.49	1.85	0.28	2.55	1.80		

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Well No.	Name of the village	Location	Owner's name	Total depth (m)	Geology	Depth to water (m)																		Nearest mine & dist. (km)
						Period	1997	1998	1999	2000	2001	2002	2003	2004	2005	2006	2007	2008	2009	2010	2011	2012	2013	
9	Yellandu	In Darga near Magzine 17°36'55.03"N, 80°18'45.09"E	Darga well	7.90	Gneisses	Winter													5.89	Dry	4.30	Dry	7.35	21 Inc.
						Pre-monsoon		7.60	6.05	5.30	7.57	7.57	7.80	5.73	6.09	6.35	6.79							
						Monsoon												1.04	Dry	7.30	8.10	Dry		0.6
						Post-monsoon	4.80	2.42	2.10	1.85	4.67	3.25	1.38	1.95	1.24	2.05	5.03	2.39		1.70		5.40		
10	Yellandu	Opp Peddamma temple Gundala road 17°36'17.57"N, 80°18'56.48"E	D. Seshaiah	9.10	Barakar Fm.	Winter													3.51	4.68	2.47	3.46	2.80	21 Inc.
						Pre-monsoon												3.62	6.40	7.76	4.76	4.80	4.45	
						Monsoon												1.23	7.98	1.29	2.20	2.43		0.2
						Post-monsoon											6.25	2.05	4.30	1.35	2.94	2.05		
11	Appaiahgudem	Near Anjaneya swamy temple 17°31'32.49"N 80°17'29.47"E	Govt Well	7.30	Pakhal Fm.	Winter													4.79	5.00	4.32	4.15	3.35	21 Inc.
						Pre-monsoon														5.46	5.50	5.52	5.80	
						Monsoon													5.43	0.35	0.45	1.20		4.8
						Post-monsoon												2.71	5.01	1.58	3.50	3.85		
12	Seetharam puram	Towards Khammam Right side cement road 17°31'21.67"N, 80°19'19.16"E	Nampalli.Mallaiah	10.50	Kamthi Fm.	Winter													5.96	12.16	3.92	6.82	4.00	JK-OC
						Pre-monsoon															8.70	10.10	7.50	
						Monsoon													7.98	4.12	4.85	4.35		2.3
						Post-monsoon												2.50	9.10	1.80	5.95	2.55		
13	Lavudya thanda	Near GP School 17°33'6.29"N, 80°18'40.60"E	Gugulothu.Babu	11.50	Kamthi Fm.	Winter														7.55	3.74	6.00	4.45	JK-OC
						Pre-monsoon													6.84	8.43	6.27	7.70	6.65	
						Monsoon													7.26	4.27	4.76	5.40		0.7
						Post-monsoon													7.05	1.98	5.52	3.70		
14	Karepally	Near Junction 17°30'40.67"N, 80°16'23.32"E	Gugulothu Mohan H-No:1-12	6.50	Gneisses	Winter														5.00	3.25	4.80	3.10	JK-OC
						Pre-monsoon														5.65	5.38	5.86	4.41	
						Monsoon													4.62	1.80	2.65	2.20		8
						Post-monsoon													4.30	2.67	4.10	2.55		
15	Yellandu	Near Bustand, Civil lane 17°35'43.12"N, 80°19'12.66"E	SVRN Raju	9.17	Barakar Fm.	Winter																		JK-OC
						Pre-monsoon																	5.85	
						Monsoon																		0.8
						Post-monsoon																		
16	Yellandu	Near Khammam road Junction 17°34'41.87"N, 80°20'24.65"E	Deeplal	9.55	Gneisses	Winter																		JK-OC
						Pre-monsoon																	5.85	
						Monsoon																		1.2
						Post-monsoon																		

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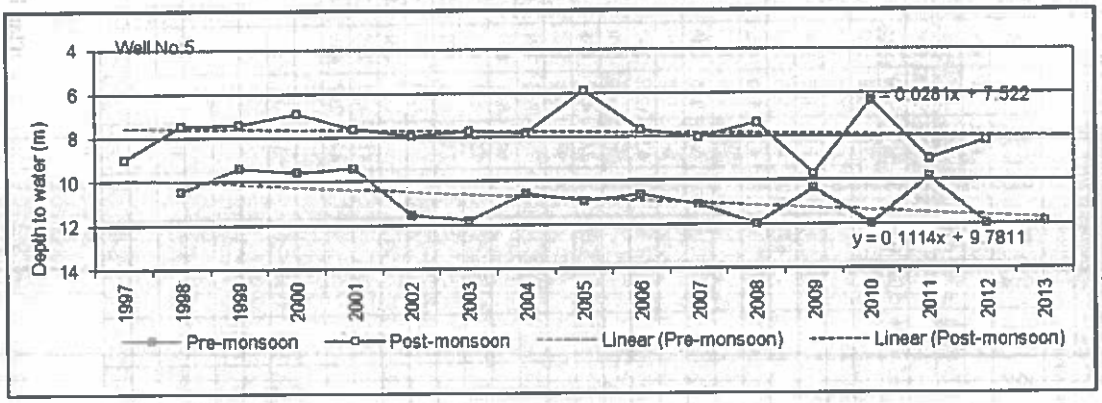
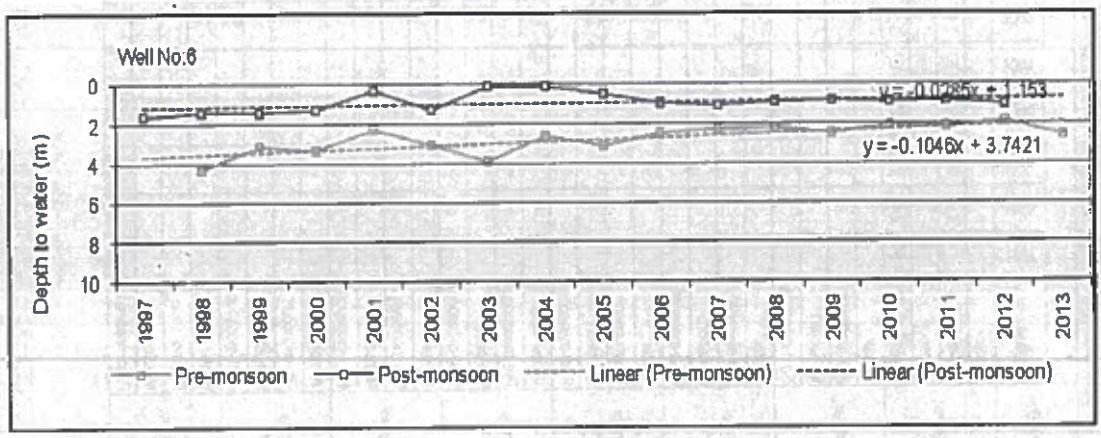
Figure: 3

HYDROGRAPHS OF PHREATIC WELLS





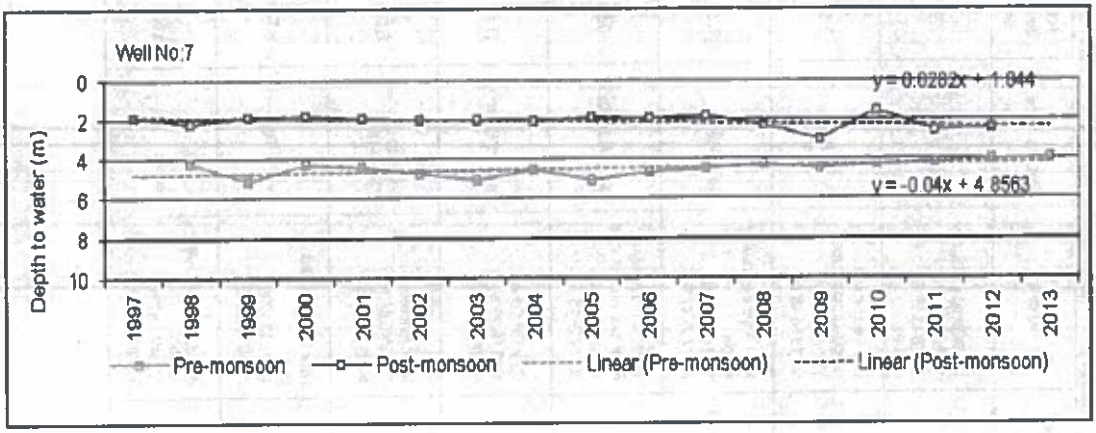


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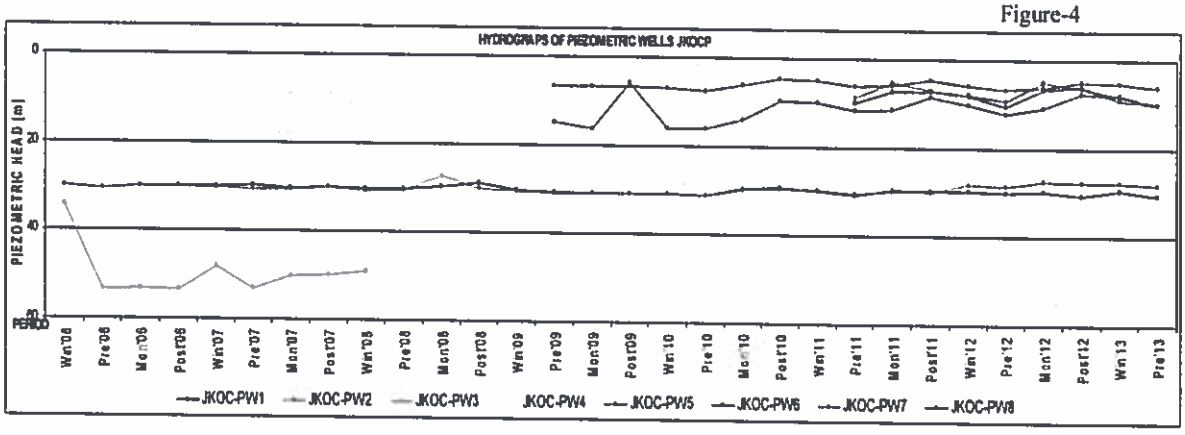
Table-3

ATTITUDE OF PIEZOMETRIC SURFACE AT JK-5 OCP

Piezometric well no.	Location	Depth (m)	Dia(m)	Period	Depth to Water (m)							
					2006	2007	2008	2009	2010	2011	2012	2013
JKOC-PW1	About 300m rise side, behind project office, adj.Idga 17°34'09.61"N, 80°20'09.33"E	50	0.10	Winter	30.05	30.02	30.15	30.19	30.98	29.80	29.75	29.30
				Pre-monsoon	30.60	29.72	30.30	30.85	31.26	30.64	30.00	30.53
				Monsoon	29.99	30.34	29.81	30.98	29.65	29.60	29.85	
				Post-monsoon	29.92	29.88	28.92	30.85	29.53	29.78	30.68	
JKOC-PW2	About 430m rise side of quarry, in the mango groove. 17°33'48.42"N, 80°20'13.68"E	50	0.10	Winter	29.92	30.20	30.78	30.49	30.95	29.99	28.35	27.77
				Pre-monsoon	30.47	30.60	30.72	30.57	31.15	30.76	28.50	28.21
				Monsoon	29.87	30.68	27.74	30.84	29.42	29.39	27.35	
				Post-monsoon	29.93	29.99	29.99	30.75	29.15	30.13	27.56	
JKOC-PW3	About 500m dip side of E-block between JK OC and JK-Inc., among neem trees	50	0.10	Winter	34.60	48.47	49.23	AB				
				Pre-monsoon	53.60	53.35	Dry	AB				
				Monsoon	53.29	50.53	Dry	AB				
				Post-monsoon	53.60	50.05	AB	AB				
JKOC-PW4	About 600m dip (NE) side of Equarry, behind view point, between JK OC and JK-5inc.	50	0.10	Winter	6.41	6.67	12.42	AB				
				Pre-monsoon	6.12	8.71	12.92	AB				
				Monsoon	4.30	8.90	17.15	AB				
				Post-monsoon	6.07	8.72	15.88	AB				
JKOC-PW5	Rail way Track Adjacent 17°34'44.29"N, 80°18'31.74"E	50	0.10	Winter				-	16.00	9.95	10.20	8.27
				Pre-monsoon				14.94	16.13	11.71	12.30	9.57
				Monsoon				16.44	13.91	11.38	10.64	
				Post-monsoon				5.82	9.65	8.50	7.60	
JKOC-PW6	Towards Karepalli Near Darga 17°34'04.94"N, 80°19'01.71"E	50	0.10	Winter				-	7.10	4.97	5.95	5.20
				Pre-monsoon				6.62	7.56	6.13	6.80	6.17
				Monsoon				6.69	6.11	5.82	6.06	
				Post-monsoon				6.58	4.75	4.70	4.81	
JKOC-PW7	Opp. Singarareni school in JK colony, 17°35'01.25"N, 80°19'58.26"E	50	0.10	Winter						–	8.00	7.79
				Pre-monsoon						8.83	9.25	9.83
				Monsoon						5.37	4.82	
				Post-monsoon						7.10	6.50	
JKOC-PW8	Towards Mahaboobad at Polampalli village. 17°35'12.64"N, 80°18'06.05"E	50	0.10	Winter						–	8.02	9.10
				Pre-monsoon						9.91	10.53	9.80
				Monsoon						7.42	6.74	
				Post-monsoon						7.15	5.95	

Figure-4



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GROUND WATER RESOURCE ESTIMATION

Rainfall is the major source of recharge in this area, besides ephemeral streams and a number of tanks. Groundwater budgeting is done as per GEC-1997 methodology.

I. CURRENT GROSS GROUND WATER DRAFT

a. Domestic consumption

Twelve revenue villages are falling in the buffer zone of the project belonging to Yellandu (4) and Singareni (8) mandals. As per 2011 census the population of this area is 1,19,916. Of this, 35,056 live in urban area of Yellandu town, for which protected water is supplied. The rest of the rural population (84,860 as 2011 census data) will be 1,10,339 by 2035 AD, at the projected growth rate of 1.1% (Source of information: National Commission of Population)annually for Andhra Pradesh. They draw ground water through open/ bore wells. At the per capita consumption rate of 60 lit/day, (as per GEC-97 procedure), this amounts to 6,620 m^3/day or 2.41 MCuM/year.

b. Cattle Consumption

Cattle consumption is assumed to be of 10% of projected domestic consumption, which comes to 0.24 MCuM/year

c. Agricultural requirement

In the buffer area of JK-5 OC Block, the main crops during Kharif season are Paddy, Chillies, Cotton, Grams etc, while in Rabi season are Paddy, Maize, Groundnut, Grams, Vegetables etc,.(Source: A.P. Agricultural census data):

Season	Source of water	
	Surface water	Groundwater
Kharif (Ha)	1697	1874
Rabi (Ha)	13	432
Total (Ha)	1710	2306

Crop-wise, Season-wise ground water requirement is given below:

Crop	Water requirement (cm)	Area irrigated (Ha) on groundwater		Total	Groundwater requirement (MCuM)/Year
		Kharif	Rabi		
Paddy	105	233.5	38.4	272.0	2.86
Chillies	65	795.6	6.9	802.5	5.22
Total Veg.	60	72.0	12.5	84.6	0.51
Maize	45		336.7	336.7	1.52
Ground nut	50	2.8	37.2	40.1	0.20
Turmeric	100	2.4		2.4	0.02
Cotton	105	767.7		767.7	8.06
Total		1874.1	431.8	2305.9	18.38

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d. Inflow of water into the coal mines

There are two coal mines in operation in this area. The quantum of water presently being pumped out from these mines and its utilisation is as follows:

Name of the mine	Total quantity of water(m^3/ day)				
	Pumped per day	Mine requirement	Domestic use	For plantation	*Let out into the streams
JK 5 OC	1334	980	50	160	204
21 inc.	6480	450	94	702	5778
Total	7814	1430	144	862	5982

* Being used for cultivation.

Presently, 7,814m^3/day or 2.85 MCuM / year of water is being pumped from the coal mines of this area.

Thus the total ground water draft in this area is:

Domestic consumption	2.41 MCuM/year
Cattle consumption	0.24 MCuM/Year
Agricultural requirement	18.38 MCuM/Year
Pumping from Coal mines	2.85 MCuM/Year
Total	23.88 MCuM/Year

II. RECHARGE

1A. Recharge from water table fluctuation

SCCL is monitoring the attitude of phreatic surface in this area since 1997, on long-term basis periodically. The pre-monsoon and post-monsoon ground water levels are monitored in 16 observation wells located in 10 km radius from the edge of JK-5 OCP (428.21 sq km). The depth to water varies over a wide range from 1.90m to 11.90 m during pre-monsoon period and 0.10 m to 9.70m during post - monsoon period. The water level fluctuation, on an average, is 0.90m to 7.55m, with a net fluctuation of 2.67m. The hilly area (33.63 sq.km.) is not considered in this groundwater recharge estimation.

Recharge = Geographical Area X water table fluctuation X sp. yield.

Recharge = 394.58 sq. Km. x 2.67 m x 0.03 = 31.60 MCuM / Year.

1B. Recharge from rainfall

The mean annual rainfall of this area is 1103.3 mm. In the buffer zone area (428.21 sq.km.) of the project, an area of 72.10 sq.km. is underlain by sedimentary formations and the rest (356.11 sq. km.) by hard rock. In the hard rock area the hills occupy an area

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Ref. 34012/01/2015 - CPAM
Dt. 05-10-2017

of about 33.63 sq.km. This hilly area is not considered in groundwater recharge estimation.

Within 10 km radius area from the edge of the block:

a. Recharge in sedimentary terrain (of semi-consolidated sandstone formation):
= 72.10 sq. km. x 12% of rainfall 1103.3mm
= 9.54 MCuM / Year

b. Recharge in hard rock terrain:
= 322.48 sq. km. x 11% of rainfall 1103.3mm
= 39.13 MCuM / Year

Recharge from rainfall in 10 km radius area from the edge of the block
(a+b) = 48.67 MCuM / Year

Comparison of recharge:

A. Recharge from water table fluctuation method = 31.60 MCuM/ Year

B. Recharge from Rainfall infiltration method = 48.67 MCuM/ Year

Percentage of deviation (PD) = ((A-B)/B) X100
= (31.60- 48.67)/ 48.67) X100
= (-17.07/48.67) x100 = -35%

Since, the PD (-35%) is < -20%, the recharge obtained from rainfall infiltration method is to be multiplied by 0.8

Then the recharge of the area will be: 0.8 x 48.67=38.93 MCuM / Year.

2. Recharge from other sources

a. *Recharge from return flow from surface water applied for irrigation :*

= 50% of (105 X 1710 ha) = 8.97 MCuM / Year

b. *Recharge from return flow from groundwater applied for irrigation:*

= For Paddy crops (50% of 2.86 MCuM) = 1.43 MCuM / Year
= For Non Paddy crops (30% of 15.52 MCuM) = 4.65 MCuM / Year

c. *Recharge from Return flow of mine water let out into streams:*

= 20% of (2.18 MCuM / Year) = 0.43 MCuM / Year

Total Recharge from other sources (*a+b+c*) = 15.91 MCuM / Year

Gross recharge = Recharge from rainfall + Recharge from other sources.
= 38.93+15.91 = 54.84 MCuM / Year

III. GROUNDWATER ALLOCATION FOR DOMESTIC AND INDUSTRIAL USE

For the domestic use of population within 10km radius from the edge of proposed JK-5 OC block, projected by the year 2035 AD, an allocation of 6,620 m3/day or 2.41MCuM/year of groundwater is made.

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Dt. 05-10-2017

IV. TREND OF PHREATIC SURFACE

The trend of phreatic surface in both pre-monsoon and post-monsoon seasons in the buffer zone of JK-5 OC Block is shown in the enclosed hydrographs Fig-3.

V. NET ANNUAL GROUNDWATER AVAILABILITY

This is calculated by deducting 10% of total groundwater resources from the gross groundwater recharge as:

= 54.84 – 5.48 = 49.36 MCuM/ year

VI. CURRENT STAGE OF GROUND WATER DEVELOPMENT

The gross annual groundwater availability within the 10 km radius from the edge of JK-5 OC block is arrived at by adding recharge from 1) rain fall and 2) return flow from water applied for irrigation and 3) recharge from return flow of mine water let out into streams. This amounts to 54.84 MCuM/Year. After deducting unaccounted losses (10% of gross recharge) the net available groundwater is 49.36 MCuM / year. The current annual gross groundwater draft all uses of this area is 23.88 MCuM/Year. This leaves a net surplus of 25.48 MCuM / year.

$$\text{The present stage of groundwater development} = \frac{C}{B} \times 100$$

Where, C is Current annual gross ground water draft and

B is net annual groundwater available = (23.88/49.36)X100 = 48.37 %.

VII. CATEGORISATION OF AREA FOR GROUND WATER DEVELOPMENT

As per GEC 1997 methodology, *"if the stage of ground water development is <70% the area is to be categorised as safe"*. The present stage of ground water development in the buffer zone area of JK-5 OC project is 48.37%. The long term monitoring of water levels reveal that the water table during pre-monsoon and post-monsoon seasons are not showing a falling trend (Fig-3). Hence, based on this information the area is categorised as "Safe".

A flow diagram of hydrologic system of the area is shown in figure-5.

SUMMERY OF GROUND WATER RESOURCE ESTIMATION:

Annual ground water ***recharge***	54.84 MCuM/ year
Unaccounted ***losses***	5.48 MCuM/ year
Net groundwater avalable	49.36 MCuM/ year
Annual ground water ***draft***	23.88 MCuM/ year
Balance groundwater available	25.48 MCuM/ year
Stage of groundwater ***development:***	48.37 %
Categorisation of area	**"Safe"**

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Ref. 34012/01/2015-CPAM
Dt. 05-10-2017

FLOW DIAGRAM OF HYDROLOGIC SYSTEM IN NATURAL CONDITIONS

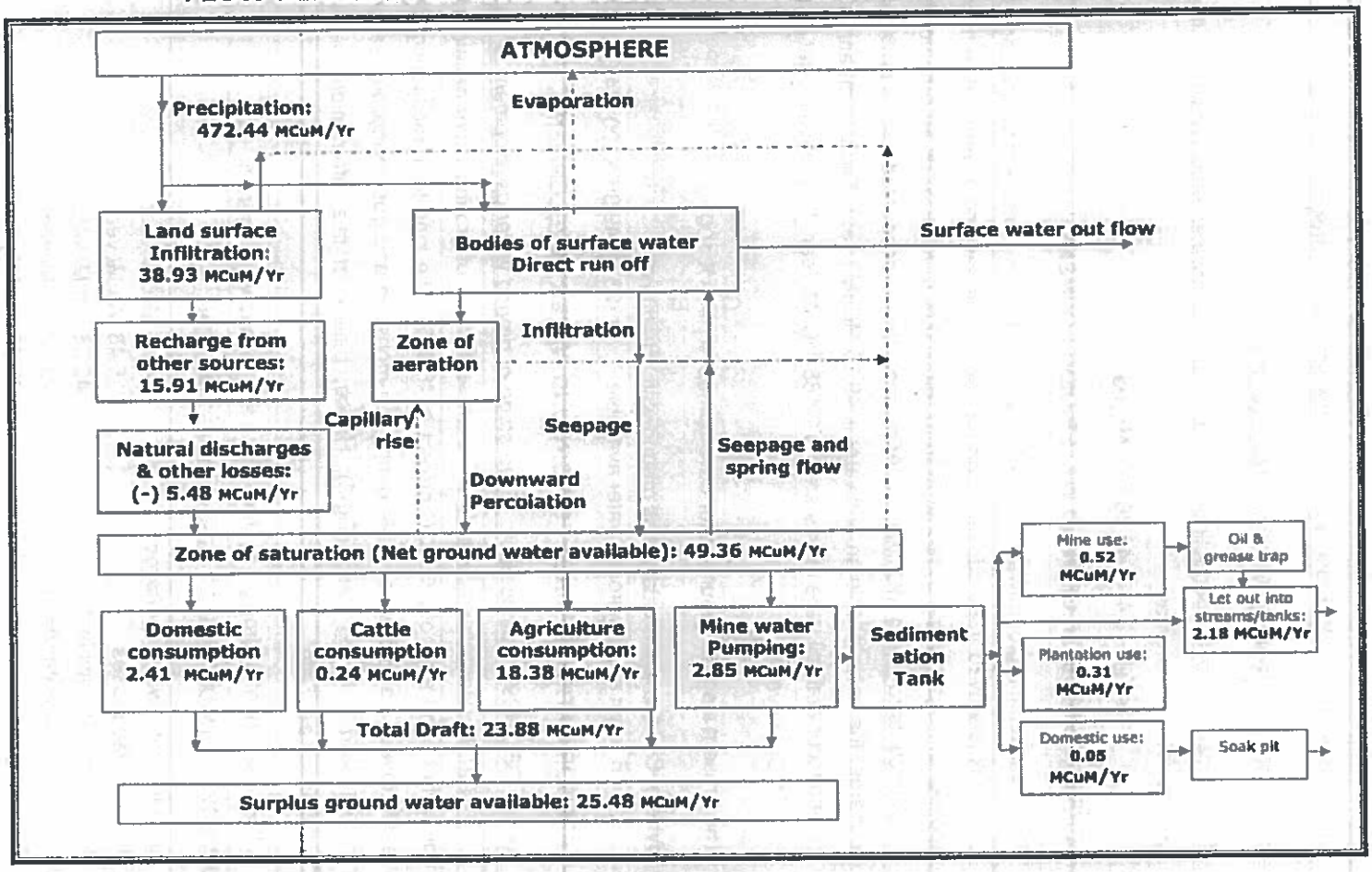

Figure-9

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Ref. 34012/01/2015 - CPAM
Dt. 05-10-2017

INFLOW OF WATER INTO JK 5 OCP

The seepage of water into the quarry is from three sources:

1. Rainfall over the excavated quarry area
2. Surface run off water
3. Ground water seepage from the aquifers exposed in the quarry side.

