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RESTRICTED CIRCULATION

MINING PLAN

Rule 22(3) of
Mineral Concession (Amendment) Rules,1987
for Renewal of
Yellandu Additional Mining Lease

VOLUME-I
(Text & Annexures)

The Singareni Collieries Company Limited
(A Government Company)

Department of Project Planning
P.O. Kothagudem Collieries - 507 101
Khammam District :: Andhra Pradesh

September 2005

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.

DGM (CP) / Chimi Secretary
SSO

CRP PP
I.W.No. 1275
Date 9/5

Restricted Circulation

MINING PLAN

RULE 22 (3) OF
MINERAL CONCESSION (AMENDMENT) RULES, 1987
FOR THE OF RENEWAL OF
YELLANDU ADDITIONAL MINING LEASE
(YELLANDU AREA)

एलिस कुजूर/ALICE KUJUR
अवर सचिव/Under Secretary
कोयला मंत्रालय / Ministry of Coal
भारत सरकार/Govt. of India
नई दिल्ली/New Delhi

Volume-I
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The Singareni Collieries Company Limited
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Department of Project Planning
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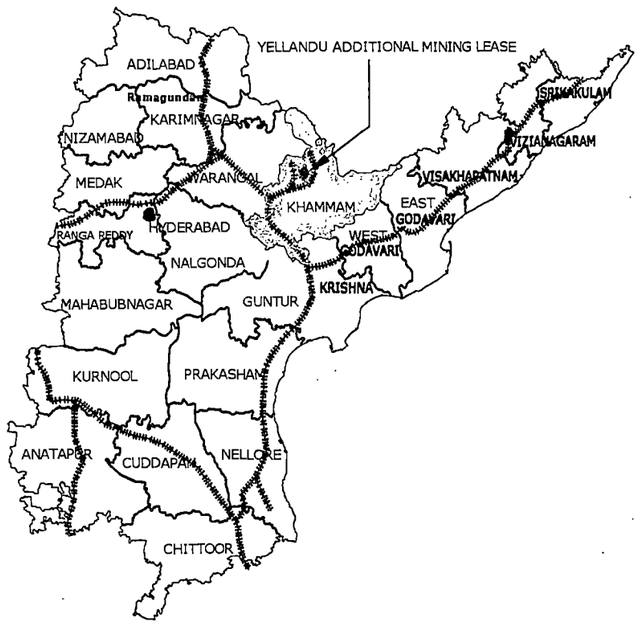
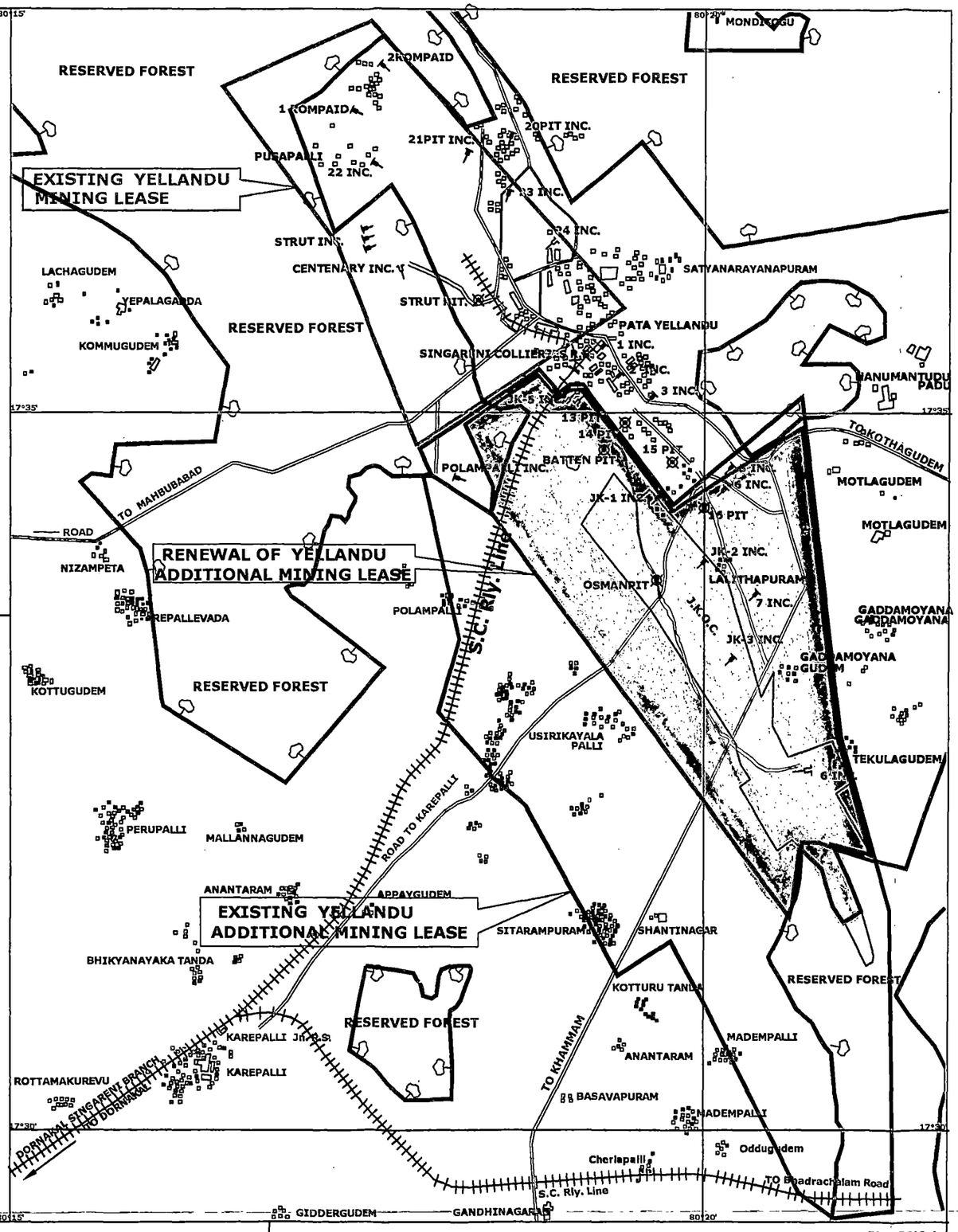
September 2005

INDIA

ANDHRA PRADESH





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Existing Yellandu Additional Mining Lease	3626 Ha.
Renewal of Yellandu additional Mining Lease	1741 Ha.
Forest Boundary	

LOCATION PLAN
YELLANDU AREA
RENEWAL OF YELLANDU ADDITIONAL MINING LEASE

Not to Scale

PLATE NO.1

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INDEX

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CHAPTER-1

INTRODUCTION

1.0 GENERAL

The Singareni Collieries Company Limited is a Public Sector undertaking producing coal since more than 100 years in the Godavari Valley Coalfield in the state of Andhra Pradesh. Coal was first discovered in 1871 near Yellandu village of Khammam district of Andhra Pradesh State. Since then extensive exploration has been carried out in the Godavari valley by GSI, SCCL & MECL. Coal bearing areas have been identified over a stretch of nearly 350 kms, with proved coal reserves of about 8450 Million tonnes as on 31.03.2005. Out of the above, 3080.15 Million tones proved reserves have been utilized for operating existing and ongoing mining projects.

The Singareni Collieries Company Limited is the sole coal producing Company in the state of Andhra Pradesh. In the year 2004-05, SCCL has produced 35.23 Million tones from its underground and opencast Mines.

Due to its strategic location and being the only coal producing Company in south India, SCCL has to meet the ever-increasing coal needs of south India. To meet the above demand of coal, SCCL Planned to increase the production to meet the future demand of coal from the level of 35.00 MT to 37.50 MT by the end of 2006-07 (X Plan) & 44.13 MTPA by the end of XII Plan.

In order to meet the growing demand, SCCL has been adopting the following measures:

(a) Opening of new Mines.
(b) Increasing the prospecting for coal in nearby existing mining blocks and other contiguous areas to prove new reserves.
(c) Reconstruction of the existing Mines for optimum production by introducing intermediate and high technologies.
(d) Extension of the existing mine workings to greater depth for increasing the life of the Mines and augmenting the production.
(e) Converting underground Mines into opencast Mines, wherever technically and financially feasible.