1. Rainfall over the excavated quarry area:

The excavated quarry area of JK-5 OCP during the mine life period varies as a function of time in a phased way as detailed below. The normal rain water intake will be during the period of about four months (June to September) in a year. The normal mean rainfall on a rainy day at Yellandu is considered as 16.32 mm (with an average number of 67.57 rainy days). All the rainfall occurring over the excavated quarry area is taken for computation of the quantum of inflow of water, which varies from a minimum of about 10,436 m^3/day to a maximum of 15,080 m^3/day during final stage of mine

Sl. no.	Period	Excavated quarry area (ha.)	Back filled area (Ha)	Balance open quarry area (ha.)	Inflow of water (m^3/day)
1	Present Stage	63.95	--	63.95	10436
2	End of 8th year	149.95	57.54	92.41	15081

2. Surface run-off water:

Run-off from slopes of internal dumps, in-pit slopes and access road of JK-5 OC shall be channelled to flow through a common drain into the surface drains. To avoid the flow of surface water towards and into the quarry, suitable precautionary measures like changing the gradient of the topography to be away from the quarry area and OB dumps as barrier and garland drains around them shall be provided. General topography and scanty development of drainage net work in the Project area shows that the surface drainage is not likely to pose any problem. Hence this component of water flow into the quarry can be ignored.

3. Ground water seepage from the aquifers exposed in the quarry side:

The inflow of groundwater into the Project is estimated based on the aquifer parameters. The hydraulic conductivity of the aquifer system is assessed to be $9.4X10^{-2}$m/day. The maximum depth of the proposed project quarry is 120m. The cumulative saturated thickness of the aquifers in this area is 95m. From this, the ground water inflow into the quarry was estimated to be 2,360 m^3 /day (360 gpm),

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Ref. 34012/01/2015-CPAM
Dt. 05-10-2017

$Q = 2\pi Kh2/w\ (u) = 2360\ m^3$ /day (360 gpm)

At present about 1335 m^3 /day of water is being pumped out from the project

It was assessed that, the total quantum of inflow of water into the quarry during monsoon period shall vary from about 12790m^3 /day initially to a maximum of 17440 m^3 /day at the final stage of the project.

Presently, from the existing JK5 OCP as per the mine discharge details, 1,334m^3/day of water is being pumped out from the project and ground water draft within the buffer zone area of mines, Agriculture, Domestic needs etc, is about 23..88 McM/Year.

ENVIRONMENTAL IMPACTS OF MINING ON WATER REGIME AND MITIGATIVE MEASURES

This project area covers a total area of about 514.95ha. (i.e., including dump yards, service buildings and diversion of road etc). The project area falls in the Buggavagu watershed. The anticipated impacts of the proposed project are discussed below.

During the life span of the project, the mine pit will reach to a maximum depth of about 120m. Due to the mining operations and OB dumps, the drainage network alters and the flow path gets re-adjusted, as such, there will be no reduction in the total quantity of the flow in this area.

The rainfall received in mine area will be accumulated in the mine pit instead of join the natural drainage as runoff. It is needed to be pumped out to the surface to protect the mine workings.

I. Impact on surface water regime

The area is drained by the Bugga Vagu and its small rivulets of dendritic pattern. The Bugga Vagu is flowing in northerly direction through the area. During the course of mining, the nallahs/ streams/vagus in and around the project area are envisaged to be disturbed.

Effect of drainage diversion/removal

There is no proposal of diversion of any major stream in this area. The quarry area will be surrounded by garland drains with intermediate settling provision so that only clear water is discharged into the natural water bodies. The mine seepage water will be pumped out & discharged into settling tanks where the coal fines will be settled and only clear water will be discharged into the water bodies.

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Ref. 34012/01/2015 - CPAM
Dt. 05-10-2017

It is assumed that there will be no reduction in the total quantity of flow in the down stream due to the diversion / removal of the existing drainage in the project area. As the rain that falls over the area will ultimately flow into the nearby nallas or tanks either by diversion or pumping from mine towards down stream side. The diversion of streams will not affect the gradient or velocity of the flow in the downstream side.

II. Impact on Groundwater regime

The impact of mining on local ground water regime depends on the mine parameters like depth and rate of expansion, ground water recharge and hydraulic parameters of the aquifers intercepted in the quarry.

Presently there are two coal projects viz., JK 5 OCP, and 21 incline underground mines are in operation in the buffer area of the project. The quantity of water being pumped out from these mines is about 7814 m^3/day.

The average quantity of water being pumped per day from existing JK-5OCP is about 1334m^3/day. After meeting the mine requirements about 204m^3/day is being released into nearby streams.

SCCL is monitoring the piezometric heads around the JK OCP project in Piezometric wells which were constructed at a distance of 300 to 600m from the quarry. The piezometric heads vary from 4.70m to 31.26m (Table-3) Hydrographs are shown in Fig-4. This monitoring is aimed at studying the impact of coal mining on ground water regime.

Water requirement

The mine discharge water will be stored in settling ponds for removal of suspended solids. At present about 1190 m^3/day is required for various purposes in the mine such as dust suppression, washing of HEMM, plantation, drinking water etc. The surplus water of about 204 m^3 /day is being let out into the local tanks and streams for use of the local people. This acts as constant source of recharge to the groundwater regime and improves the water levels around the mine.

Radius of influence

The continuous pumping of ground water from the mine will result the depletion of water table around the project area. The radius of influence of water withdrawing from the proposed open pit has been determined by Thiem's equation.

$$Q = \frac{2\pi k b(H_0 - hw)}{2.3 \log R_o / rw}$$

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Dt. 05-10-2017

Where,

Q	is Discharge (m^3/sec)
k	is Coefficient of permeability (m/sec)
b	is Thickness of the aquifer (m)
H_0	is Initial piezometric head in the aquifer (m)
hw	is Target drawdown level in the equivalent well (m)
Ro	is Radius of influence (m)
rw	is radius of the well/sump/pit

At the end of final year, taking the value of 'k' as 1.08×10^{-6} m/sec, 'b' as 55m, '$(H_0 - hw)$' as 40m, 'r_w' as 437m (assumed as the void of mine area being about 60ha at final stage) and 'Q' as 2360m^3/day, the value of "Ro" is calculated as :

$$0.027 = \frac{2 \times 3.14 \times 1.08 \times 10^{-6} \times 55 \times 40}{2.3 \log R_o / 437}$$

Radius of influence Ro = 761m from centre of the project or 324 m from the surface edge during the final stage of the project.

Due to stratification, the permeable beds act as individual units and develop multi-aquifer system. As such, the propagation of drawdown cone is limited to a small distance from the edge of the mine. Due to prominent boundaries/faults, the propagation of this cone of influence is further restricted. The mine water discharged into the local drainage net work/tanks act as constant source of recharge and improves the water levels around the mine.

After cessation of mining, due to increased permeability in the backfilled area, the infiltration of rain water increases and the water levels recoup in a short time. At the final stage of the mine, the void left in the dip-side area will be gradually filled with rain water and surface run off and become a good reservoir and acts as constant source of recharge to the groundwater regime and improves the water levels around the mine. The maximum depth of the final void at the end of mining operations is 120m.The volume of the void would be 72.85 MCum and covers an area of 92.41Ha.

Mitigate measures

Garland drains are to be provided all along the periphery of quarry area. The streamlets that originate out side the proposed project and flow across the quarry are to be re-oriented through garland drains along the periphery of the project/quarry, so that, the flow should meet the original course in the down stream and the impact on regional hydrology will be negligible.

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Ref. 34012/01/2015 - CPAM
Dt. 05-10-2017

Pollution of surface water is mainly due to soil erosion and wash off from loose overburden, coal yards and associated material in monsoon season. Hence, check dams and sedimentation tanks are to be constructed around the OB dump and the lease area to reduce soil erosion and arrest suspended solids before discharging the run-off water into the natural water regime. The water that stored in the quarry during rains and mine seepage will be discharged into the local tanks/ streams after conventional treatment.

Pollution of Groundwater takes place where the mine rejects contain toxic chemical substances. As coal mine is not a chemical industry, no such pollution takes place. Excess water from opencast mine is to be pumped into a settling pond before letting out into the local drainage net work. Water from the workshops is to be circulated through oil and grease trap before letting out into the local drainage so that there will be no pollution or contamination of ground water due to coal mining.

The total groundwater draft in the buffer zone area is about 23.88 MCuM/Year. Of this, from mines it is about 2.85MCuM/Year and cultivation requirements is about 18.38MCuM/Year.

The monitoring of water levels around the Coal mines will be continued, to observe the adverse impact, if any, which may arise. The water conservation measures advised by A.P State Ground Water Department shall be followed to recharge the ground water regime where ever required.

CONCLUSION

In this area, the attitude of phreatic surface is being monitored in the observation wells located at a distance of 200m to 8km from the coal mines in operation. The phreatic surface varies from 1.9m to 11.9m during pre-monsoon season and from 0.1m to 9.7m during post-monsoon season. The piezometric heads also being monitored in Piezometric wells. The piezometric heads vary from 3.40m to 15.08

From this long term monitoring of phreatic and piezometric data in the buffer zone of the existing mine scenario, it is observed that, there is no considerable impact of mining on groundwater regime in this area.

As per the Groundwater Resource Estimation, the present stage of groundwater development is 48.37%. The total quantum of water pumped out from the existing mines is about 2.85 MCuM/Year, while the ground water used for cultivation it is about 18.38 MCuM/Year. The ground water inflow into the project may not vary much from existing mine discharge of about 0.48 MCuM/Year.

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Ref. 34012/01/2015 - CPAM
Dt. 05-10-2017

The streamlets that originate out side the quarry and flow across the project area will be diverted to flow through garland canal and subsequently, connect them to original course in downstream side. It is assumed that there will be no reduction in the total quantity of flow in the down stream due to the diversion / removal of the existing drainage in the project area.

From the available hydrogeological information, it is assumed that the mining influence of project on the ground water regime is about 324m from the surface boundary of the mine during the final stage.

After cessation of mining, the rain water infiltrates rapidly in to the back filled unconsolidated material in the mine pit and the water levels will recoup in a short time. The void left during the final stage will be about 72.85 MCuM with a maximum depth of 120m. It is proposed to reduce the depth of the void to 35 m (from surface). Then the final void will be 37.68 M.Cum in the project to store the rain water and run off from the surroundings. This void will become a reservoir in the area to cater the requirements of local communities and augmenting recharge to the ground water regime.

In view of the above, it can be inferred that there will be no impact on water regime in this area. *The impact of mining on groundwater system, if any, will only be a temporary phase and localised phenomenon.*

However, it is proposed to continue the monitoring of phreatic and piezometric surfaces around the project periodically on long term basis, to observe the adverse impact, if any that may arise. In the event of any adverse impact on the surrounding area, conservative measures will be taken up.

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Annexure - 14

No. J-11015/31/2013-IA-II (M)
Government of India
Ministry of Environment, Forest & Climate Change
IA-II (Coal Mining) Division

Indira Paryavaran Bhawan,
Jorbagh Road, N Delhi-3

Dated: 3rd March, 2016

To,

The Director, (Planning & Projects)
M/s Singareni Collieries Company Ltd. (SCCL),
Bhadrachalam Road Railway Station,
Kothagudam Collieries
Khammam District – 507101,
(Telangana)

Email: gm_env@scclmines.com

Sub: Expansion of Jawahar Khani - 5 Opencast Coal Mine Project from 2.0 MTPA to 2.50 MTPA in ML area of 514.95 ha Village Sudimalla, Mandal Yellandu, District Khammam (Telangana) of M/s The Singareni Collieries Company Limited- Environmental Clearance - reg.

Sir,

This is with reference to your letter No.CRP/ENV/A/417/61 dated 28.01.2013 and revised application No. CRP/ENV/A/417/536 dated 03.08.2013 along with the application for expansion of production under section 7(ii) of the EIA Notification, 2006. EC was granted to the project vide letter no. J-11015/358/2006-IA-II (M) of dated 18.05.2009. Reference is also invited to the letter Nos CRP/ENV/A/427 dated 28.09.2015, 30.12.2015, 06.01.2016, 08.01.2016 for environmental clearance on the above-mentioned subject.

2. The Ministry of Environment, Forest & Climate Change has considered the application. It is noted that the proposal is for grant of environmental clearance for **Expansion of Jawahar Khani - 5 opencast coal mine project from 2.0 MTPA to 2.50 MTPA in ML area of 514.95 ha Village Sudimalla, Mandal Yellandu, District Khammam (Telangana) of M/s The Singareni Collieries Company Limited**

3. The proposal was considered by the Expert Appraisal Committee (EAC) in the Ministry for Thermal & Coal Mining Projects in its 5th EAC meeting held on 25th -26th November, 2013 and 49th meeting held on 7th - 8th January, 2016. The details of the project, as per the documents submitted by the project proponent (PP), and also as informed during the above said EAC meetings, are reported to be as under:-

i. The Expansion is under 7(ii) of EIA Notification, 2006.
ii. The project with its production capacity of 2 MTPA was accorded EC vide letter no. J-11015/358/2006-IA.II (M) dated 18.05.2009.
iii. The latitude and longitude of the project are 17° 33' 59" to 17° 35' 25" (North) and 80° 18' 51" to 80° 19' 51" (East) respectively.

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Ref. 34012/01/2015 - CPAM
DL 05-10-2017

iv. The land usage of the project will be as follows:

Pre-mining:

Land Use Land Cover Class		Area of Sub Class	
		Area in Ha	% of Usage
Agriculture			
	Crop Land	0.68	0.13
	Fallow Land	11.75	2.28
	Plantations	5.80	1.17
Waste Land			
	Land with/ without scrub	208.62	40.58
Others			
	Built Up Land	26.55	5.17
	Mine Pit	87.44	17.04
	Dump	54.71	10.37
	Dump with plantation	75.20	14.65
	Coal Dump	12.14	2.36
	Haul Roads	21.07	4.11
	Other Roads	7.57	1.48
	Surface Water	3.42	0.67
Total Area		**514.95**	**100.00**

Post-mining:

Sl. No.	Description	LAND USE DETAILS (Ha.)				
		Plantation	water body	Public use	Other uses	Total
1	Top Soil Rehandled area	16.69	-	-		16.69
2	External waste dump	247.04				247.04
3(a)	Excavation (Backfill)	94.31	--	--	--	94.31
(b)	Excavation (Voids only)	-	55.64	--	--	55.64
4	Road	-	-	7.41	-	7.41
5	Built up area / Infrastructure	-	-		4.46	4.46
6	Safe barrier, Roads, Drainage around Quarry & Dumpyard.	89.40				89.4
7	Other uses	-	-	-	--	0
	TOTAL	447.44	55.64	7.41	4.46	514.95

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Dt. 05-10-2017

Core area:

Particulars	Total Land Required	Land Under Possession	Land To be acquired		
			Govt.	Private (Agriculture)	Total
Quarry Area	149.95	142.29	7.66	0.00	7.66
Safe barrier, Roads, Drainage around Quarry & Dumpyard.	106.09	87.56	8.35	10.18	18.53
External dump yard	247.04	223.55	0.00	23.49	23.49
Mine Service Facilities	4.46	4.46	0.00	0.00	0.00
Diversion of Road	7.41	4.86	2.55	0.00	2.55
Total	**514.95**	**462.72**	**18.56**	**33.67**	**52.23**

v. The total geological reserve is 26.30 MT. The mineable reserve are 23.67 MT, extractable reserve is 19.97 MT. The extraction would be 90 %.
vi. The coal grades is G-13. The average Gradient is from 1 in 6.5 to 1 in 7.5. There will be total five seams with thickness ranging from 0.10 to 20.23 m.
vii. The total estimated water requirement is 1415 m3/day. The level of ground water ranges from Pre monsoon (2012): 1.90 m to 11.90 m ; Post Monsoon (2012): 0.10 m to 9.70 m.
viii. The Method of mining would be opencast deploying Shovel/Backhoe-Dumper Technology.
ix. There is one external OB dump covering an area of 247.04 ha having a height upto 60 m with the quantity of 57.858 m3 (B). There is one internal dump covering an area of 94.31 ha having a height upto 30 m with the quantity of 46.242 m3. There is a quarry area of 149.94 ha.
x. The seasonal data for ambient air quality has been documented and all results at all stations are within prescribed limits.
xi. The life of mine is 8 Years.
xii. Transportation: Coal transportation in pit to surface CHP by dumper for 1 km. Surface to Siding by Trucks 3.5 km and Siding to loading by wagon.
xiii. There is R & R involved. There are 1429 PAFs for these production.
xiv. Cost: Total capital cost of the project is Rs. 116.99 Crore. CSR Cost (Rs. 5/- per tonne of
xv. coal.). R&R Cost Rs. 65.38 Crore. Environmental Management Cost is Capital cost – Rs. 4.23 Crore Recurring – Rs. 16.94 per Tonne.
xvi. Water body: Streamlet (Bugga Vagu) flowing adjacent to the mining block on northwesterly is proposed for realignment. (Earlier Proposal only).
xvii. Approvals: Clearance for abstraction of ground water has been obtained vide letter No. 1088/T/SCCL/2006-07 dt 04.08.2007. Revised Mining Plan/ Mine closure plan for requested capacity approved by MOC vide letter No. 13016/20/2005-CA-II dated 15th September, 2015.
xviii. Wildlife issues: There are no national Parks, wildlife sanctuary, biosphere reserves found in the 10 km buffer zone.
xix. Forestry issues: No forest area involved for mining area.
xx. Total afforestation plan shall be implemented covering an area of 447.44 ha at the end of mining. Green Belt over an area of 106.09 ha. Density of tree plantation 2500 trees/ ha of plants. Void in 55.64 ha at a depth of 35 m which is proposed to be converted into water body.
xxi. There are no court cases/violation pending with the project proponent.
xxii. The revised feasibility report of Mine Plans is under circulation with technical committee. This will be sent to Company's Board for approval.

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Dt. 05-10-2017

4. The proposal was earlier considered during the 5th EAC meeting held on 25-26 November, 2013. The Committee had recommended the proposal for grant of EC. However the same was not taken forward due to non submission of the revised mining Plan duly approved by Competent Authority.

5. The EAC, after detailed deliberations on the proposal in its 49th meeting held on 7th -8th January, 2016 has recommended the project for grant of Environmental Clearance. The Ministry of Environment, Forest and Climate Change hereby accords Environmental Clearance to the **Expansion of Jawahar Khani - 5 opencast coal mine project from 2.0 MTPA to 2.50 MTPA in ML area of 514.95 ha Village Sudimalla, Mandal Yellandu, District Khammam (Telangana) of M/s The Singareni Collieries Company Limited** under the provisions of the Environment Impact Assessment Notification, 2006 and subsequent amendments/circulars thereto subject to the compliance of the terms and conditions mentioned below:

A. Specific Conditions:

i. The maximum production from the mine at any given time shall not exceed the limit as prescribed in the Environmental Clearance (EC).
ii. The validity of the EC is for the life of the mine or as specified in the EIA Notification, 2006, whichever is earlier.
iii. The PP will not alter the major channels around the site.
iv. Efforts shall be made to explore the availability of mechanically covered trucks.
v. All statutory permissions/MoU from Sate Government shall be obtained for transportation of coal by road.
vi. Coal transportation in pit by tippers, surface to siding by tippers and siding to loading by pay loaders into rail wagons.
vii. The production shall be within the same Mine Lease area.
viii. The OB shall be completely re-handled at the end of the mining.
ix. Final mine void depth will not be more than 40 m. The void area will be converted into water body. The remaining area will be back filled up to the ground level and covered with about a meter thick top soil and put to use.
x. Garland drains be provided.
xi. Appropriate embankment shall be provided along the side of the river/nallah flowing near or adjacent to the mine.
xii. The land after mining shall be restored for agriculture purpose.
xiii. Mine water should be treated for discharge into the lagoon. The quality of lagoon water shall be regularly monitored and mitigation measures taken.
xiv. The CSR cost should be Rs 5 per tonne of coal produced which should be adjusted as per the annual inflation.
xv. Everybody in the core area should be provided with mask for protection against fugitive dust emissions.
xvi. Dust mask to be provided to every worker in the mining area.
xvii. The supervisory staff should be held personally responsible for ensuring compulsory wearing of dust mask in the core area.
xviii. People working in the core area should be periodically tested for the lung diseases and the cost to be met by PP.
xix. The mining area should be surrounded by green belt having tree cover with thick closed canopy.
xx. The embankment constructed along the river boundary shall be of suitable dimensions and critical patches shall be strengthened by stone pitching on the river front side and stabilised with plantation so as to withstand the peak water flow and prevent mine inundation.
xxi. There shall be no overflow of OB into the river and into the agricultural fields and massive plantation of native species shall be taken up in the area between the river and the project.
xxii. OB shall be stacked at two earmarked external OB dumpsite(s) only. The ultimate slope of the dump shall not exceed 28°. Monitoring and management of existing reclaimed dumpsites shall continue until

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Ref. 34012/01/2015-CPAM
Dt. 05-10-2017

the vegetation becomes self-sustaining. Compliance status shall be submitted to the Ministry of Environment, Forests & Climate Change and its concerned Regional Office on yearly basis.

xxiii. Catch drains and siltation ponds of appropriate size shall be constructed to arrest silt and sediment flows from soil, OB and mineral dumps. The water so collected shall be utilised for watering the mine area, roads, green belt development, etc. The drains shall be regularly desilted and maintained properly. Garland drains (size, gradient and length) and sump capacity shall be designed keeping 50% safety margin over and above the peak sudden rainfall and maximum discharge in the area adjoining the mine site. Sump capacity shall also provide adequate retention period to allow proper settling of silt material.

xxiv. Dimension of the retaining wall at the toe of the dumps and OB benches within the mine to check run-off and siltation shall be based on the rainfall data.

xxv. Crushers at the CHP of adequate capacity for the expansion project shall be operated with high efficiency bag filters, water sprinkling system shall be provided to check fugitive emissions from crushing operations, conveyor system, haulage roads, transfer points, etc.

xxvi. Drills shall be wet operated.

xxvii. The PP shall undertake regular repairing and tarring of roads used for mineral transportation. A 3-tier green belt comprising of a mix of native species shall be developed all along the major approach roads,

xxviii. Controlled blasting shall be practiced with use of delay detonators and only during daytime. The mitigative measures for control of ground vibrations and to arrest the fly rocks and boulders shall be implemented.

xxix. A Progressive afforestation plan shall be implemented covering an area of **447.44 Ha** at the end of mining, which includes reclaimed External OB dump area **(247.04 Ha),** Internal OB dump area **(94.31 Ha)** and Green belt **(106.09 Ha)** and in township located outside the lease by planting native species in consultation with the local DFO/Agriculture Department. The density of the trees shall be around 2500 plants per ha. Massive plantation shall be carried out in open spaces in and around the mine and a 3-tier avenue plantation along the main approach roads to the mine.

xxx. An estimated total **104.10 Mm^3** of OB will be generated during the entire life of the mine. Out of which **57.858 Mm^3** of OB will be dumped in **1** external OB Dumps an earmarked area covering **247.04** Ha of land. **46.242** Mm3 of will be one internal OB dump in covering an area of **94.31** Ha. The maximum height of external OB dump will not exceed **90 m and that for soft OB shall not exceed 60 m.** The maximum slope of the dump shall not exceed 28 degrees. Monitoring and management of reclaimed dump sites shall continue till the vegetation becomes self- sustaining and compliance status shall be submitted to MOEFCC and its Regional Office on yearly basis.

xxxi. The proponent should prepare restoration and reclamation plan for the degraded area. The land be used in a productive and sustainable manner.

xxxii. Compensatory Ecological Restoration of waste land, other degraded land and OB dumps in lieu of breaking open the land be carried out.

xxxiii. The mining should be phased out in sustainable manner. No extra over burden dumps are permitted.

xxxiv. No groundwater shall be used for mining operations.

xxxv. Of the total quarry area of **149.95 Ha,** the backfilled quarry area of **94.31** Ha shall be reclaimed with plantation and a void of **55.64 Ha at a depth of 35 m** is proposed to be converted into a water body shall be gently sloped and the upper benches shall be terraced and stabilised with plantation/afforestation by planting native plant species in consultation with the local DFO/Agriculture Department. The density of the trees shall be around **2500** plants per ha.

xxxvi. Regular monitoring of groundwater level and quality shall be carried out by establishing a network of existing wells and construction of new peizometers. The monitoring for quantity shall be done four times a year in pre-monsoon (May), monsoon (August), post-monsoon (November) and winter (January) seasons and for quality in May. Data thus collected shall be submitted to the Ministry of Environment, Forests & Climate Change and to the Central Pollution Control Board quarterly within one month of monitoring.

xxxvii. The Company shall put up artificial groundwater recharge measures for augmentation of groundwater resource in case monitoring indicates a decline in water table. The project authorities shall meet water requirement of nearby village(s) in case the village wells go dry due to dewatering of mine.

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Dt. 05-10-2017

xxxviii. Sewage treatment plant shall be installed in the existing colony. ETP shall also be provided for workshop and CHP wastewater.

xxxix. Besides carrying out regular periodic health check-up of their workers, 10% of the workers identified from workforce engaged in active mining operations shall be subjected to health check-up for occupational diseases and hearing impairment, if any, through an specialised agency /institution within the District/State and the results reported to this Ministry and to DGMS.

xl. Land oustees shall be compensated as per the norms laid out R&R Policy of CIL or the National R&R Policy or R&R Policy of the State Government whichever is higher.

xli. For monitoring land use pattern and for post mining land use, a time series of land use maps, based on satellite imagery (on a scale of 1: 5000) of the core zone and buffer zone, from the start of the project until end of mine life shall be prepared once in 3 years (for any one particular season which is consistent in the time series), and the report submitted to MOEFCC and its concerned Regional Office

xlii. A detailed Final Mine Closure Plan along with details of Corpus Fund shall be submitted to the Ministry of Environment, Forests & Climate Change within 6 months of grant of Environmental Clearance.

xliii. The project authorities shall in consultation with the Panchayats of the local villages and administration identify socio-economic and welfare measures under CSR to be carried out over the balance life of the mine.

xliv. Corporate Environment Responsibility:

a) The Company shall have a well laid down Environment Policy approved by the Board of Directors.
b) The Environment Policy shall prescribe for standard operating process/procedures to bring into focus any infringements/deviation/violation of the environmental or forest norms/conditions.
c) The hierarchical system or Administrative Order of the company to deal with environmental issues and for ensuring compliance with the environmental clearance conditions shall be furnished.
d) To have proper checks and balances, the Company shall have a well laid down system of reporting of non-compliances/violations of environmental norms to the Board of Directors of the Company and/or shareholders or stakeholders at large.

B. **General Conditions:**

(i) No change in mining technology and scope of working shall be made without prior approval of the Ministry of Environment, Forest & Climate Change.

(ii) No change in the calendar plan of production for quantum of mineral coal shall be made.

(iii) Four ambient air quality monitoring stations shall be established in the core zone as well as in the buffer zone for PM_{10}, $PM_{2.5}$, SO_2 and NOx monitoring. Location of the stations shall be decided based on the meteorological data, topographical features and environmentally and ecologically sensitive targets in consultation with the State Pollution Control Board. Monitoring of heavy metals such as Hg, As, Ni, Cd, Cr, etc carried out at least once in six months.

(iv) Data on ambient air quality (PM_{10}, $PM_{2.5}$, SO_2 and NO_x) and heavy metals such as Hg, As, Ni, Cd, Cr and other monitoring data shall be regularly submitted to the Ministry including its concerned Regional Office and to the State Pollution Control Board and the Central Pollution Control Board once in six months. Random verification of samples through analysis from independent laboratories recognised under the EPA rules, 1986 shall be furnished as part of compliance report.

(v) Adequate measures shall be taken for control of noise levels below 85 dBA in the work environment. Workers engaged in blasting and drilling operations, operation of HEMM, etc shall be provided with ear plugs/muffs.

(vi) Industrial wastewater (workshop and wastewater from the mine) shall be properly collected, treated so as to conform to the standards prescribed under GSR 422 (E) dated 19th May 1993 and 31st December 1993 or as amended from time to time before discharge. Oil and grease trap shall be installed before discharge of workshop effluents.

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Ref. 34012/01/2015-CPAM
Dt 05-10-2017

(vii) Vehicular emissions shall be kept under control and regularly monitored. Vehicles used for transporting the mineral shall be covered with tarpaulins and optimally loaded.
(viii) Monitoring of environmental quality parameters shall be carried out through establishment of adequate number and type of pollution monitoring and analysis equipment in consultation with the State Pollution Control Board and data got analysed through a laboratory recognised under EPA Rules, 1986.
(ix) Personnel working in dusty areas shall wear protective respiratory devices and they shall also be provided with adequate training and information on safety and health aspects.
(x) Occupational health surveillance programme of the workers shall be undertaken periodically to observe any contractions due to exposure to dust and to take corrective measures, if needed and records maintained thereof. The quality of environment due to outsourcing and the health and safety issues of the outsourced manpower should be addressed by the company while outsourcing.
(xi) A separate environmental management cell with suitable qualified personnel shall be set up under the control of a Senior Executive, who will report directly to the Head of the Company.
(xii) The funds earmarked for environmental protection measures shall be kept in separate account and shall not be diverted for other purpose. Year-wise expenditure shall be reported to this Ministry and its concerned Regional Office.
(xiii) The PP shall advertise at least in two local newspapers widely circulated around the project, one of which shall be in the vernacular language of the locality concerned within seven days of the issue of EC letter informing that the project has been accorded environmental clearance and a copy of the EC letter is available with the State Pollution Control Board and may also be seen at the website of the Ministry of Environment, Forests & Climate Change at http://envfor.nic.in.
(xiv) A copy of the EC letter shall be marked to concern Panchayat/Zila Parishad, Municipal Corporation or Urban local body and local NGO, if any, from whom any suggestion/representation has been received while processing the proposal. A copy of the EC letter shall also be displayed on company's website.
(xv) A copy of the EC letter shall be shall also be displayed on the website of the concerned State Pollution Control Board. The EC letter shall also be displayed at the Regional Office, District Industry Sector and Collector's Office/Tehsildar's Office for 30 days.
(xvi) The EC letter shall be uploaded on the company's website. The compliance status of the stipulated EC conditions shall also be uploaded by the project authorities on their website and updated at least once every six months so as to bring the same in public domain. The monitoring data of environmental quality parameter (air, water, noise and soil) and critical pollutant such as PM_{10}, $PM_{2.5}$, SO_2 and NO_x (ambient) and critical sectoral parameters shall also be displayed at the entrance of the project premises and mine office and in corporate office and on company's website.
(xvii) The PP shall submit six monthly compliance reports on status of compliance of the stipulated EC conditions (both in hard copy and in e-mail) to the respective Regional Office of the Ministry, respective Zonal Office s of CPCB and the SPCB.
(xviii) The Regional Office of this Ministry located in the Region shall monitor compliance of the stipulated conditions. The PP shall extend full cooperation to the office(s) of the Regional Office by furnishing the requisite data/ information/monitoring reports.
(xix) The Environmental Statement for each financial year ending 31 March in For –V is mandated to be submitted by the PP for the concerned State Pollution Control Board as prescribed under the Environment (Protection) Rules, 1986, as amended subsequently, shall also be uploaded on the Company's website along with the status of compliance of EC conditions and shall be sent to the respective Regional Offices of the MoEF&CC by e-mail.

6. The PP shall abide by all the commitments and recommendations made in the EIA/EMP report so also during their presentation to the EAC.

7. The commitment made by the project proponent to the issue raised during Public Hearing shall be implemented by the proponent.

SKM

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Dt. 05-10-2017

8. The project proponent shall obtain all necessary clearances/approvals that may be required before the start of the project. The Ministry or any other competent authority may stipulate any further condition for environmental protection.

9. The PP shall set up an Environment Audit cell with responsibility and accountability to ensure implementation of all the EC Conditions.

10. Concealing factual data or submission of false/fabricated data and failure to comply with any of the conditions mentioned above may result in withdrawal of this EC and attract action under the provisions of Environment (Protection) Act, 1986.

11. The above conditions will be enforced inter-alia, under the provisions of the Water (Prevention & Control of Pollution) Act, 1974, the Air (Prevention & Control of Pollution) Act, 1981, the Environment (Protection) Act, 1986 and the Public Liability Insurance Act, 1991 along with their amendments and Rules and any other orders passed by the Hon'ble Supreme Court of India/High Courts and any other Court of Law relating to the subject matter. The PP shall ensure to undertake and provide for the costs incurred for taking up remedial measures in case of soil contamination, contamination of groundwater and surface water, and occupational and other diseases due to the mining operations.

12. Any appeal against this EC shall lie with the National Green Tribunal, if preferred, within a period of 30 days as prescribed under Section 16 of the National Green Tribunal Act, 2010.

13. This EC supersedes the earlier EC letter No. J-11015/358/2006-IA.II (M) dated 18.05.2009.

3/3/2016

(S. K. Srivastava)
Scientist E

Copy to:

1. The Secretary, Ministry of Coal, Shastri Bhawan, New Delhi
2. The Secretary, Department of Environment, Forest & Climate Change, Government of Telangana, Secretariat, Hyderabad
3. The Chief Conservator of Forest, Regional office (SZ), Ministry of Environment, Forest & Climate Change, 4th Floor, F-Wing, Kenriya Sadan Block, Kormangala, Bangalore – 560034
4. The Member Secretary, Telangana State Pollution Control Board, Paryavaran Bhawan, A-3 Industrial Estate, Sanatnagar, Hyderabad – 500038
5. The Member Secretary, Central Pollution Control Board, CBD-cum-Office Complex, East Arjun Nagar, New Delhi -110032
6. The Member-Secretary, Central Ground Water Authority, Ministry of Water Resources, Curzon Road Barracks, A-2, W-3 Kasturba Gandhi Marg, New Delhi
7. District Collector, **Khammam**, Government of Telangana
8. Monitoring File 9. Guard File 10. Record File 11. Notice Board.

3/3/2016

(S. K. Srivastava)
Scientist E

Plan received by me

(SHAIK MADAR)
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DL 05-10-2017

Annexure-15 'A'

Progressive Closure Activities to be taken up at JK - 5 Opencast Mine (3 Years from 2018-19)

		2018-19	2019-20	2020-21
Progressive Closure Activities (Rs.53.859 Cr.)				
a	Water Quality Management (Cost: Rs.3.036 Cr)	Rs.3.036 Cr		
		1.012	1.012	1.012
b	Air Quality Management (Cost Rs.4.710 Cr)	Rs. 4.710 Cr		
		1.570	1.570	1.570
c	Waste Management (4 Mm^3 - Cost Rs. 40 Crores)	4 Mm^3 - Cost Rs. 40 Crores		
		1.34 Mm^3 - 13.40 Cr	1.33 Mm^3 - 13.30 Cr	1.33 Mm^3 - 13.30 Cr
d	Barrbered wire fencing around pit (Cost Rs.0.448 Cr)	Rs. 0.448 Cr		
		0.149	0.149	0.150
e	Top Soil management - (0.932 Mm^3 - Rs. 3.961 Cr)	0.932 Mm^3 - Rs. 3.961 Cr		
		0.250 Mm^3 - 1.062 Cr	0.534 Mm^3 - 2.270 Cr	0.148 Mm^3 - 0.629 Cr
f	Technical & Biological reclamation of mined of land and OB dump (132.09 ha - Rs.0.462 Cr)	132.09 ha - Rs. 0.462 Cr		
		32.20 ha - 0.112 Cr	38.45 ha - 0.135 Cr	61.44 ha - 0.215 Cr
g	Toewall around dump (Cost Rs. 1.114 Cr)	Rs. 1.114 Cr		
		0.038	0.038	0.038
h	Garland drain around Quarry (Cost Rs. 0.067 Cr)	Rs.0.067 Cr		
		0.022	0.022	0.023
i	Garland drain around dump (Cost Rs.0.061 Cr)	Rs.0.061 Cr		
		0.020	0.020	0.021
Total Cost of Progressive Mine Closure Activities		**Rs.53.859 Cr**		

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Ministry of Coal, Govt. of India.
Ref. 34012/01/2015-CPAM
Dt. 05-10-2017

Annexure - 15 'B'

Final Mine Closure Activities to be taken up at JK - 5 Opencast Post Closure Activities (3 Years from 2021-22)

		2021-22	2022-23	2023-24
Post Closure Activities (Rs.14.973 Cr.)				
1) Dismantling of Infrastructure & Disposal/ rehabilitation of Mining machinery (Rs.6.626 Cr)				
a	Dismantling of workshop (Cost: Rs. 1.650 Cr.)	Rs.1.650 Cr.		
		0.55	0.55	0.55
b	Dismantling of office buildings (Cost: Rs. 2.300 Cr.)	Rs. 2.300 Cr.		
		0.766	0.766	0.768
c	Dismantling of CHP (Cost: Rs. 1.440 Cr.)	Rs. 1.440 Cr.		
		0.48	0.48	0.48
d	Dismantaling of pumps & pipes /Other Facilities (Cost Rs. 0.420 Cr.)	Rs. 0.420 Cr.		
		0.140	0.140	0.140
e	Dismentaling Power lines (Cost Rs.0.816 Cr.)	Rs. 0.816 Cr.		
		0.272	0.272	0.272
2) Safety and Security (Rs. 1.106 Cr)				
a	Barbered wire fencing around quarry (Cost: Rs. 0.346 Cr.)	Rs. 0.346 Cr.		
		0.115	0.115	0.116
b	Toe wall around dump (Cost: Rs. 0.684 Cr.)	Rs. 0.684 Cr.		
		0.228	0.228	0.228
c	Garland drain around quary (Cost: Rs. 0.045 Cr.)	Rs. 0.045 Cr.		
		0.015	0.015	0.015
d	Garland drain around dump (Cost: Rs. 0.031 Cr.)	Rs. 0.031 Cr.		
		0.01	0.01	0.011
3) Technical and Biological Reclamation of Mined out of land and OB Dump (Rs.2.435 Cr)				
a	Top Soil Management (0.248 Mm³ - Rs. 1.054 Cr)	0.248 Mm3 - Rs. 1.054 Cr		
		0.085 Mm3 - 0.362 Cr	0.085 Mm3 - 0.362 Cr	0.078 Mm3 - 0.330 Cr
b	* OB Rehandling for Backfilling (0.5 Mm³ - Rs. 1.000 Cr.)	0.5 Mm3 - Rs. 1.000 Cr.		
		0.25 Mm3 - 0.5 Cr	0.25 Mm3 - 0.5 Cr	0.000
c	Terracing, blanketing with soil and vegetation of External OB Dump (33.00 ha - Cost: Rs.0.116 Cr.)	33.00 ha - Cost: Rs.0.116 Cr		
		11.00 ha - 0.0387 Cr	11.00 ha - 0.0387 Cr	11.00 ha - 0.0386 Cr
d	Land scaping & Plantation (75.81 ha - Rs.0.265 Cr)	75.81 ha - Rs. 0.265 Cr		
		25.27 ha - 0.0883	25.27 ha - 0.0883	25.27 ha - 0.0884
4) Post Closure Management and Supervision (Rs. 4.806 Cr)				
a	Power cost (Cost Rs. 1.80 Cr)	Rs.1.80 Cr.		
		0.60	0.60	0.60
b	Post Mining Water Quality Managemebt (Cost Rs. 0.609 Cr)	Rs. 0.609 Cr		
		0.203	0.203	0.203
c	Post Mining Air Quality Managemebt (Cost Rs. 1.017 Cr)	Rs.1.017 Cr		
		0.339	0.339	0.339
d	Man Power Cost & Supervision (Cost Rs.1.380 Cr)	Rs. 1.380 Cr		
		0.46	0.460	0.460
	Total Cost of Post Closure Activities	**14.973 Cr**		

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Ref. 34012/01/2015-CPAM
Dt. 05-10-2017

Annexure - 16

S66020/116/2011/RN1(SCZ)

REGISTERED

भारत सरकार/ Government of India
श्रम एवं रोजगार मंत्रालय
Ministry of Labour & Employment
खान सुरक्षा महानिदेशालय
Directorate General of Mines Safety
Hyderabad क्षेत्र सं 1 / Region no. 1

Phone: +9140 24602507;Fax: +9140 24602504e-mail:ddgms_sz@yahoo.com
गृहकल्पा, ब्लाक–2,एम जे रोद, नामपल्लि, हैदराबाद–500001

No.H1/010085/Perm/ २३५४ हैदराबाद, दिनांक 5/12/11

प्रेषक

खान सुरक्षा निदेशक,
हैदराबाद क्षेत्र–१

सेवा में

अभिकर्ता एवं प्रबंधक,
जवहारखनि पोखरीय खदान,
M/s. सिंगरेनी कालरीज कं. लि.,
PO: येल्लन्दु . 507123,
Dist : खम्मम (AP)

विषय - Permission under Regulation 98(1), 98(3) and 100(1) of the Coal Mines Regulation , 1957 to extend the working permission of Block-E to Block JK 5 of Jawahar Khani Opencast Mine to extract developed and caved pillars of Queen seam by mechanized opencast mining with use of HEMM by using deep hole blasting at JawaharKhani Opencast Mine of M/s. Singareni Collieries Company Limited - reg.

महोदय,

Please refer your letter No.YLD/AGTUG/D2/588 dated 28-11-2011, and subsequent correspondence, plans/sections enclosed therewith on the above subject.

Your proposal has been considered in the light of what has been mentioned in the application under reference and shown on the accompanying plans. In exercise of powers conferred on the Chief Inspector of Mines (also designated as Director-General of Mines Safety) under Regulation 98(1), 98(3) and 100(1) of the Coal Mines Regulations, 1957 and by virtue of authorisation granted to me under section 6(1) of Mines Act, 1952 by the Chief Inspector of Mines (also designated as Director-General of Mines Safety), I, hereby, permit you for removal of overburden and extraction of coal, both blocked in developed pillars and in caved goaf in the block JK 5 of the mine in Queen seam by Mechanized Opencast Mining with the use of Heavy earth machinery by adopting a system of deep hole blasting at Jawahar Khani Opencast Mine of M/s. Singareni Collieries Company Limited in the area enclosed as J1, J2, - - - - J68 and J1 is enclosed in plan (i) Plan No. SCCL/YLD/JKOC/PER.PLAN 98(1)(3)/2011/51A, dated 4.11.2011 (ii) Part Plan No. SCCL/YLD/JKOC/PER.PLAN 98(1)(3)/2011/51 dated 4.11.2011, subject to the following conditions being strictly complied with: -

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(SHAIK MADAR)
Recognised Qualified Person U/R 22(C of Mineral Concession Rules 1960 by Ministry of Coal, Govt. of India
Ref. 34012/01/2015 - CPAM
Dt. 05-10-2017

(i) No blasting shall be done within the danger zone of dwellings or any other permanent buildings or structures of permanent nature not belonging to owner except with the prior permission in writing from this directorate.

(ii) All other conditions specified in the permission letter No.H1/010085/Perm/152 dated 12/1/2009 shall be fully complied with.

2.0 This permission is subject to the following additional conditions:

2.1 In the event of any change in the circumstances connected with this permission, which is likely to endanger the life of workmen employed in the mine or endanger the mine, the mining operations for which this permission has been granted shall be stopped forthwith and intimation thereof shall be sent to this Directorate. The said mining operations shall not be resumed without an express and fresh permission in writing.

2.2 This permission is being issued specifically under the regulations mentioned above, and without prejudice to any other provisions of law, which may be or may become applicable at any time.

2.3 If at any time any of the conditions subject to which this permission is granted is violated or not complied with, this permission shall be deemed to have been revoked with immediate effect. The above permission may be amended or withdrawn at any time, if considered necessary in the interest of safety.

2.4 This Directorate shall be informed as soon as the mining operations are commenced in accordance with the above permission and intimation about completion of the mining operations should also be sent promptly and in any case not later than one month thereof.

भवदीय,

(पी- रंगनाथीश्वर)
खान सुरक्षा निदेशक,
हैदराबाद क्षेत्र-1

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(SHAIK MADAR)
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Ref. 34012/01/2015 - CPAM
Dt. 05-10-2017

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भारत सरकार / Government of India
श्रम एवं रोजगार मंत्रालय
Ministry of Labour & Employment
खान सुरक्षा महानिदेशालय
Directorate General of Mines Safety
Hyderabad क्षेत्र सं I / Region no. 1
गड्डाकल्ला, ब्लाक–2,एम जे रोड, नामपल्ली, हैदराबाद–500001
Phone: +9140 24602507; Fax: +9140 24602504; e-mail: ddgms_sz@yahoo.com

संख्या H1/Perm/ 202 हैदराबाद, दिनांक 7/2/ 2018.

प्रेषक,

खान सुरक्षा निदेशक,
हैदराबाद क्षेत्र–I
हैदराबाद–500001 I

सेवा में

अधिकर्ता,
जवाहरखनि पोखरीय खदान,
M/s. सिंगरेनी कालरीज कं. लि.,
PO: येल्लान्दु - 507123,
Dist : खम्मम (AP)

विषय:- Permission under Regulation 170 (1A &1B) of the Coal Mines Regulations, 1957, for conducting controlled blasting within 300m distance but beyond 70m distance of Public road and buildings and structures not belonging to Owner at Jawaharkhani Opencast Mine, Yellandu Area of M/s Singareni Collieries Co. Limited.

Respected Sir,

Please refer to your letter No. YLD/AGTUG/D2/390 dated 08.11.2012 and plans/sections enclosed therewith on the above subject.

The matter has since been examined in the light of the particulars given and information furnished by you. In exercise of the powers conferred on the Chief Inspector of Mines (also designated as Director-General of Mines Safety) under the provisions of Regulation 170 (1A & 1B) of the Coal Mines Regulations, 1957 and by virtue of the authorisation granted to me by the Chief Inspector of Mines (also designated as Director-General of Mines Safety) under Section 6(1) of the Mines Act, 1952. I, hereby permit to conduct regular deep hole controlled blasting under the provision of Regulation 170 (1A & 1B) of the Coal Mines Regulations, 1957, within 300m but beyond 70m distance from the public road and dwellings (residential Area) not belonging to the owner at Jawahar Khani Opencast Mine of M/s. Singareni Collieries, subject to the following conditions being strictly complied with:

1.0 The maximum charge per delay with respect to the distance from blast site to the public road and dwellings (residential Area) not belonging to the owner at Jawahar Khani Opencast Mine of M/s. Singareni Collieries, to maintain ground vibrations not exceeding peak particle velocity of 10mm/sec. shall be complied as follows:

..2

AGT UGM
IW No 62
DATE 11/12

Plan Prepared by me
(SHAIK MADAR)
Recognised Qualified Person U/R 22(C of Mineral Concession Rules 1960 by Ministry of Coal, Govt. of India.
Ref. 34012/01/2015 - CPAM
Dt. 05-10-2017

Distance from blasting to site public road and dwellings not belonging to the owner	Maximum. charge/delay, in kgs.	Total charge per blast in Kgs
70	30.1	722.4
80	20.1	400.1
105	25.1	828.3
125	26.1	861.3
160	27.1	936.0

2.0 All the other conditions specified vide this directorate's permission Letter No. H1/010085/Perm/2004/483 dated 28.2.2005, shall remain unchanged and shall be strictly complied with.