1. 1 *Plan Prepared by me*

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Presently Singareni Collieries Company Limited is operating 48(Nos.) underground Mines and 8 (Nos.) opencast Mines. These Mines are located in 4 districts of Andhra Pradesh namely Khammam, Adilabad, Karimnagar and Warangal. For administrative convenience, coal Mines in Adilabad district are grouped under one Region called Bellampalli Region, Mines in Karimnagar and Warangal district are grouped under Ramagundam Region and the Mines in Khammam district are grouped under Kothagudem Region.

The Mines in Kothagudem region are being operated under the administrative control of 3 Areas namely Kothagudem, Yellandu and Manuguru, which are covered under the following Mining Leases:

1. Kothagudem Mining Lease (29289 Ha)
2. Gouthamkhani OCP Mining Lease (675.69 Ha)
3. Yellandu Mining Lease (1363 Ha)
4. Yellandu Additional Mining Lease (3626 Ha)
5. Koyagudem Mining Lease (247 Ha.)
6. Manuguru Mining Lease (2186 Ha)
7. Manuguru Additional Mining Lease (125.90 Ha)
8. Manuguru OC-II (Phase-III) Balance Mining Lease (198.22 Ha)

Details of the Existing Yellandu Additional Mining Lease

Government of Andhra Pradesh had granted Yellandu Additional Mining Lease for an area of 3626 Ha. Vide its G.O.Ms.No.1175 dated 07-11-1972 for a period of 30 years, it was executed on 15-04-1974 and it is valid up to 14-04-2004. (A copy of the Government order for grant of Yellandu Additional Mining Lease is enclosed as Annexure – VIII).

Present Proposal

The present Proposal is for Renewal of the above Yellandu Additional Mining Lease for an area of 1741 Ha.

Yellandu Additional Mining Lease hold Area is covering two working underground mine viz. Part of 21 Incline, JK.5 Incline and one Opencast mine namely JK Opencast.

Mining activities in all the above three working mines are still going on and likely to continue for more than 32 years. Hence it is proposed to obtain renewal for the Yellandu Additional Mining Lease. The area proposed for renewal is shown in Plate Nos. I, II, III, IV & V.

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1.1 DETAILS OF LAND COVERED UNDER PROPOSED RENEWAL OF YELLANDU ADDITIONAL MINING LEASE:

Sl. No.	Description	Area (Ha)
1	Forest land (Ha)	71.50
2	Non-Forest land (Ha)	1669.50
	Total	1741.00

1.2 PRIOR APPROVAL OF FOREST LAND IN THE PROPOSED AREA

Total forest land within the Yellandu additional mining lease area is 71.50 Ha. Out of which an application for prior approval for 42.50 Ha was submitted in the prescribed form to State Government as required under forest (Conservation) Act, 1980 and the same has been forwarded to MOEF and is under process. However, a temporary working permission granted for a period of six months from 15-04-2005 or till renewal of the Mining Lease, Whichever is earlier, vide GOI, MOEF (F.C. Divison) F.No.8-54/1991-FC(pt),dated.10-05-2005.(Copy enclosed as Annexure No. VII).

The remaining forest land of 29.00 Ha is already under the possession of SCCL.

1.3 SPHERICAL CO-ORDINATES OF THE PROPOSED AREA:

STATION NO.	LONGITUDE	LATITUDE
Y1	17°35'20"	80°18'47"
Y2	17°35'11"	80°18'58"
Y3	17°35'12"	80°18'59"
Y4	17°35'10"	80°19'09"
Y5	17°34'18"	80°19'48"
Y6	17°34'55"	80°20'43"
Y7	17°32'46"	80°20'55"
Y8	17°31'54"	80°21'11"
Y9	17°32'00"	80°20'53"
Y10	17°31'43"	80°21'00"
Y11	17°31'37"	80°21'02"
Y12	17°31'30"	80°21'52"
Y13	17°31'51"	80°20'42"
Y14	17°31'54"	80°20'40"
Y15	17°31'32"	80°20'38"
Y16	17°31'29"	80°20'37"
Y17	17°34'20"	80°18'31"
Y18	17°34'29"	80°18'32"
Y19	17°34'52"	80°18'18"

1. 3 Plan Prepared by me

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1.4 APPLICANTS 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 1886.