3.0 Please note that, this permission is subject to the following additional conditions:

3.1 In the event of any change in the circumstances likely to affect the safety of persons and stability of the structure, this permission shall be deemed to have been withdrawn.

3.2 If any condition subject to which this permission has been granted is violated or not complied with, this permission shall be deemed to have been revoked with immediate effect.

3.3 The above permission may be amended or withdrawn at any time, if considered necessary in the interest of safety.

3.4 This permission is being issued specifically under the provisions of regulations mentioned above without prejudice to any other provisions of law, which may be or may become applicable at any time.

भ व दी य.

(पी.रामनारायणेश्वर)
खान सुरक्षा निदेशक,
हैदराबाद क्षेत्र-I

Plan Prepared by me

(SHAIK MADAR)
Recognised Qualified Person U/R 22(C of Mineral Concession Rules 1960 by Ministry of Coal. Govt. of India.
Ref. 34012/01/2015 - CPAM
Dt. 05-10-2017

GOVERNMENT OF INDIA
श्रम एवं रोजगार मंत्रालय
Ministry of Labour & Employment
खान सुरक्षा महानिदेशालय
Directorate General of Mines Safety
Hyderabad क्षेत्र सं 1 / Region no. 1

REGISTERED
S 66020/132/2012-RN1(SCZ)

गगनविहार, ब्लाक–2,एम जे रोड, नामपल्लि, हैदराबाद–500001

Phone: +9140 24602507 ,Fax: +9140 24602504 e-mail:ddgms_sz@yahoo.com

संख्या.H1/Perm/010085/2013/ 281 हैदराबाद, दिनांक 7|2| 2013.

प्रेषक,
खान सुरक्षा निदेशक,
हैदराबाद क्षेत्र–1

सेवा में
अभिकर्ता,
जवहारखनि ओपनकास्ट खदान,
M/s. सिंगरेनी कालरीज कं. लि.,
PO: येल्लन्दु - 507123,
Dist : खम्मम (AP)

विषय:- Permission under regulation 161(1) and 168(5) of the Coal Mines Regulations, 1957 for regular use of Site Mixed Emulsion Explosives (SME) at Jawaharkhani Opencast mine of M/s SCC Ltd – reg.

महोदय,

Please refer to your letters No. YLD/AGTU/D-2 /391 dated 08.11.2012 on the above subject.

The matter has been considered in the light of what has been stated in your application under reference. By virtue of the powers conferred on the Chief Inspector of Mines (also designated as Director-General of Mines Safety) under Regulation 161(1) & 168(5) of the Coal Mines Regulations, 1957, and the authorisation granted to me by the Chief Inspector of Mines (also designated as Director-General of Mines Safety) under section 6(1) of Mines Act 1952, I hereby permit you for regular use of Site Mixed Emulsion Explosives, at Jawaharkhani Opencast mine of M/s Singareni Collieries Co.Ltd, , subject to the strict compliance of the following conditions:

1.(a) The operations of making Site Mixed Slurry/Emulsion, Loading, Charging and firing of shot holes shall be carried out under the supervision of Technical Service Engineer of SMS Explosive manufacturer.

(b) The mine management shall frame a suitable code of practice to be observed by the blasting crew for handling the SMS/SME in consultation of the explosive manufacturer. A copy of the same shall be submitted to this Directorate for record. Sample copy is enclosed at ANNEXUE – I.

2.0 All conditions stipulated by the Chief Controller of Explosives issued concern license to the Ideal Explosives for SMS/SME regarding manufacturing storage, transportation and handling shall be strictly followed.

3.0. General precautions and normal rules regarding handling, transportation and use of explosive shall be observed by the blasting crew.

4.0 (a) Pump truck carrying premix/constituents of slurry explosives shall be of approved by the Chief Controller of Explosives and shall be in a safe operating condition and should be driven by competent licensed drivers.

(b) The pump truck shall be kept in isolated location while loaded.

AGT. 2GM	
Reg No.	67
Date	12/2

Plan Prepared by me

(SHAIK MADAR)
Recognised Qualified Person U/R 22(C
of Mineral Concession Rules 1960 by
Ministry of Coal, Govt. of India
Ref. 3/012/01/2015 - CPAM
Dt. ... 2017

(c) No smoking and no open flames shall be permitted within 60 metres of the pump truck.

(d) The area surrounding the pump truck not less than 10 metres in all directions shall be kept free of rubbish, dry leaves or other materials of combustible nature.

5.0(a) Only necessary minimum number of persons shall be allowed during charging and firing of shot holes.

(b) Due care shall be taken to ensure that the explosive is pumped only into proper drilled shot holes and that there is no spillage of explosives.

(c) Charging of explosives shall be done in such a manner so as to ensure continuity of the explosive column in each shot hole. Where deck charging is done, continuity shall be ensured for each deck of explosive charge.

(d) The hose used for loading the SMS/SME shall have antistatic properties and shall have a diameter less than the critical diameter for that particular explosive so that the mixture remains non-explosive while loading.

(e) The BMD vehicle shall also be properly earthed with chain link while loading.

(f) The charging and firing of the holes shall be carried out in day light hours only.

(g) The area of the loaded holes shall be conspicuously marked by visible bright red flags during day light hours and by fluorescent signs during night hours and the entry into the area shall be effectively cordoned off to prevent inadvertent and unauthorized entry.

(h) Proper record shall be maintained of the quantity/ratio of each ingredient in the mixture density of the mixture, quantity of explosive in shot hole and the quantity of charge in each round of blast, giving therein the plane of firing, type of strata, fragmentation obtained, distance of the fly rock, ground vibration and the quantity of overburden/coal broken. The record shall be signed by a competent persons possessing managers certificate appointed for the purpose and then technical services engineer of the manufacture supervising the operation. The record shall be countersigned by the manager of the mine.

6.0 The explosive charges shall not be allowed to sleep over in shot holes unless express permission in writing to that effect has been obtained from this Directorate.

7.0 Adequate amount of cast booster shall be used with non-cap sensitive explosive charge to ensure complete detonation of the explosive charge.

8.0 Primer explosive cartridges shall not be split or deformed.

9.0 No site mixed slurry or emulsion explosive shall be used in any shot holes in which water is encountered, unless prior permission is obtained in writing from this Directorate, specifying the proposed precautions and the proposed composition and density of the explosive.

10.0 Before entering the area after the blast, the Shot firer and other personnel shall ensure that the place is free from any fume and dust and safe in all respect.

11.0 In case of misfires, precautions as laid down in Regulation 177 of the Coal Mines Regulations, 1957, shall be followed.

12.0 Precautions laid down in DG's (Tech) Circular No.2 of 1985 & 2 of 1990 shall be complied with in case of hot strata condition, so, however that no blasting shall be done in fire area/hot holes unless prior permission has been obtained in writing from this Directorate.

Plan Prepared by me

(SHAIK MADAR)
Recognised Qualified Person U/R 22(C
of Mineral Concession Rules 1960 by
Ministry of Coal, Govt. of India.
Ref. 34012/01/2015 - CPAM
Dt. 05-10-2017

13.0 In case of any dangerous situation arises out of the use of the above explosive at any time, further use of the same shall be stopped forthwith and this Directorate shall be informed immediately. Further use shall not be started till a written approval is obtained form this Office.

14.0 The entire operation of transportation of the explosives to the site of its use, charging and blasting shall be placed under the charge of a person possessing manager's certificate of competency and duly appointed and authorized for the purpose in writing by the manager.

15.0 The mine management and the manufacturer shall prepare a scheme of training covering all aspects of operations involved in SMS blasting method. The persons engaged in the SMS operation shall be trained as per the scheme at regular interval.

16.0 This permission is valid for a period of 5 Years (FIVE YEARS) from the date of issue of this letter.

17.0 This permission is being issued under regulation 161(1) and 168(5) of the Coal Mines Regulations, 1957 only and without prejudice to any other provision of law which may be or may become applicable at any time.

18.0 This permission deemed to have been revoked with immediate effect if at any time any one of the conditions, subject to which this permission is granted, is not complied with or violated.

19.0 The permission may be amended or withdrawn at any time, if considered necessary. In the interest of safety and issued with out prejudices to any other provisions of law, which may be or may become applicable at any time.

भ व दी य,

...7/7/13

(पी रंगनायीश्वर)
खान सुरक्षा निदेशक,
हैदराबाद क्षेत्र–1

Plan Prepared by me

(SHAIK MADAR)
Recognised Qualified Person U/R 22(C
of Mineral Concession Rules 1960 by
Ministry of Coal, Govt. of India.
Ref. 34012/01/2015 - CPAM
Dt. 05-10-2017

Enclosure to permission letter No. 267 Dated 7/2/17

Perm. granted under Regulation 161(1) and 168(5) of the Coal Mines Regulations, 1957 for regular use of Site Mixed Emulsion Explosives (SME) at Jawahatkhani Opencast Mine of M/s SCCL.

Annexure - I

CODE OF PRACTICE FOR HANDLING SMS/SME

1.0 OPERATION OF DELIVERY SYSTEMS (STRAIGHT TYPE)

1.1 Collect Gate Pass and other relevant documents from the Sales Engineer or other concerned person and take the Delivery system to the specified location for weighment.

1.2 Get the weighment (as the case may be) done by appropriate Mines Authority, collect the relevant slip/documents and drive the BDS to the charging site.

1.3 Collect the loading sheet from the Sales Engineer and ensure that every bore-hole is marked with distinct number and have been primed already.

1.4 Ensure that individual bore-holes as mentioned in the loading sheet are properly prime, if not bring it to the notice of Sales Engineer and get it primed.

1.5 Park the BDS near the bore-hole and earth the system with the chain link provided.

1.6 Keep Density Test Kit, for checking density of the finished product, ready and handy.

1.7 Helmet MUST be worn in Mines area and use PVS gloves and goggles for handling premix.

2.0 CHARGING THE BORE-HOLES IN THE MINES

2.1 Part the BDS near the first borehole. Ensure that earthling chain link touches the ground.

2.2 Ensure that the coupling of the drive of the Explosive Pump is suitably guarded.

2.3 Open Hydraulic Tank Valve.

2.4 Start Engine.

2.5 Engage the PTO (Power Take Off).

2.6 Set the engine acceleration to 1200 rpm as indicated in the appropriate indicator on the dashboard.

2.7 Energize the panel by switching it ON.

2.8 Start the Hydraulic pump check and ensure that all the motors are functioning properly.

2.9 Open the premix tank outlet valve.

2.10 Lower the delivery hose and make sure it reaches the bottom of the hole. Lift the hose by about 1m from bottom and allow the hose to hang.

2.11 Build up pressure in the Gassing Agent solution tank and open the valve to check [illegible] that the Gassing agent Rotameter is working properly.

Plan Prepared by me

(SHAIK MADAR)
Recognised Qualified Person U/R 22(C) of Mineral Concession Rules 1960 by Ministry of Coal, Govt. of India.
Ref. 34012/01/2015 - CPAM
Dt. 05-10-2017

2.13 Set FCVs of different drives with respect of Product delivery rate as per chart available at site.

2.14 Put switch on "auto" mode. Check the counter setting to "zero" and then set the counter as per loading sheet.

2.15 As soon as the Sales Engineer gives clearance, start charging by switching ON the appropriate button on the panel, which will start Product Pump and Water Lubrication Pump, simultaneously open the Gassing Agent injection valve and Water Lubrication valve.

2.16 Monitor the pumping pressure 6 to 10 Kg/cm^2, by controlling flow of lubricating water.

2.17 Fine tune the dose of Gassing Agent (GA) by adjusting the GA control valve to get the desired flow (0.8 lt./min for 100 Kg/min delivery rate – indicative figure) in the Rota meter and ensure the following while charging is in progress:

(a) GA flow constant at the desired level.
(b) Lifting the hose to commence ONLY after one minute of product charging the rate of lifting/retrieval NOT to exceed 2 to 3m per minute.
(c) ¼ m of the end hose remains immersed in the explosive column during charging.
(d) The speed of hose lifting should never be increased unless the end of the hose is completely detached from the explosive column.

2.18 In "auto" mode the charging will stop as soon as the countering mechanism reaches the setting made earlier.

2.19 Check the level of the explosive column in the borehole by dip and charge more quantity, if asked by the Sales Staff.

2.20 Take out the delivery hose take sample from the deliver house (finished product) for checking "Cup Density" for adjustment of dose of GA in subsequent bore-holes "Cup Density" should be maintained at 1.00 ± 0.15 gm/ml for dry holes and 1.15 ± 0.05 gm/ml for wet holes.

2.21 If the drop in Cup Density with time (25 to 35 minutes – indicative figure) is as desired then proceed to the next borehole. Repeat all the operations 2.2, 2.7, 2.8, 2.10 & 2.11) till charging of all the boreholes is completed.

2.22 If the drop in Cup Density with time is not as required, then adjust GA dosing level to achieve desired cup density and repeat as above. Even after adjusting the GA dosing if final cup density is not achieved within range, check and repair the hardware.

3.0 CONCLUDING JOBS

3.1 Flush the delivery hose with compressed air, after completion of charging operation for the day.
3.2 Shut off the premix tank outlet valve and GA tank outlet valve etc. Clean the PC pumps finally with water to clear all premix, flush the system with compressed air again.
3.3 Ensure that all spilled emulsion and left over samples of finished are either charged into a borehole before stemming or bagged to bring back to the site.
3.4 Load all safety appliances, test kit tools, tape etc. back in the trunk.
3.5 Disengage the PTO and stop the hydraulic pump, oil system, valves, etc.
3.6 Take (with the permission of the Sales Staff) the delivery system to the Weigh Bridge; take weight, record and return back to the site. Park it at its designated place.
3.7 Clean the vehicle, equipment with moistened cloth.
3.8 Inform the site in-charge of any special cleaning, repairs to be done.
3.9 Fill all appropriate documents and hand them over to the site in-charge of [illegible]

Plan Prepared by me

(SHAIK MADAR)
Recognised Qualified Person U/R 22(C of Mineral Concession Rules 1960 by Ministry of Coal, Govt. of India.
Ref. 34012/01/2015 - CPAM
Dt. 05-10-2017

4.0 OPERATION OF EMULSION (PROGRESSIVE CAVITY/RATO) PUMP

4.1 NEVER run the pump DRY (when there is no flow of material into the suction line, indication will be drop and fluctuation in pressure) or DEADHEAD (When there is no flow due to blockage in the delivery line).

4.2 PREVENT ingress of foreign material into the pump, keep the hopper on the suction side of the pump covered all the time.

4.3 NEVER bypass, defeat or alter the set valves of the trips provided on the delivery line of pump, without proper authorization.

4.4 NEVER blank off the line after the Bursting disc. It defeats the safety device DO NOT carry out any modification without authorization.

भवदीय,

7/2/17

(पी रंगनाथीश्वर)
खान सुरक्षा निदेशक,
हैदराबाद क्षेत्र-I

Plan Prepared by me

(SHAIK MADAR)
Recognised Qualified Person U/R 22(C
of Mineral Concession Rules 1960 by
Ministry of Coal, Govt. of India
Ref. 34012/01/2015 - CPAM
Dt. 05-10-2017

GOVERNMENT OF INDIA
श्रम एवं रोजगार मंत्रालय
Ministry of Labour & Employment
खान सुरक्षा महानिदेशालय
Directorate General of Mines Safety
Hyderabad क्षेत्र सं I / Region no. 1

गगनकल्पा; ब्लाक–2,एम जे रोड, नागपल्लि, हैदराबाद–500001

Phone: +9140 24602507 Fax: +9140 24602504 e-mail:ddgms_sz@yahoo.com

REGISTERED
S 66020/132/2012-RN1(SCZ)

संख्या:III/Perm/010085/2013/ २८९ हैदराबाद, दिनांक 7/2/ 2013.

प्रेषक,

खान सुरक्षा निदेशक,
हैदराबाद क्षेत्र–1

सेवा में

अभिकर्ता,
जवाहारखनि पोखरीय खदान,
M/s. सिंगरेनी कालरीज कं. लि.,
PO: येल्लन्दु - 507123,
Dist : खम्मम (AP)

विषय:- Permission under regulation 161(1) and 168(5) of the Coal Mines Regulations, 1957 for regular use of Site Mixed Emulsion Explosives (SME) at Jawaharkhani Opencast mine of M/s SCC Ltd – reg.

महोदय,

Please refer to your letters No- YLD/AGTU/D-2 /391 dated 08.11.2012 on the above subject.

The matter has been considered in the light of what has been stated in your application under reference. By virtue of the powers conferred on the Chief Inspector of Mines (also designated as Director-General of Mines Safety) under Regulation 161(1) & 168(5) of the Coal Mines Regulations, 1957, and the authorisation granted to me by the Chief Inspector of Mines (also designated as Director-General of Mines Safety) under section 6(1) of Mines Act 1952, I hereby permit you for regular use of Site Mixed Emulsion Explosives, at Jawaharkhani Opencast mine of M/s Singareni Collieries Co.Ltd, , subject to the strict compliance of the following conditions:

1.(a) The operations of making Site Mixed Slurry/Emulsion, Loading, Charging and firing of shot holes shall be carried out under the supervision of Technical Service Engineer of SMS Explosive manufacturer.

(b) The mine management shall frame a suitable code of practice to be observed by the blasting crew for handling the SMS/SME in consultation of the explosive manufacturer. A copy of the same shall be submitted to this Directorate for record. Sample copy is enclosed at ANNEXUE – I.

2.0 All conditions stipulated by the Chief Controller of Explosives issued concern license to the Ideal Explosives for SMS/SME regarding manufacturing storage, transportation and handling shall be strictly followed.

3.0. General precautions and normal rules regarding handling, transportation and use of explosive shall be observed by the blasting crew.

(a) Pump truck carrying premix/constituents of slurry explosives shall be of approved by the Chief Controller of Explosives and shall be in a safe operating condition and should be driven by competent licensed drivers.

(b) The pump truck shall be kept in isolated location while loaded.

JK OC / YLD
I.W.No.: 158
DATE: 6/2/13

Plan Prepared by me

(SHAIK MADAR)
Recognised Qualified Person U/R 22(C)
of Mineral Concession Rules 1960 by
Ministry of Coal, Govt. of India.
Ref. 34012/01/2015 - CPAM
Dt. 05-10-2017

(c) No smoking and no open flames shall be permitted within 60 metres of the pump truck.

(d) The area surrounding the pump truck not less than 10 metres in all directions shall be kept free of rubbish, dry leaves or other materials of combustible nature.

5.0(a) Only necessary minimum number of persons shall be allowed during charging and firing of shot holes.

(b) Due care shall be taken to ensure that the explosive is pumped only into proper drilled shot holes and that there is no spillage of explosives.

(c) Charging of explosives shall be done in such a manner so as to ensure continuity of the explosive column in each shot hole. Where deck charging is done, continuity shall be ensured for each deck of explosive charge.

(d) The hose used for loading the SMS/SME shall have antistatic properties and shall have a diameter less than the critical diameter for that particular explosive so that the mixture remains non-explosive while loading.

(e) The BMD vehicle shall also be properly earthed with chain link while loading.

(f) The charging and firing of the holes shall be carried out in day light hours only.

(g) The area of the loaded holes shall be conspicuously marked by visible bright red flags during day light hours and by fluorescent signs during night hours and the entry into the area shall be effectively cordoned off to prevent inadvertent and unauthorized entry.

(h) Proper record shall be maintained of the quantity/ratio of each ingredient in the mixture density of the mixture, quantity of explosive in shot hole and the quantity of charge in each round of blast, giving therein the place of firing, type of strata, fragmentation obtained, distance of the fly rock, ground vibration and the quantity of overburden/coal broken. The record shall be signed by a competent persons possessing managers certificate appointed for the purpose and then technical services engineer of the manufacture supervising the operation. The record shall be countersigned by the manager of the mine.

6.0 The explosive charges shall not be allowed to sleep over in shot holes unless express permission in writing to that effect has been obtained from this Directorate.

7.0 Adequate amount of cast booster shall be used with non-cap sensitive explosive charge to ensure complete detonation of the explosive charge.

8.0 Primer explosive cartridges shall not be split or deformed.

9.0 No site mixed slurry or emulsion explosive shall be used in any shot holes in which water is encountered, unless prior permission is obtained in writing from this Directorate, specifying the proposed precautions and the proposed composition and density of the explosive.

10.0 Before entering the area after the blast, the Shot firer and other personnel shall ensure that the place is free from any fume and dust and safe in all respect.

11.0 In case of misfires, precautions as laid down in Regulation 177 of the Coal Mines Regulations, 1957, shall be followed.

12.0 Precautions laid down in DG's (Tech) Circular No.2 of 1985 & 2 of 1990 shall be complied with in case of hot strata condition, so, however that no blasting shall be done in fire area/hot holes unless prior permission has been obtained in writing from this Directorate.

Plan Prepared by me

(SHAIK MADAR)
Recognised Qualified Person U/R 22(C of Mineral Concession Rules 1960 by Ministry of Coal. Govt. of India.
Ref. 34012/01/2015 - CPAM
Dt. 05-10-2017

13.0 In case of any dangerous situation arises out of the use of the above explosive at any time, further use of the same shall be stopped forthwith and this Directorate shall be informed immediately. Further use shall not be started till a written approval is obtained form this Office.

14.0 The entire operation of transportation of the explosives to the site of its use, charging and blasting shall be placed under the charge of a person possessing manager's certificate of competency and duly appointed and authorized for the purpose in writing by the manager.

15.0 The mine management and the manufacturer shall prepare a scheme of training covering all aspects of operations involved in SMS blasting method. The persons engaged in the SMS operation shall be trained as per the scheme at regular interval.

16.0 This permission is valid for a period of **5 Years (FIVE YEARS)** from the date of issue of this letter.

17.0 This permission is being issued under regulation 161(1) and 168(5) of the Coal Mines Regulations, 1957 only and without prejudice to any other provision of law which may be or may become applicable at any time.

18.0 This permission deemed to have been revoked with immediate effect if at any time any one of the conditions, subject to which this permission is granted, is not complied with or violated.

19.0 The permission may be amended or withdrawn at any time, if considered necessary. In the interest of safety and issued with out prejudices to any other provisions of law, which may be or may become applicable at any time.

भ व दी य,
Sd/- (पी रंगनाथीश्वर)
खान सुरक्षा निदेशक,
हैदराबाद क्षेत्र–1

आ सं/SMS/Perm/010085/2013/ २१८० हैदराबाद, दिनांक ११/२/2013.

प्रतिलिपि आवश्यक कार्यवाही एवं सूचना प्रेषित :

1 श्री पी. रमेश कुमार, निदेशक (प्रचालन) एवं नामांकित मालिक, सिंगरेनी कालरीज कं. लि., पो.आ. कोथागुडेम कालरीज–507101, खम्मम जिल्ला ।

2 महाप्रबंधक एवं अभिकर्ता, येल्लन्दु क्षेत्र, सिंगरेनी कालरीज कंपनी लिए, पोष आफ येल्लन्दु – 507124 खम्मम जिला ।

प्रबंधक, जवहारखानि पोवरिया खदान, सिं. कॉ. कं लि, पो आ येल्लन्द–507124, खम्मम जिला ।

(पी. रंगनाथीश्वर)
खान सुरक्षा निदेशक,
हैदराबाद क्षेत्र–1

Plan Prepared by me

(SHAIK MADAR)
Recognised Qualified Person U/R 22(C of Mineral Concession Rules 1960 by Ministry of Coal. Govt. of India,
Ref 34012/01/2015 - CPAM
DL 05-10-2017

Annexure - 17
Annexure 17

THE SINGARENI COLLIERIES COMPANY LIMITED
(A Government Company)

Date: 31.08.2018.

DISTRICT WISE LIST OF MINING LEASES FOR COAL HELD BY SCCL.

Sl. No.	Name of the lease	Area	Date of execution	Lease area Ha.	Period	From	To
A) BHADRADRI KOTHAGUDEM DISTRICT:-							
1	2nd Renewal of Kothagudem M.L. G.O.Ms.No.324, dt.12.12.2008.	Kothagudem	04.03.2009	5158.00. (1466 Ha. RF) @	20 years	27.04.2009	26.04.2029
2	1st Renewal of G.K OCP (Ph-I) ML, G.O.Ms.No.211, dt.08.08.2008.	Kothagudem	20.01.2009	261.31 @@	27 years	19.09.2007	18.09.2034
3	1st Renewal of Yellandu Addl.M.L. G.O.Ms. No. 278, dt.23.10.2007.	Yellandu	26.02.2008	1741.00. @	20 years	15.04.2004	14.04.2024
4	3rd Renewal of Yellandu M L G.O.Ms.No.5 dt.06.02.2015.	Yellandu	01.08.2015	524.96 @	20 years	01.01.2015	31.12.2034
5	Koyagudem OCP-I (Phase-I) ML, G.O Ms. No. 171, dt.22.04.2002.	Yellandu	21.05.2002	247.00 @	30 years	14.05.2001	13.05.2031
6	Koyagudem OCP-II (Phase-I) ML, G.O. Ms. No.254, dt.21.09.2007.	Yellandu	26.02.2008	231.94 @@	20 years	26.02.2008	25.02.2028
7	Koyagudem OCP-II (Phase-II) ML G.O.Ms. No.23, dt.31.07.2015.	Yellandu	13.10.2015	446.10 @@	20 Years	13.10.2015	12.10.2035
8	1st Renewal of Manuguru M.L G.O. Ms. No.217, dt.12.08.2008.	Manuguru	20.01.2009	2186.00. @	30 years	23.07.2005	22.07.2035
9	1st Renewal of Manuguru Extn. Addl. M.L., G.O. Ms. No. 259, dt.23.09.2008.	Manuguru	31.01.2009	125.90 @@	20 years	10.04.2007	09.04.2027
10	OC-II, MNG (Ph-III Balance), G.O. Ms. No. 63, dt.06.03.1999.	Manuguru	05.08.1999	198.22. @@	30 years	05.08.1999	04.08.2029
11	OCP-III, MNG G.O. Ms. No. 91, dt.24.03.2005.	Manuguru	30.05.2005	75.00 @@	20 years	30.05.2005	29.05.2025
12	Manuguru OCP-II Expn. GO Ms. No. 238, dt 27.08.2008	Manuguru	22.11.2008	175.69 @@	20 years	22.11.2008	21.11.2028
13	Kondapuram ML G.O Ms. No. 107, dt.12.10.2010.	Manuguru	14.12.2010	477.03 @@	21 years	14.12.2010	13.12.2031

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Ref. 34012/01/2015 - CPAM
Dt. 05-10-2017

Sl. No.	Name of the lease	Area	Date of execution	Lease area Ha.	Period	From	To
14	Addl. Mining Lease for MNG OCP. G.O Ms. No.6, dt.06.02.2015	Manuguru	16.04.2015	373.90 @@@	20 years	16.04.2015	15.04.2035
15	Manuguru OCP-IV Extn. M L. GO Ms. No.13,dt.18.05.2016	Manuguru	14.07.2016	384.31 @	30 years	14.07.2016	13.07.2046
B) KHAMMAM DISTRICT:-							
16	JVR OCP-I ML. G.O.Ms. No. 51, dt.21.02.2005.	Kothagudem	23.03.2005	383.05 @	20 years	23.03.2005	22.03.2025
17	JVR OCP-I Expn. ML GO.Ms.No.115, dt.13.05.2008.	Kothagudem	10.11.2008	136.50 @@	20 years	10.11.2008	09.11.2028
18	JVR OCP-II ML G.O.Ms. No.29, dt.03.11.2016.	Kothagudem	14.02.2017	1300.69 @	30 Years	14.02.2017	13.02.2047
C) Pro. JAYASHANKAR BHOOPALPALLI DISTRICT:-							
19	1st Renewal of Bhoopalapalli ML G.O. Ms. No. 14, dt.09.03.2010.	Bhoopalpalli	28.08.2010	2792.00 @@@	20 years	04.08.2009	03.08.2029
20	Peddapur Block-I Extn. (North) ML G.O. Ms. No. 455, dt.26.12.1998.	Bhoopalpalli	26.05.1999	330.00 @@@	30 years	26.05.1999	25.05.2029
21	Peddapur ML. G.O.Ms.No.114, dt.19.04.1999.	Bhoopalpalli	22.09.1999	955.00 @@@	30 years	22.09.1999	21.09.2029
22	KTK 5 & 5A Inc. ML. G.O. Ms. No. 155, dt.26.05.2003	Bhoopalpalli	02.09.2003	144.00 @@	30 years	02.09.2003	01.09.2033
23	KTK 1 & 1A Inc. ML. G.O. Ms. No. 194, dt.01.07.2003.	Bhoopalpalli	02.09.2003	235.00 @@	30 years	02.09.2003	01.09.2033
24	KTK 9 & 9A Inc. ML G.O. Ms. No. 151, dt.29.05.2006.	Bhoopalpalli	24.11.2006	616.38 @	20 years	24.11.2006	23.11.2026
25	Dip side of Peddapur Extn. Block-I(N) ML. GO. Ms. No.146, dt.19.06.2009	Bhoopalpalli	17.09.2009	376.10 @@@	30 years	17.09.2009	16.09.2039
26	KTK-I Extension ML GO Ms.No.23, dt.21.06.2016	Bhoopalpalli	06.09.2016	128.77 @	30 years	06.09.2016	05.09.2046
D) PEDDAPALLI DISTRICT:-							
27	1st Renewal of South Godavari Addl. ML. G.O. Ms. No. 201, dt.31.07.2008.	Ramagundam	12.11.2008	1554.00 @@@	20 years	17.09.2005	16.09.2025
28	3rd renewal of South Godavari G.O. Ms. No. 2, dt.12.01.2015.	Ramagundam	26.03.2015	6848.00 (276.40 Protected Forest) @	20years	01.01.2015	31.12.2034
29	Pandulapalli M.L. G.O. Ms. No. 25, dt.21.01.1991.	Ramagundam	19.07.1991	4877.00 (136.00 Protected Forest)@	30 years	19.07.1991	18.07.2021

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Sl. No.	Name of the lease	Area	Date of execution	Lease area Ha.	Period	From	To
30	Medipalli M.L. G.O. Ms. No.210, dt.20.06.1991.	Ramagundam	10.12.1991	1643.00 @@@	30 years	10.12.1991	09.12.2021
E) MANCHERIAL DISTRICT:-							
31	Chennur M.L. G.O. Ms. No.415, dt.25.08.1989.	Srirampur	25.01.1991	3603.00 @@@	20 years	25.01.1991	24.01.2011 (1st Renewal is under process).
32	1st Renewal of Indaram M.L. G.O.Ms. No. 15, dt.23.01.2006.	Srirampur	21.04.2006	2100.00 (1054.84 RF) @	20 years	24.07.2000	23.07.2020
33	Srirampur M.L. G.O.Ms. No.42, dt.11.02.2008.	Srirampur	28.06.2008	938.85 (140.0 RF) @	30 years	28.06.2008	27.06.2038
34	Srirampur Extn. M.L. G.O. Ms. No. 279, dt.24.10.2007.	Srirampur	12.03.2008	714.90 @@@	25 years	12.03.2008	11.03.2033
35	Indaram Extn. ML GO Ms. No 215, dt.18.09.2009.	Srirampur	09.12.2009	199.88 (180.88 RF) @	30 years.	09.12.2009	08.12.2039
36	Kasipet M.L. G.O.Ms.No. 460, dt.28.12.1998.	Mandamarri	19.03.1999	356.00 @@@	30 years	19.03.1999	18.03.2029
37	3rd renewal of North Godavari M.L. G.O. Ms. No. 1, dt.12.01.2015.	Mandamarri	30.06.2015	4494.00 @	20 years	22.05.2010	21.05.2030
38	Kasipet North Extn. Block ML. GO Ms. No.282 , dt.20.10.2008..	Mandamarri	22.01.2009	206.00 @@@	30 years	22.01.2009	21.01.2039
39	Shantikhani Extn. Block ML. GO.Ms No. 99, dt.12.05.2009.	Mandamarri	18.09.2009	401.70 (285.89 RF) @	30 years	18.09.2009	17.09.2039
40	3rd Renewal of Kanala M.L,G.O. Ms. No. 3, dt.05.01.2006.	Bellampalli	21.04.2006	1476.00 @@@	20 years	01.01.2005	31.12.2024
F) MANCHERIAL& KOMARAMBHEEM ASIFABAD DISTRICTS:-							
41	2nd Renewal of Tandur M.L. G.O. Ms. No. 3, dt.12.01.2015.	Bellampalli	Execution is under process	12611.70 @	20 years	01.01.2015	31.12.2034
42	Dorli OCP – I M.L, G.O.Ms. No.11, dt.19.01.2007.	Bellampalli	26.05.2007	510.10 @@@	30 years	26.05.2007	25.05.2037
43	Dorli OCP- II (Phase-I) ML GO Ms. No. 323, dt.12.12.2008.	Bellampalli	23.04.2009	241.107 @@@	10 Years	23.04.2009	22.04.2019
44	Goleti 1&1A ML GO Ms. No.100, dt.12.05.2009.	Bellampalli	18.09.2009	250.00 (83.77 RF) @	30 Years	18.09.2009	17.09.2039

@ .. Partly forest.
@@ .. Fully forest.
@@@ .. Non-forest.

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SUMMARY

Sl. No.	Name of the District	No. of mining leases	Area Ha.
1	Bhadradri Kothagudem	15	12606.36
2	Khammam	3	1820.24
3	Pro.Jayashankar Bhoopalpalli	8	5577.25
4	Peddapalli	4	14922.00
5	Mancherial	10	14490.33
6	Mancherial & Komarambheem Asifabad	1	12611.70
7	Komarambheem Asifabad	3	1001.207
	Total	**44**	**63029.087**

***

Plan Prepared by me

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Ministry of Coal. Govt. of India.
Ref. 34012/01/2015 - CPAM
Dt. 05-10-2017

Annexure-18

Dated:31.08.2018.

THE SINGARENI COLLIERIES COMPANY LIMITED
(A Government Company)

LIST SHOWING THE STATUS OF MINING LEASES FOR COAL PENDING AT VARIOUS STAGES.

Sl. No.	Name of the Mining Lease	Fresh or Renewal	Date of application	Lease period	Area in Ha.	Remarks
KOTHAGUDEM AREA						
1	Kistaram OCP ML	Fresh	24.01.2015	20 Years	435.68	• ADMG, Khammam forwarded the application to DMG on 16.06.2015. • DMG forwarded the same to State Govt. on 14.09.2016. • State Govt. forwarded the application to MOC on 16.11.2016 and requested to issue prior approval. • MOC issued prior approval on 19.01.2017 subject to submission of forest clearance, Mining Plan etc.,. **SCCL to submit forest clearance, copy of Mining Plan etc.,. to State Govt. to issue GO.**
MANUGURU AREA						
2	Manuguru OC-II Expn. Project (Ph-II)	Fresh	15.07.2010	25 Years	367.03	• MOC issued prior approval on 06.04.2016 subject to submission of certain document. Stage 1 Cleared • On 23.04.2016 State Govt. requested SCCL to submit Mining Plan, Mine closure Plan etc., **SCCL to submit certain documents to State Govt. to issue GO.**
BELLAMPALLI AREA						
3	Tandur Addl. Ml.	Fresh	26.12.2011	20 Years	397.57	• SCCL submitted application to ADMG, MNCL on 26.12.2011. • ADNG, MNCL forwarded the application to DMG on 12.06.2013 • DMG forwarded the application to State Govt. • As advised by State Govt. DMG returned the proposal to ADMG, Mancherial for addl. information. **ADMG, Mancherial to submit addl. information to DMG.**

***

Plan Prepared by me

(SHAIK MADAR)
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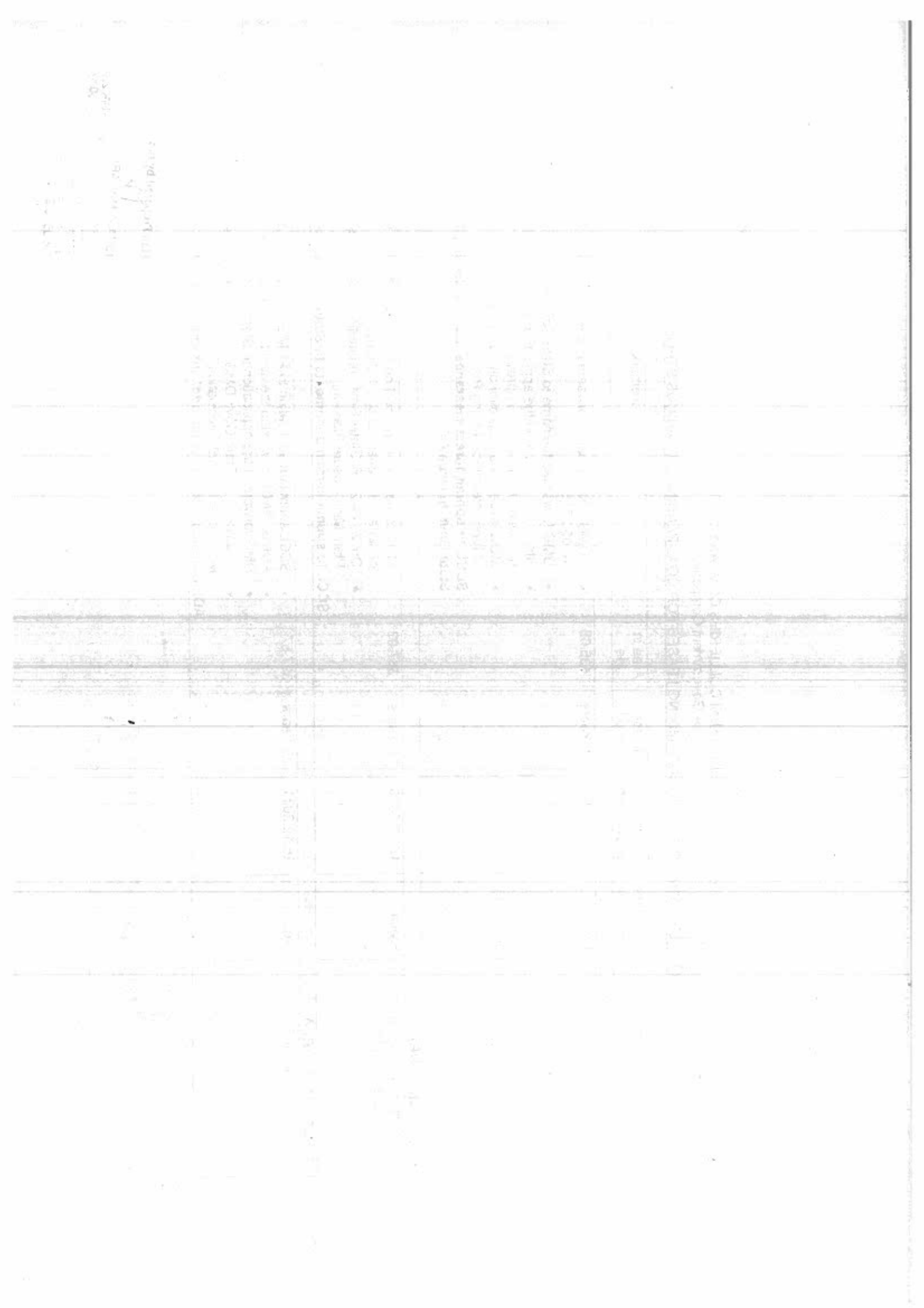

ANNEXURE-19

TELANGANA STATE POLLUTION CONTROL BOARD
PARYAVARAN BHAVAN, A - 3, INDUSTRIAL ESTATE,
SANATHNAGAR, HYDERABAD - 500 018

Phone: 23887500
Fax: 040-23815631

CONSENT ORDER FOR EXPANSION – RED CATEGORY

Consent Order No : 17072998391 **Date: 03/01/2018**

(Consent Order for Existing/New or altered discharge of sewage and/or trade effluents/outlet under Section 25/26 of the Water (Prevention & Control of Pollution) Act, 1974 and amendments thereof, Operation of the plant under section 21/22 of Air (Prevention & Control of Pollution) Act 1981 and amendments thereof).

CONSENT is hereby granted under section 25/26 of the Water (Prevention & Control of Pollution) Act, 1974, under section 21/22 of Air (Prevention & Control of Pollution) Act 1981 and amendments thereof and the rules and orders made there under to **M/s Singareni Collieries Co. Ltd, JK OC-5, Coal Mining Project, Yellandu (V&M), Khammam district** and applied for CFO Renewal (hereinafter referred to as 'the Applicant /Industry') authorized to operate the industrial plant to discharge the effluents from the outlets and the quantity of Emissions per hour from the chimneys, by operating pollution control equipment, as detailed below.

I. Outlets for discharge of effluents:

Out let No.	Outlet Description	Max Daily Discharge (KLD)	Point of Disposal
1.	Washings of HEMM	80	After treatment, shall be used for onland for gardening and excess shall be discharged into nearby nallah, duly complying to the standards stipulated in Schedule –B
2.	Excess mine discharge water	1230	
3	Domestic	40	Septic tank followed by soak pit

This consent order is valid for Mining of Coal in Mine lease area of 514.94 Ha.for the following capacity:

S.No	Product	Quantity
1.	Coal (Open cast mining)	2.50 MTPA

This order is subject to the provisions of the Acts, Rules and Amendments made thereunder and further terms and conditions incorporated in the schedule A and B enclosed to this order

This consent should be valid for a period ending with the 31st day of December, 2022

Sd/-
MEMBER SECRETARY

To
M/s Singareni Collieries Co. Ltd,
JK OC-5, Coal Mining Project, Yellandu (V&M),
Khammam district

///T.C.F.B.O///

SENIOR ENVIRONMENTAL ENGINEER (FAC)
(Unit-I)

Plan Prepared by me

(SHAIK MADAR)
Recognised Qualified Person U/R 22(C of Mineral Concession Rules 1960 by Ministry of Coal, Govt. of India.
Ref. 34012/01/2015 - CPAM
Dt. 05-10-2017

SCHEDULE – A

1. The applicant shall make applications through online for renewal of Consent (under Water & Air Acts) and Authorisation under HWM Rules at least 120 days before the date of expiry of this order, along with prescribed fee under Water and Air Acts for obtaining Consent & HW Authorisation of the Board.

2. This order is issued in line with Board's CFO order dated 05.11.2015 and CFE (Expansion) order dt. 13.12.2016. Concealing the factual data or submission of false information/ fabricated data and failure to comply with any of the conditions mentioned in this order may result in withdrawal of this order and attract action under the provisions of relevant pollution control Acts. The industry shall comply with earlier CFO order dated 05.11.2015 and CFE (Expansion) order dt. 13.12.2016 still applicable.

3. Any person aggrieved by an order made by the State Board under Section 25, Section 26, Section 27 of Water Act, 1974 or Section 21 of Air Act, 1981 may within thirty days from the date on which the order is communicated to him, prefer an appeal as per Andhra Pradesh Water Rules, 1976 and Air Rules 1982, to such authority (hereinafter referred to as the Appellate Authority) constituted under Section 28 of the Water (Prevention and Control of Pollution) Act, 1974 and Section 31 of the Air (Prevention and Control of Pollution) Act, 1981.

4. The facility may explore the possibility of tapping the solar energy for their energy requirements.

5. The Board reserves its right to modify above conditions or stipulate any further conditions and to take action including revoke of this order in the interest of protection of public health and environment.

SCHEDULE - B

1. Total Water Consumption shall not exceed : 1130.00 KLD.

S.No	Purpose	Quantity in KLD
1	Dust suppression	800
2	Washings of HEMM	180
3	Domestic	50
4	Greenbelt	100

2. The Treated Effluent Discharged shall not exceed the following prescribed standards

Outlet No.	Parameter No.	Limiting Standards
1 & 2	pH	5.5 – 9.0
	Total Suspended Solids (TSS)	100 mg/l
	Oil & Grease	10 mg/l
	BOD (3 days at 27^0 C)	30 mg/l
	Total Dissolved Solids (TDS)	2100 mg/l
	Chemical Oxygen Demand (COD)	250 mg/l

3. The industry should not produce beyond the permitted capacity as mentioned in this order, without obtaining prior CFE & CFO of the Board. The mining capacity of the coal also should not be increased more than IBM approved capacity.

4. The industry should comply with the ambient air quality standards of PM_{10}(Particulate Matter size less than 10μm) - 100 μg/ m^3; $PM_{2.5}$ (Particulate Matter size less than 2.5 μm) - 60 μg/ m^3; SO_2 - 80 μg/ m^3; NO_x - 80 μg/m^3, outside the mine premises at the periphery of the mine.

   Standards of other parameters as mentioned in the National Ambient Air Quality Standards CPCB Notification No.B-29016/20/90/PCI-I, dated 18.11.2009.

Noise Levels: Day time (6 AM to 10 PM) - 75 dB (A)
Night time (10 PM to 6 AM) - 70 dB (A).

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(SHAIK MADAR)
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of Mineral Concession Rules 1960 b
Ministry of Coal, Govt. of India.
Ref. 34012/01/2015 - CPAM
Dt. 05-10-2017

5. The project shall maintain separate water meters for recording water consumption for various purposes and also maintain daily records.

6. The project shall provide STP to treat 40 KLD Domestic wastewater generated from colony, etc., within 6 months. They shall submit time bound action plant to the Board within a month.

7. The project shall maintain the water spraying system properly by adopting preventive maintenance schedule to avoid fugitive dust emissions.

8. The project shall carryout water spraying on haul roads to avoid fugitive dust emissions due to vehicular movement. The project shall provide permanent water sprinkling system along the haul roads.

9. The project shall install 3 fixed AAQM stations and one CAAQM station in core area for monitoring of ambient air and connect the CAAQM data to TSPCB server. They shall submit monthly AAQM data to RO, Kothagudem.

10. The project shall develop and maintain greenbelt as per norms.

11. The vehicular emissions should be kept under control and regularly monitored. Vehicles used for transporting the mineral should be covered with tarpaulins and optimally loaded.

12. The personnel working in dusty areas should wear protective / respiratory devices and they should also be provided with adequate training and information on safety and heath aspects.

13. The industry should reuse the treated effluents generated from workshop for dust separation and for raising plantation.

14. Blasting should be sequential in such a manner as to achieve minimum vibration.

15. The industry should comply with the following for controlling air pollution.

    - To avoid the dust generation from the drilling operations, wet-drilling should be done.

    - Use of appropriate explosives for controlled blasting and avoid overcharging the blast holes.

    - The volume of dust rising from dumps by the action of wind should be controlled significantly by planting grasses on slopes and plants on dumps soon after their formation.

    - To overcome the problems of dust generation from mine haul roads, the following steps should be adopted.

        - Black topping of permanent roads like routes to coal handling plant, permanent internal roads etc.

        - Water spraying on haul roads and permanent transport routes at required frequencies. Provision should be made for procurement of six water sprinklers for this purpose.

        - Avenue plantation along roads should be adopted.

    - Effective dust suppression measures are proposed to be taken up at pit head coal handling plant (CHP). The crusher house should be enclosed to the extent possible and dust suppression arrangement should be provided at suitable locations in the CHP. All the conveyors, screens, crusher etc., should be provided with covers to avoid fugitive dust during operation. Some of the measures proposed to be adopted at CHP in order to control dust emission include:

        - Height of fall to be minimized at all coal transfer points.

        - Internal lining of chutes and bins should be done to take care of abrasion & dust.

Plan Prepared by me

(SHAIK MADAR)
Recognised Qualified Person U/R 22(C of Mineral Concession Rules 1960 by Ministry of Coal, Govt. of India.
Ref. 34012/01/2015 - CPAM
Dt. 05-10-2017

16. Dumping of overburden, if done, should use the retreating pyramid bench formation with concurrent, physical and biological reclamation. Dumps should be contoured and provided with relief control and stabilized. Dump tops should be compacted, leveled and be properly drained.

17. Soil binding and nitrogen fixing plants should plant in the Mining Lease Area. Biological reclamation should be done in two phase the first phase should be plant appropriate quick growing grass and shrubs and the second phase should grow slower native shrubs and trees.

18. Ground water table levels should be monitored every season. Any lowering of the ground water table in comparison to the previous season should be reported to the Board immediately. Discarded pits should be allowed to fill with water.

19. Vehicles should be well maintained and engine idling should be minimized. Vehicle cabs should be made dust-proof.

20. The industry shall use atleast 25% of fly ash on volume to volume basis of the total materials used for external dump of overburden and same percentage in upper benches of back filling of open cast mines, as per Fly Ash Notification.

21. The industry shall comply with MOE&F Notification No.GSR.02 (E), dt. 02.01.2014 for supply of coal with Ash content not exceeding 34% to coal based Thermal Power plants.