1.5 MINING LEASES HELD BY SCCL

Being the only coal company in south India, SCCL holds Mining Leases for coal in Khammam, Warangal, Karimnagar and Adilabad district of Andhra Pradesh.

The mining rights of SCCL cover a stretch of 320 kms, in Godavari Valley with proved coal reserves of about 8450 Million tones at present.

Mining Leases for coal held by SCCL as on 31.08.2005 are given in Annexure-IIA.

Mining Lease for coal applied by SCCL and pending at various stages are given in Annexure-IIB.

1.6 JUSTIFICATION FOR APPROVAL OF MINING PLAN

I) SCCL - a Public Sector Company - and the present lease holder of the area seeking Mining Lease Where already developed all the infra-structure necessary - like Approach Roads, Power supply, Water supply, Communications, Post Offices, Police Station, Banks, Market facilities, Transport facilities, Schools, Hospitals, Recreation facilities etc., investing huge amount of money (as stated below) to work above mines. The Mines are producing coal to the desired capacity and catering to the needs of the consumers in South India.

II) The Mines have got a further life of 32 years. The details of Capital expenditure pertaining to above Mines are furnished below:

Sl. No.	Name of Mine	Investment as on 30.06.2005 (Original Value) Rs.Lakhs	Written Down Value as on 30.06.2005Rs. Lakhs
1	21 Incline	2318.81552	1621.00751
2	JK-5 Incline	4240.58638	919.26157
3	Jk-OC	5817.51454	1180.54068
	Total	12376.91644	3720.80976

III) The total estimated manpower for these working mines are 4604. The production capacities of the mines are 17.10 lakh tonnes per annum.

Hence, the Mining Plan for grant of renewal of Yellandu Additional Mining Lease is submitted for approval.

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CHAPTER-2

LOCATION, COMMUNICATION & PHYSIOGRAPHY

2.0 LOCATION AND COMMUNICATION

Yellandu Additional Mining Lease hold area is a part of Yellandu Coal belt of Godavari Valley Coalfield. Yellandu coal belt lies between longitude $80^0$18'58" to $80^0$21'59" and latitudes $17^0$34'02" to $17^0$39'24".The Yellandu Additional Mining Lease hold area now proposed for renewal lies between longitude 80^0 18'00" to 80^0 22'00" and latitude $17^0$30'00" to $17^0$36'00" . The area is covered in Survey of India part of the Toposheet No. 65C/6. It is situated in Yellandu and Singareni Mandal of Khammam district of Andhra Pradesh State.

The location of the area is shown in Plate No. I.

R&B of state roads are passing through Yellandu Additional Mining Lease hold area.

Yellandu Mining Block is well connected by an all weather, asphalt road with Kothagudem (i.e., nearest town), Khammam (district headquarter) and Hyderabad (State capital). Kothagudem, Khammam and Hyderabad are at a distance of 37 Kms., 48 Kms. & 263 Kms. respectively from Yellandu Additional Mining Leasehold area.

The nearest Railhead for Yellandu mining block is Singareni collieries Railway station, which is at a distance of 2 Kms. Singareni collieries Railway station is terminus of the branch line from Dornakal junction of South Central Railway.

2.1 PHYSIOGRAPHY

This is a narrow and elongated valley trending in a NNW-SSE direction and bound by low lying hillocks of cuesta type with intervening depressions. The mining area is gently undulating with sandy soil cover. The topographic elevation ranges from 400m above MSL on the hills, through 238m above MSL in the northern plains to 180m above MSL in the southern low lying area with a general slope towards SW.

There is no effective drainage development in this area, since the terrain forms an elevated ground, sloping towards SW. The drainage density of this area is 1.00 km/sq.km with a basin slope of 27m/km.

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2. 1 *Plan Prepared by me.*

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CHAPTER-3

GEOLOGY

3.0 GENERAL

The southern tract of Pranhita Godavari Valley Coalfield which is falling in Andhra Pradesh is termed as Godavari Valley Coalfield (GVCF). This basin houses a thick pile of fluviatile continental sediments with cumulative thickness of about 5000m. This basin covers an area of about 17000 sq.km in the districts of Adilabad, Karimnagar, Warangal and Khammam.