22. The applicant should submit Environment statement in Form V before 30th September of every year as per Rule No.14 of E(P) Rules, 1986 & amendments thereof.

23. All the rules & regulations notified by Ministry of Law and Justice, Government of India regarding Public Liability Insurance Act, 1991, should be followed.

24. The conditions stipulated in this order are without any prejudice to rights and contentions of this Board in any Hon'ble court of Law.

Sd/-
MEMBER SECRETARY

To
M/s Singareni Collieries Co. Ltd,
JK OC-5, Coal Mining Project, Yellandu (V&M),
Khammam district

///T.C.F.B.O///

SENIOR ENVIRONMENTAL ENGINEER (FAC)
(Unit-I)

Plan Prepared by me

(SHAIK MADAR)
Recognised Qualified Person U/R 22(C of Mineral Concession Rules 1960 by Ministry of Coal, Govt. of India.
Ref. 34012/01/2015 - CPAM
Dt. 05-10-2017

Annexure - 20

GOVERNMENT OF ANDHRA PRADESH
GROUND WATER DEPARTMENT

From:
Dr. A.K. Jain,I.F.S.,
Director,(FAC)
Ground Water Department,
BRKR Govt.Offices Complex,
8th Floor, B-Block,
Tank Bund Road,
HYDERABAD – 500 063.
Fax No: 040-23225602
E.Mail: apsowrd@ap.nic.in

To:
The General Manager
(Environment).
Kothagudem Collieries-507101
Bhadrachalam Road Railway station,
Khammam District,
Andhra Pradesh.

Lr.No.12674/Hg.II(1)/06 dt:10-4-07

Sir.

Sub: - A.P.-Ground Water Department – Groundwater clearance in respect of proposed open cast coal mines JK-5 OCP of Yellandu area and Kunavaram OCP of Manuguru area of SCCL in Khammam district – Reg.

Ref: - CRP/ENV/A/545/165 dt:1-3-2007 from GM(Env) Kothagudem Collieries.

-oooOooo-

The attention is invited to the letter cited, wherein the reduction of investigation charges of three (3) mines 1. Jawahar Khani No.5 Open cast 2. Kunavaram Open cast 3. 21 incline Open cast is requested. In this connection, it is informed that the Survey charges being collected are as per the actuals based on number of field days. Vehicle hiring charges. geophysical investigation accessories, etc. Reduction in the investigation charges may not be possible as per the existing norms.

Yours Faithfully,

Sd/- Dr.A.K.JAIN
DIRECTOR(FAC)

Copy to
The Deputy Director, Ground Water Department,
Khammam for information.

//TRUE COPY//

FOR DIRECTOR

Plan Prepared by me

(SHAIK MADAR)
Recognised Qualified Person U/R 22(C of Mineral Concession Rules 1960 by Ministry of Coal, Govt. of India.
Ref. 34012/01/2015 - CPAM
Dt. 05-10-2017

I. ADDENDUM - I

ADDENDUM-I / Clarifications to *"Mining Plan (Including Final Mine Closure Plan) (3rd Revision/Modification) for JK-5 Opencast Mine"*, Yellandu Area of M/s. The Singareni Collieries Company Limited.

The Technical Members of the Standing Committee sought certain clarifications vide letter no. 34011/21/2018-CPAM dated 04.04.2019 on the presentation of aforesaid MP & MCP during the meeting held on 29.03.2019. The Point wise clarifications are furnished hereunder as addendum & incorporated in the relevant pages to *"Mining Plan (Including Final Mine Closure Plan) (3rd Revision/Modification) for JK-5 Opencast Mine"*.

Sl. No.	Ref Para	Observations	Clarifications	Incorporated at
1	Cover Page	Name of the Mining Plan should be Mining Plan (Including Final Mine Closure Plan) (3rd Revision/ Modification) for JK-5 Opencast Mine instead of Mining Plan (III Revision) including Final Mine Closure Plan JK-5 Opencast Project.	The name of the Mining Plan is modified as Mining Plan (Including Final Mine closure plan) (3rd Revision/Modification) for JK-5 Opencast Mine.	Cover Page and at all relevant pages
2	Annexure 2B	3rd Revision / modification has been sought for this mining plan, while details and letter of approval has been enclosed for only 2nd Revision of Mining Plan. This needs to be looked into. Further, it is not clear about the area for which this lease was granted and when was it granted.	Letters of approval for initial Mining Plan & 1st Revision Mining Plan are furnished. Further, Yellandu Additional Mining Lease was granted for an area of 1741 ha vide G.O.M.S. No.278, dated 23.10.2007.	Annexure 2B & 2C Annexure 12
3	CL3 (d)	Board approval attached at Annexure 1, 1A &1B dated:10.05.2014 relates to MCP submitted earlier for approval, it is not related to this Mining Plan and Mine Closure Plan submitted for approval.	Copy of SCCL Board's approval, dated: 28.11.2018 pertaining to the present proposal is furnished.	CL 15 (III) of Checklist and enclosed as Annexure 1A
4	Annexure D,E,F & G of Checklist	Calendar year should be indicated against the year 1,2,3 in the table shown at the annexure under reference. Further the Action plan for OB removal management, top soil management etc should be envisaged for the life of the mine plus three years.	The observation has been complied with. Calendar year is indicated against the year 1, 2 & 3 and furnished as Table Nos 1, 2, 3 & 4. Further, top soil management and waste management is furnished as Table no.1 & 3 for the entire life of the mine plus 3 years i.e. post closure period.	Annexure D, E,F & G of Checklist

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Ref. 34012/01/2015-CPAM
Dt. 05-10-2017

Sl. No.	Ref Para	Observations	Clarifications	Incorporated at

Table No. 1

Waste Management:

Year/Stage		Cumulative OB Removal			External Dump (Cumulative) (Mm^3)		Internal Dump/ Backfilling (Cumulative) (Mm^3)		Embankment (Mm3)	
		Top Soil	Hard OB	Total	Hard OB	Top Soil	Hard OB	Top Soil	Hard OB	Top Soil
Upto 31.03.2018		2.688	70.262	72.950	69.56	2.440	0.702	-		
Y-1	2018 - 19	2.938	82.99	85.928	69.56	2.690	13.43	-		
Y-2	2019 – 20	3.472	97.477	100.949	69.56	2.886	27.92	0.338		
Y-3	2020 – 21	3.620	106.580	110.200	69.56	3.009	37.02	0.363		
Post Closure										
Y-6	2023-24	3.620	106.580	110.200	69.56	3.009	37.02	0.611		

Table No. 2

Technical Reclamation (Cumulative in ha):

Year/Stage		Land Degraded area (ha)				Technically Reclaimed Area (ha)			
		Excavation	Dump (External + Top Soil)	Infra structure/ Others	Total	*Backfill*	Dump (External + Top Soil)	Others	Total
Upto 31.03.2018		102.29	212.88	127.31	442.48	-	174.59	37.51	212.10
Y-1	2018-19	114.01	218.88	127.31	454.20	-	174.59	43.03	217.62
Y-2	2019-20	133.89	218.88	127.31	474.08	-	174.59	47.33	221.92
Y-3	2020-21	149.95	218.88	127.31	490.14	42.27	191.91	127.31	361.49
Post Closure									
Y-6	2023-24	149.95	212.88	127.31	490.14	42.27	191.91	255.96	490.14

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Dt [illegible]-10-2017

Sl. No.	Ref Para	Observations	Clarifications	Incorporated at

Biological Reclamation (Cumulative in ha):

Year/Stage		Biologically Reclaimed Area (ha)					Forest Land (Return)	Un Disturbed/to be left for public/ company use	Total
		Agriculture	Plantation	Water Body	To be left for Public/ Company Use	Total			
Upto 31.03.2018		-	119.40	-	-	119.40	-	-	119.40
Y-1	2018-19	-	151.60	-	-	151.60	-	-	151.60
Y-2	2019-20	-	190.05	-	-	190.05	-	-	190.05
Y-3	2020-21	-	251.49	-	-	251.49	-	-	251.49
Post Closure									
Y- 6	2023-24	-	327.30	137.47	25.37	490.14	-	-	490.14

Table No. 3

Topsoil Management:

Year/ Stage		Top Soil Removal in Cumulative (Mm^3)	Top Soil Used in Cumulative "Mm^3"				
			Embankment	Spreading over the backfilled area	Spreading over the OB Dump area	Using for Green Belt Area	Total utilised
Upto 31.03.2018		2.688			2.440		2.440
Y-1	2018-19	2.938			2.690		2.690
Y-2	2019-20	3.472		0.338	2.886		3.224
Y-3	2020-21	3.620		0.363	3.009		3.372
Post Closure							
Y-6	2023-24	3.620		0.611	3.009		3.620

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Dt. 05-10-2017

Sl. No.	Ref Para	Observations	Clarifications	Incorporated at

Table No. 4

Head	Activity	Unit	Quantity	Rate Rs / Unit	Amount "Rs. Cr"
Progressive closure up to March-2018	**Water quality management:**				
	a. Filter beds (1 lakh gallons per day) construction	Nos	1	2500000	0.25
	b.Maintenance of Filter beds	Years	7	400000	0.28
	c.Mixing of chemicals in filter beds for water quality	Years	7	100000	0.07
	d.Mixing of lime or other chemicals in OC sumps for maitaining pH value	t	284	4600	3.27
	e.Construction of setling ponds	Nos	3	1000000	0.30
	f.Cleaning of drains	Km/Year	12.2	170000	5.19
	g.De-silting of setling ponds	Sq.m	14542	50	0.36
	h.Construction of Effluent Treatment Plants	Nos	1	1500000	0.15
	i. Construction of Sewage Treatment Plants	Mld	0.50	15000000	0.75
	j. Maintenance of ETP & STPs	ls		1650000	0.17
	Air quality management:				
	a.splillage coal cleaning over haul roads	Km	3.2	2500	3.65
	b.Grading of roads by graders	Nos	1	7511118.67	18.78
	c.Water sprinkling by mobile tankers	Nos	3	7736524.04	58.02
	d.Dust suppression of fugitive emission by chemical spray system at CHP	Nos	1	11400000	1.14
	e. Continuous water spraying arrangements along haul roads	km	1.5	2500000	0.38
	f. Compaction of blasted benches with dozers before water spraying	Nos	2	7511118.67	37.56
	g.Fire fighting Equipment	Nos	1	6790172.75	16.98
	h. Portable Fire fighting operations	Lot	1	300000	0.03
	i. Green belt within CHP area				

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Ref. 3401201/2015-CPAM
Dt. 05-10-2017

Sl. No.	Ref Para	Observations	Clarifications					Incorporated at
			j. Dust respirators					
			k. Dust Extractor system	Nos	1	2000000	0.20	
			l. Mixing of chemicals along with mist sprayers					
			Waste Management	Mm^3				
			(1) Oils					
			(2) Hazardous Waste like					
			a.Old Tyres	Nos	96	573.64	0.01	
			b.Used Oils	KL	8	1370.88	0.001	
			c.Used Transformer Oils	KL	1	1428.00	0.000	
			d.Old Batteries	Nos	10	198.68	0.000	
			e.Empty oil & grease Barrels	Nos	52	192.13	0.001	
			f.Aluminium & non ferrous scrap	t	1	5712.00	0.001	
			g.Old carton boxes	t	1	571.20	0.000	
			h.Misc scrap items	t	4	615.14	0.000	
			i.MS scrap	t	18	576.39	0.001	
			j.CHP (Old Belting)	t	1	952.00	0.000	
			k.CHP (Old belt conveyor items)	t	6	571.77	0.000	
			l.Computers, peripherals & other IT waste	t	1	5712.00	0.001	
			Barbed wire fencing around dump	m				
			Barbed wire fencing around the Pit	m	4250	772	0.33	
			Filling of Void - Rehanding of Crown Dump	Mm^3				
			Top Soil management	Mm^3	2.688	42450000	11.41	
			Technical and Biological Reclamation of Mined out of land and OB Dump	ha	151.37	25000	0.38	
			Plantation over virgin area including green belt	ha	119.4	60000	0.72	

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Dt. 05-10-2017

Sl. No.	Ref Para	Observations	Clarifications					Incorporated at
			Manpower Cost and supervision	Nos	3	989332.5	7.42	
			Toe Wall around the dump	m	12200	4362	5.32	
			Garland drain around quarry	m	4700	214	0.10	
			Garland Drain around the dump	m	8900	214	0.19	
			Deck drains					
			Cross Deck drains					
			Check dams over slopes					
			Gabbion structures etc.					
			Any other Activity					
			(a) Post Project Environmental Monitoring	Years	7	500000	0.35	
			(b) Sealing of panels	Nos				
			(c) Subsidence monitoring					
			(d) CO monitoring					
			(e) Shale picking	Years	6	1825000	1.10	
			(f) Dismantling/dipsosal of UG/OC equipment	Nos				
			(g) Power cost w.r.t mine closure activities	Years	7	4438184.332	3.11	
			(h) security manpower	Nos	3	989332.5	7.42	
				Sub-Total (A):		**119376969**	**185.36**	
		Progressive closure from April-2018	**Water quality management**					
			a.Maintenance of Filter beds	Years	3	400000	0.12	
			b.Mixing of chemicals in filter beds for water quality	Years	3	100000	0.03	
			c.Mixing of lime or other chemicals in OC sumps for maitaining pH value	t	62.5	5000	0.03	
			d.Construction of settling ponds		1	1000000	0.10	
			e.Cleaning of drains	Km/Yr	12.2	170000	0.62	
			f.De-silting of setling ponds	Sq.m	14542	50	0.07	

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Ref. 3401201/2015-CPAM
Dt. 05-10-2017

Sl. No.	Ref Para	Observations	Clarifications					Incorporated at
			g.Construction of Effluent Treatment Plants					
			h.Construction of Sewage Treatment Plants					
			i.Maintenance of ETP & STPs					
			Air quality management					
			a.Dust cleaning over roads	Km	3.2	2500	0.44	
			b.Grading of roads by graders	Nos	1	10166608.50	3.05	
			c.Water sprinkling	Nos	3	7913747.92	7.12	
			d.Dust suppression and fog spray system at CHP	Nos	1	5700000	0.57	
			e. Continuous water spraying arrangements along haul roads	Km	1.5	1250000	0.19	
			f. Compaction of blasted benches before water spraying		2	10166608.50	6.10	
			g.Fire fighting		1	9190778.50	2.76	
			Waste Management	Mm^3				
			Barbed wire fencing around dump	m	4250	772	0.33	
			Barbed wire fencing around the Pit	m				
			Filling of Void - Rehanding of Crown Dump	Mm^3				
			Top Soil management	Mm^3	0.932	42450000	3.96	
			Technical and Biological Reclamation of Mined out of land and OB Dump	ha	132.09	35000	0.46	
			Plantation over virgin area including green belt	ha				
			Manpower Cost and supervision	Nos	3	1533000	0.46	
			Toe Wall around the dump	m	1000	4798.2	0.48	
			Garland drain around quarry	m				
			Garland Drain around the dump	m				
			Any other Activity					
			(a) Post Environmental Monitoring	Years	3	704394.61	0.21	

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Dt. 05-10-2017

Sl. No.	Ref Para	Observations	Clarifications					Incorporated at
			(b) Sealing of panels	Nos				
			(c) Subsidence monitoring					
			(d) CO monitoring					
			(e) Shale picking	Years	3	2573250	0.77	
			(f) Dismantling/dipsosal of UG/OC equipment					
			(g) Power cost w.r.t mine closure activities	Years	3	6007265.3	1.80	
			(h) security manpower	Nos	3	1533000	0.46	
				Sub-Total (B):		**100906774**	**30.13**	
		Post Closure Activities						
		Dismantling of Infrastructure & Disposal/ rehabilitation of Mining machinery	**Dismantling of Infrastructure**					
			a.RCC structures	ha	0.320	45620782.29	1.46	
			b.Closed sheds	ha	0.286	53251566.33	1.52	
			c.Open Sheds	ha	0.090	34080926.36	0.31	
			d.Others	ha	0.524	36145614.42	1.89	
			e. Decommissioning of CHP	ha	0.328	61566854.01	1.86	
			f.Decommissioning of Sub-Station	ha	0.486	3373538.726	0.16	
			Rehabilitation of the Dismantled Facilities					
			Dismantaling of pumps and Pipes/ other facilitites					
			Total Reclaimed land - Sub Total		**2.03**			
			Dismantling/dipsosal of UG/OC equipment					
			a.Old Tyres	Nos	400	2013.48	0.08	
			b.Used Oils	KL	40	6854.40	0.03	
			c.Used Transformer Oils	KL	12	1904	0.002	
			d.Old Batteries	Nos	36	1269.33	0.005	
			e.Empty oil & grease Barrels	Nos	800	528.36	0.04	
			f.Aluminium & non ferrous scrap	t	1	5712	0.001	

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Dt: 05-10-2017

Sl. No.	Ref Para	Observations	Clarifications					Incorporated at
			g.Old carton boxes	t	1	5712.00	0.001	
			h.Misc scrap items	t	60	666.40	0.004	
			i.MS scrap	t	200	1056.72	0.02	
			j.CHP (Old Belting)	t	10	1142	0.001	
			k.CHP (Old belt conveyor items)	t	50	1142.40	0.01	
			l.Computers, peripherals & other IT waste	t	1	5712.00	0.001	
			Rearranging water pipeline to dump top park/ Agricultural land					
			Dismantling of Power lines	Km	17	479240	0.81	
		Safety and security	Security all around the project	Nos	3	1533000	0.46	
			Barbed wire fencing around dump	m	800	772	0.06	
			Barbed wire fencing around the Pit	m	800	772	0.06	
			Barbed wire fencing with masonary pillars					
			Concrete wall with Masonalry pillars around the pit					
			Securing air shaft					
			Securing of Incline					
			Building of Water Dams (UG)					
			Boundary wall around the water body	m	5860	9440	5.53	
			Stabilisation (viz benching, pitching etc) of side walls of the water body					
			a.Sloping & Stabilizing the high wall benches	Sq.m	532573	350	18.64	
			b.Sloping, Stabilizing and reclaiming the internal dump slopes with plantation	Sq.m	385268.2	350	13.48	
			c.Providing grassed water ways along slopes and benches	m	2814	1500	0.42	
			d.Planting Hedge rows on slopes	ha	46.12	25000	0.12	
			e.Grass mixture cladding on slopes	ha	46.12	35000	0.16	
			Toe Wall around the dump					

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Dt: 05-10-2017

Sl. No.	Ref Para	Observations	Clarifications					Incorporated at
			Garland drain quarry					
			Garland Drain around the dump					
			Drainage Channel from main OB dump					
		Technical and Biological Reclamation of Mined out of land and OB Dump	Filling of Void	ha				
			Top Soil management	Mm^3				
			OB Rehandling for backfilling	Mm^3				
			Terracing, blanketing with soil and vegetation of External OB Dump	ha	38	35000	0.13	
			Paripheral road, gates, view point, cemented steps on bank					
			Expenditure on development of Agricultural land					
			Plantation	ha	75.81	35000	0.27	
		Post Closure management and supervision	Power Cost	Years	3	6007265	1.80	
			Post Mining Water quality management					
			a. Maintenance of Fitler beds	Years	3	400000	0.12	
			b. Pumping power cost for sustenance of acquatic system in water body/final void	Years	3	100000	0.03	
			c. Clearing of drains	Km/Yr	12.2	170000	0.62	
			d.De-silting of tanks & nallahs	Sq.m	14542	50	0.07	
			Post Mining Air quality management					
			Post Environmental Monitoring	Years	3	704394.61	0.21	
			Waste Management					
			Pumping	Years	3	17583530	5.28	
			Manpower Cost and supervision	Nos	3	1533000	0.46	

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Ref. 3401201/2015-CPAM
Dt. 05-10-2017

Sl. No.	Ref Para	Observations		Clarifications		Incorporated at
		Others	Entrepreneurship development (vocational/skill development training for sustainable income of affected people)	74 nos of skilled operators deployed in this project from project affected people will be utilized in the adjoining mines of KOC-II & KOC III of Yellandu Area after closure of this mine.		
			Golden Handshake / Retrenchment benefits to 100 employees of OC	SCCL will not retrench any employee due to closure of this mine or in any of the other mines. They will continued to be deployed in other projects of SCCL till their retirement age of 60 years. 62 employees will be retiring during 2018-21 year and remaining 271 direct employees will be redeployed in other projects.		
			Golden Handshake / Retrenchment benefits to 200 employees of UG			
			Onetime financial grant to societies / institutions /organizations which is dependent upon the project;			
			Provide jobs in other mines of the company			
			Continuation of other services like running of schools etc.	SCCL is operating a high school at Yellandu in Yellandu Area, which will be continued to be operated inspite of closing this mine.		
			Misc Cost	12.26		
			Sub-Total (C):	**68.40**		
			Grand Total (A+B+C)	**283.89**		

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Ref. 3-0012/01/2015-CPAM
Dt. 05-10-2017

Sl. No.	Ref Para	Observations	Clarifications	Incorporated at
5	CL 12.2 & Para 15.1.2	Statutory obligations and their compliance status should be shown in a tabular form.	Statutory obligations and their compliance status is shown in the tabular form as furnished below at Table No.5	CL 12.2, Para No. 15.1.2 of Chapter 15.

Table No. 5

Sl. No.	Statutory obligations	Approved Capacity (Mty)	Compliance
1	Mining Plan (II Revision) & Mine Closure Plan of JK-5 OPENCAST Project (514.95 ha) (Ref. No.13016 / 20 / 2005 - CA - II, dated 15th Sep, 2015)	2.5	Exceeded the production during 2015-16, 2016-17 & 2017-18 by 2.514 Mt, 2.692 Mt & 2.962 Mt respectively. The excess production was achieved from within the approved Mining Plan boundary and same mining lease area.
2	Yellandu Additional Mining Lease (1741 ha) (G.O.Ms.No: 278 (I&C dept), dated:23.10.2007)	Valid from 15.04.2004 to 14.04.2024	Operated within the ML and not encroached into the adjoining areas.
3	Environmental Clearance (514.95 ha) (Lr.No:11015 \31\ 2013-1A-II (M), dated.03-03-2016)	2.5	Exceeded the production during 2015-16, 2016-17 & 2017-18 by 2.514 Mt, 2.692 Mt & 2.962 Mt respectively and submitted application for obtaining EC as per notification S.O.804(E), dated 14th March, 2017. Further, SCCL has already submitted affidavit to MoEF&CC for obtaining EC for the enhanced capacity.
4	Consent for Operation (Order No. 17072998391, dtd.03/01/2018)	2.5 & Valid upto 31st December, 2022.	Exceeded the production during 2015-16, 2016-17 & 2017-18 by 2.514 Mt, 2.692 Mt & 2.962 Mt respectively. Further, SCCL has already submitted affidavit to MoEF&CC for obtaining EC for the enhanced capacity.
5	Ground water Clearance (No. 12674/Hg.II(1)/06, dtd: 10/07/2007)	All conditions	Being Implemented

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Sl. No.	Ref Para	Observations	Clarifications	Incorporated at
6	CL 10(a)	The previous approval of the Mining Plan based on which Yellandu Additional Mining Lease was granted consisted another 2-3 mines in addition to JK-5 OC mine. The approval of this mining plan separately may affect the approval of Mining Plans of other mines. This needs to be looked into.	Mining Plan was earlier approved for renewal of Yellandu Additional Mining Lease for two mines, namely JK 5 Incline and JK OC, which were operating. Subsequently, Revised Mining Plan (1st Revision) for part of Yellandu Additional Mining Lease (JK 5 OC Project) was approved by converting the aforesaid JK 5 UG Mine to OC by utilizing the decoaled voids of the aforesaid JK OC Mine and no other mine was operating in the Mining Lease area. Further, Mining Plan (II Revision) & Mine Closure Plan for JK 5 Opencast Project was approved for this sole operating mine in the said ML. As such, only one mine has been operating all along previously with Single approved MP/MCP and thus, the present proposal would not affect any other mining plans.	CL 10 (a) & 2.1 of Chapter 2
7	CL 12.3, CL12.4, 12.6 & Para 15.4 & 15.5	The top soil management and waste management should be indicated for entire life of the mine plus 3 year i.e. post closure period instead of limited it to 3 years of operation life only.	Top soil management and waste management is furnished as Table No.6 & 7 for the entire life of the mine plus 3 years i.e. post closure period.	CL 12.3, CL 12.4, 12.6 of Checklist & Para 5.6.6.4 of Chapter 15

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Ref: 34012/01/2015 - CPAM
Dt: 05-10-2017

Sl. No.	Ref Para	Observations	Clarifications	Incorporated at

Table No. 6

Topsoil Management:

Year/ Stage		Top Soil Removal in Cumulative (Mm^3)	Top Soil Used in Cumulative "Mm^3"				
			Embankment	Spreading over the backfilled area	Spreading over the OB Dump area	Using for Green Belt Area	Total utilised
Upto 31.03.2018		2.688			2.440		2.440
Y-1	2018-19	2.938			2.690		2.690
Y-2	2019-20	3.472		0.338	2.886		3.224
Y-3	2020-21	3.620		0.363	3.009		3.372
Post Closure							
Y-6	2023-24	3.620		0.611	3.009		3.620

Table No. 7

Waste Management:

Year/Stage		Cumulative OB Removal			External Dump (Cumulative) (Mm^3)		Internal Dump/ Backfilling (Cumulative) (Mm^3)		Embankment (Mm3)	
		Top Soil	Hard OB	Total	Hard OB	Top Soil	Hard OB	Top Soil	Hard OB	Top Soil
Upto 31.03.2018		2.688	70.262	72.950	69.56	2.440	0.702	-		
Y-1	2018 - 19	2.938	82.99	85.928	69.56	2.690	13.43	-		
Y-2	2019 – 20	3.472	97.477	100.949	69.56	2.886	27.92	0.338		
Y-3	2020 – 21	3.620	106.580	110.200	69.56	3.009	37.02	0.363		
Post Closure										
Y-6	2023-24	3.620	106.580	110.200	69.56	3.009	37.02	0.611		

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Ref 34012/01/2015 - CPAM
Dt. 05-10-2017

Sl. No.	Ref Para	Observations	Clarifications	Incorporated at
8	CL 12.14 & Para 15.7 & 15.10	The cost of activities, to be undertaken for closure of mine is indicated as Rs. 29.51 Crores, while total amount required to be deposited in escrow account is Rs. 43.298 Crs. This needs to be reconciled. Further the provisioning for mine Closure cost envisaged at para 15.7.0 & Checklist Annexure - G is different. This needs to be reconciled.	The cost of activities to be undertaken for closure of mine is estimated and now indicated as Rs.283.89 Crore and furnished below Table 8 and at all relevant pages. The amount deposited in the Escrow Account is Rs.29.51 Crore upto Mar'18 and amount to be deposited for the 3 years is indicated as Rs.14.160 Crore and furnished below Table 9 and at all relevant pages. Further, provisioning for mine closure cost envisaged at para 15.7.0 & Checklist Annexure - G are reconciled and furnished below Table No.8 and at all relevant pages.	GL 12.14 of Checklist,. Para 15.7 & 15.11.0 of Chapter 15.

Table No. 8

Head	Activity	Unit	Quantity	Rate Rs / Unit	Amount "Rs. Cr"
Progressive closure up to March-2018	**Water quality management:**				
	a. Filter beds (1 lakh gallons per day) construction	Nos	1	2500000	0.25
	b.Maintenance of Filter beds	Years	7	400000	0.28
	c.Mixing of chemicals in filter beds for water quality	Years	7	100000	0.07
	d.Mixing of lime or other chemicals in OC sumps for maitaining pH value	t	284	4600	3.27
	e.Construction of setling ponds	Nos	3	1000000	0.30
	f.Cleaning of drains	Km/Yr	12.2	170000	5.19
	g.De-silting of setling ponds	Sq.m	14542	50	0.36
	h.Construction of Effluent Treatment Plants	Nos	1	1500000	0.15
	i. Construction of Sewage Treatment Plants	Mld	0.50	15000000	0.75
	j. Maintenance of ETP & STPs	ls		1650000	0.17
	Air quality management:				
	a.splillage coal cleaning over haul roads	Km	3.2	2500	3.65
	b.Grading of roads by graders	Nos	1	7511118.67	18.78
	c.Water sprinkling by mobile tankers	Nos	3	7736524.04	58.02

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RQP/2012/01/2015 - CPAM
Dt. 05-10-2017

Sl. No.	Ref Para	Observations	Clarifications					Incorporated at
			d.Dust suppression of fugitive emission by chemical spray system at CHP	Nos	1	11400000	1.14	
			e. Continuous water spraying arrangements along haul roads	km	1.5	2500000	0.38	
			f. Compaction of blasted benches with dozers before water spraying	Nos	2	7511118.67	37.56	
			g.Fire fighting Equipment	Nos	1	6790172.75	16.98	
			h. Portable Fire fighting operations	Lot	1	300000	0.03	
			i. Green belt within CHP area					
			j. Dust respirators					
			k. Dust Extractor system	Nos	1	2000000	0.20	
			l. Mixing of chemicals along with mist sprayers					
			Waste Management	Mm^3				
			(1) Oils					
			(2) Hazardous Waste like					
			a.Old Tyres	Nos	96	573.64	0.01	
			b.Used Oils	KL	8	1370.88	0.001	
			c.Used Transformer Oils	KL	1	1428.00	0.000	
			d.Old Batteries	Nos	10	198.68	0.000	
			e.Empty oil & grease Barrels	Nos	52	192.13	0.001	
			f.Aluminium & non ferrous scrap	t	1	5712.00	0.001	
			g.Old carton boxes	t	1	571.20	0.000	
			h.Misc scrap items	t	4	615.14	0.000	
			i.MS scrap	t	18	576.39	0.001	
			j.CHP (Old Belting)	t	1	952.00	0.000	
			k.CHP (Old belt conveyor items)	t	6	571.77	0.000	
			l.Computers, peripherals & other IT waste	t	1	5712.00	0.001	
			Barbed wire fencing around dump	m				

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Dt. 05-10-2017

Sl. No.	Ref Para	Observations	Clarifications					Incorporated at
			Barbed wire fencing around the Pit	m	4250	772	0.33	
			Filling of Void - Rehanding of Crown Dump	Mm^3				
			Top Soil management	Mm^3	2.688	42450000	11.41	
			Technical and Biological Reclamation of Mined out of land and OB Dump	ha	151.37	25000	0.38	
			Plantation over virgin area including green belt	ha	119.4	60000	0.72	
			Manpower Cost and supervision	Nos	3	989332.5	7.42	
			Toe Wall around the dump	m	12200	4362	5.32	
			Garland drain around quarry	m	4700	214	0.10	
			Garland Drain around the dump	m	8900	214	0.19	
			Deck drains					
			Cross Deck drains					
			Check dams over slopes					
			Gabbion structures etc.					
			Any other Activity					
			(a) Post Project Environmental Monitoring	Years	7	500000	0.35	
			(b) Sealing of panels	Nos				
			(c) Subsidence monitoring					
			(d) CO monitoring					
			(e) Shale picking	Years	6	1825000	1.10	
			(f) Dismantling/dipsosal of UG/OC equipment	Nos				
			(g) Power cost w.r.t mine closure activities	Years	7	4438184.332	3.11	
			(h) security manpower	Nos	3	989332.5	7.42	
					Sub-Total (A):	**119376969**	**185.36**	

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Dt. 05-10-2017

Sl. No.	Ref Para	Observations	Clarifications					Incorporated at
		Progressive closure from April-2018	**Water quality management**					
			a.Maintenance of Filter beds	Years	3	400000	0.12	
			b.Mixing of chemicals in filter beds for water quality	Years	3	100000	0.03	
			c.Mixing of lime or other chemicals in OC sumps for maitaining pH value	t	62.5	5000	0.03	
			d.Construction of settling ponds		1	1000000	0.10	
			e.Cleaning of drains	Km/Yr	12.2	170000	0.62	
			f.De-silting of setling ponds	Sq.m	14542	50	0.07	
			g.Construction of Effluent Treatment Plants					
			h.Construction of Sewage Treatment Plants					
			i.Maintenance of ETP & STPs					
			Air quality management					
			a.Dust cleaning over roads	Km	3.2	2500	0.44	
			b.Grading of roads by graders	Nos	1	10166608.50	3.05	
			c.Water sprinkling	Nos	3	7913747.92	7.12	
			d.Dust suppression and fog spray system at CHP	Nos	1	5700000	0.57	
			e. Continuous water spraying arrangements along haul roads	Km	1.5	1250000	0.19	
			f. Compaction of blasted benches before water spraying		2	10166608.50	6.10	
			g.Fire fighting		1	9190778.50	2.76	
			Waste Management	Mm^3				
			Barbed wire fencing around dump	m	4250	772	0.33	
			Barbed wire fencing around the Pit	m				
			Filling of Void - Rehanding of Crown Dump	Mm^3				
			Top Soil management	Mm^3	0.932	42450000	3.96	
			Technical and Biological Reclamation of Mined out of	ha	132.09	35000	0.46	

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Dt. 05-10-2017

Sl. No.	Ref Para	Observations	Clarifications					Incorporated at
			land and OB Dump					
			Plantation over virgin area including green belt	ha				
			Manpower Cost and supervision	Nos	3	1533000	0.46	
			Toe Wall around the dump	m	1000	4798.2	0.48	
			Garland drain around quarry	m				
			Garland Drain around the dump	m				
			Any other Activity					
			(a) Post Environmental Monitoring	Years	3	704394.61	0.21	
			(b) Sealing of panels	Nos				
			(c) Subsidence monitoring					
			(d) CO monitoring					
			(e) Shale picking	Years	3	2573250	0.77	
			(f) Dismantling/dipsosal of UG/OC equipment					
			(g) Power cost w.r.t mine closure activities	Years	3	6007265.3	1.80	
			(h) security manpower	Nos	3	1533000	0.46	
				Sub-Total (B):		**100906774**	**30.13**	
		Post Closure Activities						
		Dismantling of Infrastructure & Disposal/ rehabilitation of Mining machinery	**Dismantling of Infrastructure**					
			a.RCC structures	ha	0.320	45620782.29	1.46	
			b.Closed sheds	ha	0.286	53251566.33	1.52	
			c.Open Sheds	ha	0.090	34080926.36	0.31	
			d.Others	ha	0.524	36145614.42	1.89	
			e. Decommissioning of CHP	ha	0.328	61566854.01	1.86	
			f.Decommissioning of Sub-Station	ha	0.486	3373538.726	0.16	
			Rehabilitation of the Dismantled Facilities					
			Dismantaling of pumps and Pipes/ other facilitites					
			Total Reclaimed land - Sub Total		**2.03**			

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Dt. 05-10-2017

Sl. No.	Ref Para	Observations	Clarifications					Incorporated at
			Dismantling/dipsosal of UG/OC equipment					
			a.Old Tyres	Nos	400	2013.48	0.08	
			b.Used Oils	KL	40	6854.40	0.03	
			c.Used Transformer Oils	KL	12	1904	0.002	
			d.Old Batteries	Nos	36	1269.33	0.005	
			e.Empty oil & grease Barrels	Nos	800	528.36	0.04	
			f.Aluminium & non ferrous scrap	t	1	5712	0.001	
			g.Old carton boxes	t	1	5712.00	0.001	
			h.Misc scrap items	t	60	666.40	0.004	
			i.MS scrap	t	200	1056.72	0.02	
			j.CHP (Old Belting)	t	10	1142	0.001	
			k.CHP (Old belt conveyor items)	t	50	1142.40	0.01	
			l.Computers, peripherals & other IT waste	t	1	5712.00	0.001	
			Rearranging water pipeline to dump top park/ Agricultural land					
			Dismantling of Power lines	Km	17	479240	0.81	
		Safety and security	Security all around the project	Nos	3	1533000	0.46	
			Barbed wire fencing around dump	m	800	772	0.06	
			Barbed wire fencing around the Pit	m	800	772	0.06	
			Barbed wire fencing with masonary pillars					
			Concrete wall with Masonary pillars around the pit					
			Securing air shaft					
			Securing of Incline					
			Building of Water Dams (UG)					
			Boundary wall around the water body	m	5860	9440	5.53	
			Stabilisation (viz benching, pitching etc) of side walls of the water body					
			a.Sloping & Stabilizing the high wall benches	Sq.m	532573	350	18.64	

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Ref. 34012/01/2015-CPAM
Dt. 05-10-2017

Sl. No.	Ref Para	Observations	Clarifications					Incorporated at
			b.Sloping, Stabilizing and reclaiming the internal dump slopes with plantation	Sq.m	385268.2	350	13.48	
			c.Providing grassed water ways along slopes and benches	m	2814	1500	0.42	
			d.Planting Hedge rows on slopes	ha	46.12	25000	0.12	
			e.Grass mixture cladding on slopes	ha	46.12	35000	0.16	
			Toe Wall around the dump					
			Garland drain quarry					
			Garland Drain around the dump					
			Drainage Channel from main OB dump					
		Technical and Biological Reclamation of Mined out of land and OB Dump	Filling of Void	ha				
			Top Soil management	Mm^3				
			OB Rehandling for backfilling	Mm^3				
			Terracing, blanketing with soil and vegetation of External OB Dump	ha	38	35000	0.13	
			Paripheral road, gates, view point, cemented steps on bank					
			Expenditure on development of Agricultural land					
			Plantation	ha	75.81	35000	0.27	
		Post Closure management and supervision	Power Cost	Years	3	6007265	1.80	
			Post Mining Water quality management					
			a. Maintenance of Filter beds	Years	3	400000	0.12	
			b. Pumping power cost for sustenance of acquatic system in water body/final void	Years	3	100000	0.03	
			c. Clearning of drains	Km/Yr	12.2	170000	0.62	
			d.De-silting of tanks & nallahs	Sq.m	14542	50	0.07	
			Post Mining Air quality management					
			Post Environmental Monitoring	Years	3	704394.61	0.21	
			Waste Management					

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Ministry of Coal, Govt. of India
Ref. 34012/01/2015-CPAM
Dt. 05-10-2017

Sl. No.	Ref Para	Observations	Clarifications				Incorporated at
			Pumping	Years	3	17583530	5.28
			Manpower Cost and supervision	Nos	3	1533000	0.46
		Others	Entrepreneurship development (vocational/skill development training for sustainable income of affected people)	74 nos of skilled operators deployed in this project from project affected people will be utilized in the adjoining mines of KOC-II & KOC III of Yellandu Area after closure of this mine.			
			Golden Handshake / Retrenchment benefits to 100 employees of OC	SCCL will not retrench any employee due to closure of this mine or in any of the other mines. They will continued to be deployed in other projects of SCCL till their retirement age of 60 years. 62 employees will be retiring during 2018-21 year and remaining 271 direct employees will be redeployed in other projects.			
			Golden Handshake / Retrenchment benefits to 200 employees of UG				
			Onetime financial grant to societies / institutions /organizations which is dependent upon the project;				
			Provide jobs in other mines of the company				
			Continuation of other services like running of schools etc.	SCCL is operating a high school at Yellandu in Yellandu Area, which will be continued to be operated inspite of closing this mine.			
			Misc Cost				12.26
			Sub-Total (C):		**26568240**		**68.40**
			Grand Total (A+B+C)				**283.89**

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Ref. 34012/01/2015-CPAM
Dt. 05-10-2017

Sl. No.	Ref Para	Observations	Clarifications	Incorporated at

Table No. 9

WPI as on				*Aug-09*	*129.60*	
WPI as on base date	*Base Year 11-12*	*156.13*	*April, 2018*	*117.30*	*183.14*	
Escalation rate of Closure cost					*1.41*	
				UG	*OC*	
Base Rate of Closure Cost "Rs. Crs./Ha"				*0.00*	*0.06*	
Closure Cost "Rs. Crs/Ha"				*0.0*	*0.08479*	
Project Area in ha					*490.14*	
Mine Closure Cost per ha basis "Rs. in Crs"				*0.00*	*41.56*	
Rate of compounding of Annual Closure Cost					*5.00%*	
Balance Life of the project "in Yrs"					*3*	
Annual Closure Cost "Rs. in Crs"				*0.000*	*13.853*	
Amount to be deposited into Escrow Account after compounding @ of					*43.670*	
Amount already deposited into Escrow Account "Rs. in Crs"					*29.51*	
Net Amount to be deposited into Escrow Account "Rs. in Crs"					*14.160*	

Amount to be deposited into Escrow Account annually ("Rs. in Crs")

Year	*OC*	*UG*	*Total*	*Deposited upto Mar, 18*	*Balance to be Deposited*
0		*0*			
1	*13.853*	*0.000*	*13.853*	*29.51*	*0.000*
2	*14.545*	*0.000*	*14.545*	*0*	*0.000*
3	*15.272*	*0.000*	*15.272*	*0*	*14.160*
Total	*43.670*	*0.000*	*43.670*	*29.510*	*14.160*

9	CL 12.4 & Para 14.5 & 15.2.4	The table indicating technical and biological reclamation needs to be re-checked. Biological and technical reclamation plan should be furnished in the following table at para under reference and relevant chapter of the mining plan and mine closure plan.	The table indicating technical and biological reclamation is checked and furnished in the following Table No. 10 and at all relevant pages.	CL 12.4 & Para No. 14.5.0 & 14.6.0 of Chapter 14

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Ministry of Coal, Govt. of India.
Ref. 34012/01/2015 - CPAM
Dt. 05-10-2017

Table No. 10

Technical Reclamation (Cumulative in ha):

Year/Stage		Land Degraded area (ha)				Technically Reclaimed Area (ha)			
		Excavation	Dump (External + Top Soil)	Infra structure/ Others	Total	*Backfill*	Dump (External + Top Soil)	Others	Total
Upto 31.03.2018		102.29	212.88	127.31	442.48	-	174.59	37.51	212.10
Y-1	2018-19	114.01	218.88	127.31	454.20	-	174.59	43.03	217.62
Y-2	2019-20	133.89	218.88	127.31	474.08	-	174.59	47.33	221.92
Y-3	2020-21	149.95	218.88	127.31	490.14	42.27	191.91	127.31	361.49
Post Closure									
Y-6	2023-24	149.95	212.88	127.31	490.14	42.27	191.91	255.96	490.14

Biological Reclamation (Cumulative in ha):

Year/Stage		Biologically Reclaimed Area (ha)					Forest Land (Return)	Un Disturbed/to be left for public/ company use	Total
		Agriculture	Plantation	Water Body	To be left for Public/ Company Use	Total			
Upto 31.03.2018		-	119.40	-	-	119.40	-	-	119.40
Y-1	2018-19	-	151.60	-	-	151.60	-	-	151.60
Y-2	2019-20	-	190.05	-	-	190.05	-	-	190.05
Y-3	2020-21	-	251.49	-	-	251.49	-	-	251.49
Post Closure									
Y- 6	2023-24	-	327.30	137.47	25.37	490.14	-	-	490.14

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Ref. 34012/01/2015 - CPAM
Dt. 05-10-2017

Sl. No.	Ref Para	Observations	Clarifications	Incorporated at
10	Plate IIA & Plate VI	Some part of external OB dump appears to extending beyond geo-reference nodes 34 & 35 in the mining lease area certified by State Govt. This needs to be reconciled.	The OB dump in the plans under reference was shown by mistake. This has been corrected. The area shown as OB dump is not basically an OB dump. The purpose of this dumping is for blanketing the subsidence cracks of adjoining UG mine and not part of this project area. The plan is modified accordingly.	Plate IIA & Plate VI Para No. 5.6.6.2 of Chapter 5
11	Plate XV	It appears from the plan under reference that JK OC void is being utilised for dumping of OB to avoid external dumping of OB and further degrading of land, but mining plan does not mention about the same.	The utilization of JK OC Mine voids for OB dumping to avoid degradation of land is now mentioned in the Mining Plan at all relevant pages.	Para No. 5.6.6.1 of Chapter 5
12		The reduce level shown in the stage plans, cross sections does not match with RL shown in the Topographical plan.	The RL shown on Topographical plan is with reference to the MSL. Datum as 700 m shown on Stage plans, cross sections etc. are with respect to Survey of Indian National Grid, which is required as per the DGMS Circular No.20/1966&No.42/1967.	Para No. 3.4 of Chapter 3
13		In Geological cross section (Plate no.X), Quarry surface and Quarry floor shall be indicated.	Quarry Surface and Floor limit lines are incorporated now in the Geological Cross Section Plan (Plate No. X)	Plate X
14	Plate XVIC	Refer plate no. XVIC, the RL of decks of external dump is not indicated.	RLs of decks of external dump are indicated now.	Plate XVIC
15		Refer Plate No. XIV, total coal thickness and overburden thickness is not provided.	Total thickness and overburden thickness are provided now.	Plate XIV and Plate XIVA
16		To derive extractable reserves, 10% deduction has been made from mineable reserve, it is on higher side, it shall be taken 5% as standard practice.	The observation has been complied with. Extractable reserves are now estimated by deducting 5% from the mineable reserves as standard practice. Accordingly, the changes are made at all relevant pages. The details furnished in Table no.11	Para No. 4.9.0 of Chapter 4

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Ref. 3101/2/01/2015-CPAM
Dt. 05-10-2017

Table No. 11

Seam	Thickness Range 'm'	Depth Range 'm'	Net GR "Mte"	Blocked Reserve below (Mte)					Mineable Res " Mte"		Mining losses (Mte)
				Highwall/ Batters	Nala/ River/ Road	Barrier	Un-economic/ unworkable	Total Blocked	UG	OC	
"A" (Queen) Seam	5.79 - 20.23	30 - 120	26.3	2.63						23.67	1.18
Total			26.3	2.63						23.67	1.18

Seam	Ext Res "Mte"			As on base date "Mte"							Reason not considered for mining
				Depletion of Reserve			Balance Reserve				
	UG	OC	Highwall	UG	OC	Highwall	UG	OC	Highwall	Total	
"A" (Queen) Seam		22.49			13.15			9.34		9.34	
Total		22.49			13.15			9.34		9.34	
Percentage of Extraction										85.51%	

17		Mine take area of new plan (490.14 ha) is reduced from old plan (514.95ha), require justification.	Earlier approved Mining Plan envisaged to use 266.81 ha voids of JK OC and 24.81 ha external dump for dumping of OB. In this proposal, entire external dump area of 24.81 ha is avoided and planned entire dumping in the 266.81 ha JK OC voids to avoid further degradation of land. Hence, the project area has been reduced from 514.95 ha to 490.14 ha	Para No. 5.6.6.1 of Chapter 5

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Ref 34012/01/2015-CPAM
Dt 05-10-2017

<table>
<tr><th>Sl. No.</th><th>Ref Para</th><th>Observations</th><th>Clarifications</th><th>Incorporated at</th></tr>
<tr><td>18</td><td></td><td>Considering peak capacity of coal & OB and productivity of machine, the number of loading equipment seems to be in lower side.</td><td>The proposed equipment configuration in the MP/MCP has already achieved 2.94 Mty consistently in the last 4 years.
The gap in proposed capacity will be achieved through outsourcing mode, the equipment configuration of which is reconciled and modified.
However, the equipment configuration with matching rated capacity has been reconciled and modified and furnished in Table No.12</td><td>Para No. 5.5.0 of Chapter 5</td></tr>
<tr><td></td><td></td><td colspan="3">
<u>Table No. 12</u>
<table>
<tr><th>SL.NO.</th><th>PARTICULARS</th><th>No. of Units</th><th>SL.NO.</th><th>PARTICULARS</th><th>No. of Units</th></tr>
<tr><td>A)</td><td>C O A L (Departmental)</td><td></td><td>C)</td><td>C O M M O N (Departmental)</td><td></td></tr>
<tr><td>1</td><td>3-3.5 Cum Hyd. Shovel</td><td>1</td><td>1</td><td>280 HP Motor Graders</td><td>1</td></tr>
<tr><td>2</td><td>3-3.5 Cum Diesel Hyd. Shovel</td><td>1</td><td>2</td><td>145 HP Motor Graders</td><td>2</td></tr>
<tr><td>3</td><td>35 T Rear Dumpers</td><td>14</td><td>3</td><td>0.9 Cum. Diesel Hydraulic Shovel</td><td>1</td></tr>
<tr><td>4</td><td>150 - 160 mm RBH Drills</td><td>2</td><td>4</td><td>28KL Water Sprinkler</td><td>1</td></tr>
<tr><td>5</td><td>410 HP Dozers</td><td>2</td><td>5</td><td>4-5 Cum FEL</td><td>1</td></tr>
<tr><td>B)</td><td>Overburden (Offloading)</td><td></td><td>6</td><td>Diesel Bowser 12 KL</td><td>1</td></tr>
<tr><td>1</td><td>3.0 Cum Hyd. Shovel</td><td>12</td><td>7</td><td>8/10T Cranes</td><td>3</td></tr>
<tr><td>2</td><td>15 Cum Dump Trucks</td><td>60</td><td>8</td><td>40T Crane</td><td>1</td></tr>
<tr><td>3</td><td>145 HP Motor Graders</td><td>5</td><td>9</td><td>Fire Tender</td><td>1</td></tr>
<tr><td>4</td><td>150 - 160 mm RBH Drills</td><td>5</td><td>10</td><td>Mobile maintenance van</td><td>1</td></tr>
<tr><td>5</td><td>410 HP Dozers</td><td>6</td><td></td><td></td><td></td></tr>
<tr><td>6</td><td>28KL Water Sprinkler</td><td>6</td><td></td><td></td><td></td></tr>
</table>
</td></tr>
</table>