Based on geological and structural setup, the Godavari basin is divided into sub-basins. The Godavari Valley Coalfields is in turn divided into a number of coal belts on further geological conditions.

Yellandu Additional Mining Lease hold area is a part of Yellandu Coal belt of Godavari Valley Coalfield. The belt extends for over a length of 20 km from one end to the other actually the coal measures extend for a length of around 12 kms.

The Yellandu coal belt is an important coal Mining area constituting a major outlier of the main Godavari Valley Coalfield being located about 20 km to further west of the main Gondwana basin in its south central part. Incidentally, it is of historic importance to note that the coal mining in the entire GVCF for that matter in South India was first started in the Yellandu coal belt long back in 1889. This belt is bound by N Latitude $17^0$34'02" to $17^0$39'24" and E Longitude $80^0$18'58" to $80^0$21'59"and falls mostly in the Survey of India Toposheet No.65C/6, while a small portion of the southern extension of the coal belt falls in the Toposheet No.65C/7. It is covered by Yellandu Coal belt covering an area of 60.00 Sq.kms

The geological map of Yellandu Additional Mining Lease property is presented in Plate No.III.

3.1 DETAILS OF EXPLORATION

3.1.1 Exploration already carried out in the Area

Exploration up to 300m depth was completed in entire Yellandu coal belt.

760 boreholes have been drilled in Yellandu coal belt area of 60Sq.km. The density of the boreholes amounts to 12.33 boreholes/Sq.km. area.

259 boreholes have been drilled in Yellandu Additional mining lease coal belt area of 17.41Sq.km. The density of the boreholes amounts to 14.87 boreholes/Sq.km. area.

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3.1.2 Exploration proposed to be carried out

No further exploration is envisaged in Yellandu Additional Mining leasehold area proposed for renewal.

3.2 STRATIGRAPHIC SUCCESSION

The stratigraphic succession of Yelandu coal belt coal belt is as given below:

Age	Group	Formation	General Lithology	Max. Thickness (m)
Recent	--	--	Soil cover	3
P E R M I A N	L O W E R G O N D W A N A	KAMTHI	Ferrugenous sandstones and clays	60+
		BARAKAR	Dominantly sandstones with few regionally persistent coal seams and sub-ordinate shale/clays	300
		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	--

3.2.1 Structure

As the exposures are scanty and no data is available on the basement configuration and relief, the structure has been largely interpreted from the sub-surface borehole data. A perusal of this data shows that it is a shallow, asymmetrical synformal mining basin with a trans-basinal fault along the axis, traces in the southern part of the belt. It shows a closure of the beds in the northern part of the basin, where the axis runs in NNW-SSE direction with a gentle SSE plunge, probably extending up to the Central part of the basin.

3. 2 *Plan Prepared by me*

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As many as 11 major faults were delineated with the help of the borehole data and mine plans. Some of these faults at times form convenient natural block boundaries for the miners.

3.2.2 Description of Coal Seams

The sub-surface data has established the occurrence of eight correlatable 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.

Out of these, the most important is the E/King seam because of its good quality and persistent occurrence over a considerable area, with a good workable thickness. Similarly, though the A/Queen seam is comparatively inferior in quality, containing a coal suitable for power generation also occurs over a considerable area extent with a good workable thickness, considered for extraction.

However, other seams like B, C, D, Local, Marker/Index seam, 5 Incline seams are though persistent in most part of the coal belt; attain workable thickness only in small patches in a localised way. Hence these un-workable seams are avoided from assessment. Seam Structures of B, C, D, Local, Marker/Index seam, 5 Incline seams are presented in Plate No. VII.

The E/King seam has already been extensively exploited and exhausted in the pre-independence period, while the present workings are largely confined to the development of the A/Queen seam.

As stated earlier, the E/King seam and the A/Queen seams are the only two productive coal seams out of eight coal seams established in this coal belt. The sequence of coal seams of the Barakar Formation of the Yellandu coal belt is given below:

Sequence of coal seams of Barakar Formation in Yellandu coal belt

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 lenticular in nature	0.25 – 4.27

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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
Talchir Formation	Greenish sandstone	60+

E/King Seam

For all practical purposes, this is the basal workable coal seam occurring 50-100m from base of the Barakar Formation. The sub-surface data is very meager to reflect the thickness variations if any for this seam as majority of the boreholes were not drilled up to this seam. However, the available data indicates that this seam attains a better thickness in the NW part of the coal belt. The King seam has been extensively developed and depillared over most part of the coal belt in the pre-independence period by Bord & Pillar method of mining.