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Dt. 25-10-2017

19		As it is final MCP, Post mining infrastructure retention and proposed decommissioning detail may be provided with provision in place of lump sump provision.	Detailed post mining infrastructure retention and proposed decommissioning is provided with provision in place of lump sum provision as this is final MCP and furnished below table no.13 and at all relevant pages.	15.8.2 of Chapter 15

Table No. 13

Sl.No.	Description	Area (Sq.m)	Type of Structure	Remarks
1	Project Office	394.35	RCC	Demolished
2	First Aid Room	16.555	Shed	Demolished
3	Pit Head bath & Toilets	69.686	Shed	Demolished
4	Muster booking office (Manway)	33.8	RCC	Demolished
5	Stores Office	15.624	Shed	Demolished
12	Canteen-cum- Rest Shelter	281.114	RCC & shed	Demolished
13	Work shop			
a	Dumper repair complex	511.0	Shed	Demolished
b	Dumper daily maintenance shop	72.8	Shed	Demolished
c	Dozer & face equipment repair complex	511.0	Shed	Demolished
d	Dozer washing station	24.031	Shed	Demolished
e	E&M repair complex	877.68	Shed	Demolished
14	Stores	1053.824	Shed	Demolished
15	Service buildings for CHP	139.12	Shed	Demolished
16	CHP	1672.10	Shed	removed and used for Rompedu OC mine.
12	Any other	1313.075	RCC & Shed	Demolished

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20		Detail on Disposal of Mining Machinery may be provided.	The detail on Disposal of Mining Machinery is provided below in Table no. 14	15.8.1 of Chapter 15

Table No. 14

Sl.No.	Machinery	Units	No of Units	Remarks
1	35 T Dumper	No.s	14	will be disposed and used for future proposed adjoining OC mines.
2	Water Sprinkler	No.s	2	
3	5 Cum shovels	No.s	1	
4	3 Cum shovels	No.s	1	
5	1 Cum Shovel	No.s	1	
6	Drill	No.s	2	
7	Dozer	No.s	3	
8	Motor Grader	No.s	2	
9	Loader	No.s	2	
10	Mobile Cranes	No.s	4	
11	ForkLifter	No.s	1	
12	Tyre Handler	No.s	1	
13	Supporting Equipment	No.s	6	
14	Sub Station equipment	Lot	1	
15	OHT & LT Lines	KM	10	
16	Communication & Networking	Lot	1	
17	Pumps	No.s	6	
18	Cables	KM	20	
19	Pipe ranges	KM	20	
20	Crushers	Nos	2	
21	Belt Conveyor Drive	Nos	4	
22	Belt Structure & Belting	KM	1	
23	Preweigh Bin complete with gantry	Nos	1	
24	Weigh Bridge	Nos	1	
25	Workshops Equipment	Lot	1	

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21		Para 15.7 and Annexure 15 may be checked and compared Annexure 15 (Bar Chart shows expenditure of Rs. 99.541 Crs).	The details provided at Para No.15.7 of Chapter 15 are correct and further the details of realistic estimation of mine closure cost are furnished at para no.15.7 of Chapter 15 and Barchart is enclosed as Annexure 15(A) and Annexure 15 (B) and the same are furnished in the Table No.15.	Annexure 15A & 15B

Table No.15

Annexure - 15 (A) - BAR CHART

Progressive Closure Activities to be taken up at JK-5 Opencast Mine

		Up to 2017-18	2018-19	2019-20	2020-21
1) Up to March, 2018 (Rs. 185.36 Cr)					
a	Water quality management (Cost: Rs. 10.78 Cr)	Rs.10.78 Cr			
b	Air quality management (Cost Rs. 136.73 Cr)	Rs. 136.73 Cr			
c	Top Soil management (Cost Rs. 11.41 Cr)	Rs. 11.41 Cr			
d	Plantation (Cost Rs. 0.72 Cr)	Rs. 0.72 CR			
c	Waste Management (Cost Rs. 0.011 Cr)	Rs. 0.011 Cr			
d	Other Activities (Cost Rs. 25.709 Cr)	Rs. 25.709 Cr			
2) From April, 2018 (Rs. 30.13 Cr)					
a	Water quality management (Cost: Rs. 0.98 Cr)		Rs. 0.98 Cr		
b	Air quality management (Cost Rs. 20.23 Cr)		Rs. 20.23 Cr		
c	Top Soil management (Cost Rs.3.96 Cr)		Rs. 3.96 Cr		
d	Plantation (Cost Rs. 0.46 Cr)				
e	Waste Management (Cost Rs. 0.33 Cr)		Rs. 0.33 Cr		
f	Other Activities (Cost Rs. 4.17 Cr)		Rs. 4.17 Cr		
3) Miscellaneous Cost (Rs. 9.1 Cr)					
Total Cost of Progressive Mine Closure Activities			Rs. 224.59 Cr		

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Annexure-15 (B)

Final Mine Closure Activities to be taken up at JK-5 Opencast Mine

		2021-22	2022-23	2023-24
1) Dismantling of Infrastructure & Disposal/ rehabilitation of Mining machinery (Rs. 8.21 Cr)				
a	Dismantling of Infrastructure (Cost: Rs.7.20 Cr)	Rs.7.20 Cr		
b	Dismantling/dipsosal of UG/OC equipment (Cost Rs. 1.01 Cr)		Rs. 1.01 Cr	
2) Safety and security (Rs. 38.94 Cr)				
a	Safety (Cost: Rs. 32.82 Cr)	Rs. 32.82 Cr		
c	Security (Cost: Rs. 6.12 Cr)	Rs. 6.12 Cr		
3) Technical and Biological Reclamation of Mined out of land and OB Dump (Rs. 0.40 Cr)				
a	Terracing, blanketing with soil and vegetation of External OB Dump (Cost: Rs. 0.13 Cr)		Rs. 0.13 Cr	
b	Plantation (Cost Rs. 0.27 Cr)			
4) Post Closure management and supervision (Rs. 8.59 Cr)				
a	Post Environmental Monitoring (Cost Rs. 0.21Cr)		Rs. 0.21 Cr	
c	Manpower Cost and supervision (Cost Rs. 0.46 Cr)		Rs. 0.46 Cr	
f	Pumping & Other Activities (Cost Rs. 7.92 Cr)		Rs. 7.92 Cr	
5) Miscellaneous Cost (Rs. 3.16 Cr)			Rs. 3.16 Cr	
Total Cost of Final Mine Closure Activities			Rs. 59.30 Cr	

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Sl. No.	Ref Para	Observations	Clarifications	Incorporated at
22		The amount to be deposited in the Escrow Account is Rs. 41.20 Crs & Rs.29.51 Cr has already been deposited upto 2017-18. The Annual deposition calculation may be checked.	The annual deposition calculation is checked and provided below in Table No.16 and at all relevant pages.	15.11.0 of Chapter 15.

Table No. 16

WPI as on				*Aug-09*	*129.60*
WPI as on base date	*Base Year 11-12*	*156.13*	*April, 2018*	*117.30*	*183.14*
Escalation rate of Closure cost					*1.41*
				UG	*OC*
Base Rate of Closure Cost "Rs. Crs./Ha"				*0.01*	*0.06*
Closure Cost "Rs. Crs/Ha"				*0.01*	*0.08479*
Project Area in ha					*490.14*
Mine Closure Cost per ha basis "Rs. in Crs"				*0.00*	*41.56*
Rate of compounding of Annual Closure Cost					*5.00%*
Balance Life of the project "in Yrs"					*3*
Annual Closure Cost "Rs. in Crs"				*0.000*	*13.853*
Amount to be deposited into Escrow Account after compounding @ of					*43.670*
Amount already deposited into Escrow Account "Rs. in Crs"					*29.51*
Net Amount to be depostied into Escrow Account "Rs. in Crs"					*14.160*

Amount to be deposited into Escrow Account annually ("Rs. in Crs")					
Year	*OC*	*UG*	*Total*	*Deposited upto Mar, 18*	*Balance to be Deposited*
0		*0*			
1	*13.853*	*0.000*	*13.853*	*29.51*	*0.000*
2	*14.545*	*0.000*	*14.545*	*0*	*0.000*
3	*15.272*	*0.000*	*15.272*	*0*	*14.160*
Total	*43.670*	*0.000*	*43.670*	*29.510*	*14.160*

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Sl. No.	Ref Para	Observations	Clarifications	Incorporated at
23		Realistic assessment of the final mine closure cost should be furnished.	Realistic assessment of the final mine closure cost is furnished below in Table No.17 and at all relevant pages.	All relevant pages

Table No. 17

Head	Activity	Unit	Quantity	Rate Rs / Unit	Amount "Rs. Cr"
Progressive closure up to March-2018	**Water quality management:**				
	a. Filter beds (1 lakh gallons per day) construction	Nos	1	2500000	0.25
	b.Maintenance of Filter beds	Years	7	400000	0.28
	c.Mixing of chemicals in filter beds for water quality	Years	7	100000	0.07
	d.Mixing of lime or other chemicals in OC sumps for maitaining pH value	t	284	4600	3.27
	e.Construction of setling ponds	Nos	3	1000000	0.30
	f.Cleaning of drains	Km/Yr	12.2	170000	5.19
	g.De-silting of setling ponds	Sq.m	14542	50	0.36
	h.Construction of Effluent Treatment Plants	Nos	1	1500000	0.15
	i. Construction of Sewage Treatment Plants	Mld	0.50	15000000	0.75
	j. Maintenance of ETP & STPs	ls		1650000	0.17
	Air quality management:				
	a.splillage coal cleaning over haul roads	Km	3.2	2500	3.65
	b.Grading of roads by graders	Nos	1	7511118.67	18.78
	c.Water sprinkling by mobile tankers	Nos	3	7736524.04	58.02
	d.Dust suppression of fugitive emission by chemical spray system at CHP	Nos	1	11400000	1.14
	e. Continuous water spraying arrangements along haul roads	km	1.5	2500000	0.38

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			f. Compaction of blasted benches with dozers before water spraying	Nos	2	7511118.67	37.56	
			g.Fire fighting Equipment	Nos	1	6790172.75	16.98	
			h. Portable Fire fighting operations	Lot	1	300000	0.03	
			i Green belt within CHP area					
			j. Dust respirators					
			k. Dust Extractor system	Nos	1	2000000	0.20	
			l. Mixing of chemicals along with mist sprayers					
			Waste Management	Mm^3				
			(1) Oils					
			(2) Hazardous Waste like					
			a.Old Tyres	Nos	96	573.64	0.01	
			b.Used Oils	KL	8	1370.88	0.001	
			c.Used Transformer Oils	KL	1	1428.00	0.000	
			d.Old Batteries	Nos	10	198.68	0.000	
			e.Empty oil & grease Barrels	Nos	52	192.13	0.001	
			f.Aluminium & non ferrous scrap	t	1	5712.00	0.001	
			g.Old carton boxes	t	1	571.20	0.000	
			h.Misc scrap items	t	4	615.14	0.000	
			i.MS scrap	t	18	576.39	0.001	
			j.CHP (Old Belting)	t	1	952.00	0.000	
			k.CHP (Old belt conveyor items)	t	6	571.77	0.000	
			l.Computers, peripherals & other IT waste	t	1	5712.00	0.001	
			Barbed wire fencing around dump	m				
			Barbed wire fencing around the Pit	m	4250	772	0.33	
			Filling of Void - Rehanding of Crown Dump	Mm^3				
			Top Soil management	Mm^3	2.688	42450000	11.41	

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			Technical and Biological Reclamation of Mined out of land and OB Dump	ha	151.37	25000	0.38	
			Plantation over virgin area including green belt	ha	119.4	60000	0.72	
			Manpower Cost and supervision	Nos	3	989332.5	7.42	
			Toe Wall around the dump	m	12200	4362	5.32	
			Garland drain around quarry	m	4700	214	0.10	
			Garland Drain around the dump	m	8900	214	0.19	
			Deck drains					
			Cross Deck drains					
			Check dams over slopes					
			Gabbion structures etc.					
			Any other Activity					
			(a) Post Project Environmental Monitoring	Years	7	500000	0.35	
			(b) Sealing of panels	Nos				
			(c) Subsidence monitoring					
			(d) CO monitoring					
			(e) Shale picking	Years	6	1825000	1.10	
			(f) Dismantling/dipsosal of UG/OC equipment	Nos				
			(g) Power cost w.r.t mine closure activities	Years	7	4438184.332	3.11	
			(h) security manpower	Nos	3	989332.5	7.42	
				Sub-Total (A):		**119376969**	**185.36**	
		Progressive closure from April-2018	**Water quality management**					
			a.Maintenance of Filter beds	Years	3	400000	0.12	
			b.Mixing of chemicals in filter beds for water quality	Years	3	100000	0.03	
			c.Mixing of lime or other chemicals in OC sumps for maitaining pH value	t	62.5	5000	0.03	
			d.Construction of settling ponds		1	1000000	0.10	

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			e.Cleaning of drains	Km/Yr	12.2	170000	0.62	
			f.De-silting of setling ponds	Sq.m	14542	50	0.07	
			g.Construction of Effluent Treatment Plants					
			h.Construction of Sewage Treatment Plants					
			i.Maintenance of ETP & STPs					
			Air quality management					
			a.Dust cleaning over roads	Km	3.2	2500	0.44	
			b.Grading of roads by graders	Nos	1	10166608.50	3.05	
			c.Water sprinkling	Nos	3	7913747.92	7.12	
			d.Dust suppression and fog spray system at CHP	Nos	1	5700000	0.57	
			e. Continuous water spraying arrangements along haul roads	Km	1.5	1250000	0.19	
			f. Compaction of blasted benches before water spraying		2	10166608.50	6.10	
			g.Fire fighting		1	9190778.50	2.76	
			Waste Management	Mm^3				
			Barbed wire fencing around dump	m	4250	772	0.33	
			Barbed wire fencing around the Pit	m				
			Filling of Void - Rehanding of Crown Dump	Mm^3				
			Top Soil management	Mm^3	0.932	42450000	3.96	
			Technical and Biological Reclamation of Mined out of land and OB Dump	ha	132.09	35000	0.46	
			Plantation over virgin area including green belt	ha				
			Manpower Cost and supervision	Nos	3	1533000	0.46	
			Toe Wall around the dump	m	1000	4798.2	0.48	
			Garland drain around quarry	m				
			Garland Drain around the dump	m				
			Any other Activity					
			(a) Post Environmental Monitoring	Years	3	704394.61	0.21	

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Dt. 05-10-2017

			(b) Sealing of panels	Nos			
			(c) Subsidence monitoring				
			(d) CO monitoring				
			(e) Shale picking	Years	3	2573250	0.77
			(f) Dismantling/dipsosal of UG/OC equipment				
			(g) Power cost w.r.t mine closure activities	Years	3	6007265.3	1.80
			(h) security manpower	Nos	3	1533000	0.46
				Sub-Total (B):		**100906774**	**30.13**
		Post Closure Activities					
		Dismantling of Infrastructure & Disposal/ rehabilitation of Mining machinery	**Dismantling of Infrastructure**				
			a.RCC structures	ha	0.320	45620782.29	1.46
			b.Closed sheds	ha	0.286	53251566.33	1.52
			c.Open Sheds	ha	0.090	34080926.36	0.31
			d.Others	ha	0.524	36145614.42	1.89
			e. Decommissioning of CHP	ha	0.328	61566854.01	1.86
			f.Decommissioning of Sub-Station	ha	0.486	3373538.726	0.16
			Rehabilitation of the Dismantled Facilities				
			Dismantaling of pumps and Pipes/ other facilitites				
			Total Reclaimed land - Sub Total		**2.03**		
			Dismantling/dipsosal of UG/OC equipment				
			a.Old Tyres	Nos	400	2013.48	0.08
			b.Used Oils	KL	40	6854.40	0.03
			c.Used Transformer Oils	KL	12	1904	0.002
			d.Old Batteries	Nos	36	1269.33	0.005
			e.Empty oil & grease Barrels	Nos	800	528.36	0.04
			f.Aluminium & non ferrous scrap	t	1	5712	0.001
			g.Old carton boxes	t	1	5712.00	0.001
			h.Misc scrap items	t	60	666.40	0.004
			i.MS scrap	t	200	1056.72	0.02

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			j.CHP (Old Belting)	t	10	1142	0.001	
			k.CHP (Old belt conveyor items)	t	50	1142.40	0.01	
			l.Computers, peripherals & other IT waste	t	1	5712.00	0.001	
			Rearranging water pipeline to dump top park/ Agricultural land					
			Dismantling of Power lines	Km	17	479240	0.81	
		Safety and security	Security all around the project	Nos	3	1533000	0.46	
			Barbed wire fencing around dump	m	800	772	0.06	
			Barbed wire fencing around the Pit	m	800	772	0.06	
			Barbed wire fencing with masonary pillars					
			Concrete wall with Masonalry pillars around the pit					
			Securing air shaft					
			Securing of Incline					
			Building of Water Dams (UG)					
			Boundary wall around the water body	m	5860	9440	5.53	
			Stabilisation (viz benching, pitching etc) of side walls of the water body					
			a.Sloping & Stabilizing the high wall benches	Sq.m	532573	350	18.64	
			b.Sloping, Stabilizing and reclaiming the internal dump slopes with plantation	Sq.m	385268.2	350	13.48	
			c.Providing grassed water ways along slopes and benches	m	2814	1500	0.42	
			d.Planting Hedge rows on slopes	ha	46.12	25000	0.12	
			e.Grass mixture cladding on slopes	ha	46.12	35000	0.16	
			Toe Wall around the dump					
			Garland Drain around the dump					
			Drainage Channel from main OB dump					

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		Technical and Biological Reclamation of Mined out of land and OB Dump	Filling of Void	ha				
			Top Soil management	Mm^3				
			OB Rehandling for backfilling	Mm^3				
			Terracing, blanketing with soil and vegetation of External OB Dump	ha	38	35000	0.13	
			Paripheral road, gates, view point, cemented steps on bank					
			Expenditure on development of Agricultural land					
			Plantation	ha	75.81	35000	0.27	
		Post Closure management and supervision	Power Cost	Years	3	6007265	1.80	
			Post Mining Water quality management					
			a. Maintainance of Fitler beds	Years	3	400000	0.12	
			b. Pumping power cost for sustenance of acquatic system in water body/final void	Years	3	100000	0.03	
			c. Clearning of drains	Km/Yr	12.2	170000	0.62	
			d.De-silting of tanks & nallahs	Sq.m	14542	50	0.07	
			Post Mining Air quality management					
			Post Environmental Monitoring	Years	3	704394.61	0.21	
			Waste Management					
			Pumping	Years	3	17583530	5.28	
			Manpower Cost and supervision	Nos	3	1533000	0.46	
		Others	Entrepreneurship development (vocational/skill development training for sustainable income of affected people)	74 nos of skilled operators deployed in this project from project affected people will be utilized in the adjoining mines of KOC-II & KOC III of Yellandu Area after closure of this mine.				
			Golden Handshake / Retrenchment benefits to 100 employees of OC	SCCL will not retrench any employee due to closure of this mine or in any of the other mines. They will continued to be deployed in other projects of SCCL till their retirement age				
			Golden Handshake / Retrenchment benefits to 200 employees of UG					

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			Onetime financial grant to societies / institutions /organizations which is dependent upon the project;	of 60 years. 62 employees will be retiring during 2018-21 year and remaining 271 direct employees will be redeployed in other projects.	
			Provide jobs in other mines of the company		
			Continuation of other services like running of schools etc.	SCCL is operating a high school at Yellandu in Yellandu Area, which will be continued to be operated inspite of closing this mine.	
			Misc Cost	12.26	
				Sub-Total (C):	**68.40**
				Grand Total (A+B+C)	**283.89**

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J. ADDENDUM - II

1. ADDENDUM - II

J - ADDENDUM-II /Clarifications to Mining Plan (including Final Mine Closure Plan) (3rd Revision/Modification) for JK-5 Opencast Mine", Yellandu Area of M/s. The Singareni Collieries Company Limited

The standing Committee sought certain clarification vide letter No. 34011/19/2018-CPAM, Dated, the 29th May 2019 on the presentation of the above mentioned project held on 22.05.2019 at Ministry of Coal, Shastri Bhavan, New Delhi. The point wise clarification to the observation is furnished here under as Addendum-II to "Mining Plan (Including Final Mine Closure Plan) (3rd Revision/Modification) of JK-5 Opencast Mine", Yellandu Area, The Singareni Collieries Company Limited". The Clarifications are also incorporated in the relevant pages and the finalized "Mining Plan (Including Final Mine Closure Plan) (3rd Revision/Modification) of JK-5 Opencast Mine", Yellandu Area, The Singareni Collieries Company Limited is submitted for approval.

Sl.No.	Observations	Clarification/compliance	Incorporated at
1	The Standing Committee advised to revisit the final mine closure activities envisaged in the mining plan and submit within a period of 15 days along with the approval of the company board for consideration in the meeting of Technical Members of the Standing Committee.	The final mine closure activities were revisited and reproduced hereunder as Table 1. The Final Mine Closure Plan of JK-5 Opencast Mine was approved by SCCL Board vide. Board Minute No. 547:5:3 dated 28.11.2018 for Mine Closure Cost of 43.298 Crores. However, copy of the revised Board Minute will be submitted separately with a covering letter for this project in due course of time.	CL 12.13 of Checklist & Para 15.70 of Chapter 15.

Table 1

Head	Activity	Unit	Quantity	Rate Rs. / Unit	Amount "Rs. In Cr"
A. Progressive Closure Activities	Water quality management	Year	3	10121000	3.036
	Air quality management	Year	3	15700000	4.710
	Waste Management	Mm^3	4	100000000	40.000
	Barbed wire fencing around the Pit	m	5800	772	0.448
	Top Soil management	Mm^3	0.932	42500000	3.961
	Technical and Biological Reclamation of Mined out of land and OB Dump	ha	132.09	35000	0.462
	Toe Wall around the dump	m	2320	4800	1.114
	Garland drain around Quarry	m	3140	214	0.067
	Garland Drain around the dump	m	2850	214	0.061
	Sub-Total (A):				**53.859**

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B. Post Closure Activities					
Dismantling of Infrastructure & Disposal/ rehabilitation of Mining machinery	Dismantling of workshop	No	1	16500000	1.650
	Dismantling of Office Buildings & Infrastructure	No	1	23000000	2.300
	Dismantling of CHP	No	1	14400000	1.440
	Dismantling of Pumps and Pipes/ other facilitites	No	6	700000	0.420
	Dismantling of Power lines	km	17	480000	0.816
Safety and security	Barbed wire fencing around the Pit	m	4480	772	0.346
	Toe Wall around the dump	m	7120	960	0.684
	Garland drain around quarry	m	11340	40	0.045
	Garland Drain around the dump	m	7650	40	0.031
Technical and Biological Reclamation of Mined out of land and OB Dump	Top Soil management	Mm^3	0.248	42500000	1.054
	*OB Re-handling for backfilling	Mm^3	0.5	20000000	1.000
	Terracing, blanketing with soil and vegetation of External OB Dump	ha	33.00	35000	0.116
	Landscaping and Plantation	ha	75.81	35000	0.265
Post Closure management and supervision	Power Cost	Year	3	6000000	1.800
	Post Mining Water quality management	Year	3	2030000	0.609
	Post Mining Air quality management	Year	3	3390000	1.017
	Manpower Cost and supervision	No	3	4599000	1.380
	Sub-Total (B):				14.973
	Grand Total (A+B):				**68.832**

*** OB Re-handling for backfilling is for Technical Reclamation for OB dumps/Final Void.**

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