A/Queen Seam

This is the top most persistent coal seam established in this coal belt and contains power grade coal. This seam occurs about 35 to 73m above the King seam. This seam has a thickness variation of 4 to 9m in the NW part and gradually increases in thickness in the central and south central part, where the thickness is as high as 18.59m with consistent 12 to 16m in this part. The bottom 4 to 6m is generally devoid of any observable dirt bands. At present this seam is being mined through 21 Incline, JK-5 Incline and JK Opencast mine.

The quality of Queen Seam is "F" grade.

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Iso-chore Plan of A/Queen Seam is presented in Plate No. XIV &XV.

Index Seam

This is a marker seam which occurs above A/Queen seam with a parting ranging in thickness from 1.83 to 13.71m and is present in the northern half of the coal belt only and it merges with underlying A/Queen seam further southwards. A perusal of available borehole data shows that this seam in general varies in thickness from 1.11m to 4.39m and attains workable thickness over a very limited area.

Iso-chore Plan of Index seam is presented in Plate No. XIII.

3.2.2.1 21 Incline

The 21 Incline property falls within the Yellandu coal belt. The location of the property is bounded by latitude N17^{0}35'11" to 17^{0}36'13" and Longitude 80^{0}17'53" to 80^{0}19'00" and is covered in Survey of India Toposheet No.65C/6. The area of the mine property is 7.56 sq.km and this mine is started in the year 1941. The area of the mine property falling with in the Yellandu Additional Mining Lease Area is 0.60 sq.km.

Structure

The general trend of coal measures in this property is NNW-SSE to NW-SE dips varying between 5^0 to 12^0. The sequence of coal seams occurring within this property is presented below:

Seams/ Parting	Lithology	Thickness range (m)	Remarks
Index	Coal with carb shale bands	1.13 – 2.66	Working Seam
Parting	Grey Sandstone	2.59 – 10.06	
Queen Seam	Coal and shaly coal with inert bands	1.90 – 9.50	Working Seam
Parting	Grey Sandstone	39.89 – 47.14	
D-Seam	Coal with devoid of inert bands	0.23 – 2.00	Unworkable due to thin and impersistent in nature
Parting	Grey Sand Stone	7.83 – 10.08	
King Seam	Coal with devoid of inert bands	0.69 – 2.20	Already extracted before 1947

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The seam wise thickness and Geological reserves available with in the block area are as follows:

Seam	Thickness (m)	Grade	Geological Reserves available in Existing Yellandu Mining Lease(Mt)	Geological Reserves available in Yellandu Additional Mining Lease Proposed for Renewal (Mt)
Index	2.40	F	10.89	2.15
Queen	11.50	F	56.29	8.20
Total			**67.18**	**10.35**

The King seam , underlying Queen seam with a sandstone parting of about 65m, is of high quality coal. This seam was totally developed and depillared about 50 years ago.

Presently, Index seam and Queen Seam are being worked in 21 Incline. Some panels of Index seam were depillared with SDLs/LHDs earlier. Development of index seam by conventional method is presently in progress in the Yellandu Additional Mining Lease Proposed for Renewal.

Queen seam was depillared in some part by conventional method and the rest is planned with Blasting Gallery method.

3.2.2.2 JK-5 Incline

The JK-5 Incline property falls within Central part of the Yellandu outlies on its eastern margin. The location of the property is bounded by Latitude N17^{0}33'00" to 17^{0}34'54" and Longitude E80^{0}18'50" to 80^{0}19'53" and is covered in Survey of India Toposheet No.65C/6. The area of the mine property is 4.89 sq.km and started in 1982.

Physiography

There are a number of isolated mountains dotting the entire area trending in NNW-SSE direction. The area is gently sloping towards western side of the coal belt. The general relief varies from 415m above MSL in the hills to 170 MSL in the south.

Structure

The general trend of coal measures in this property is NNW to SSE with west south westerly dips ranging from 8^0 to 22^0. In this block totally 39 faults were delineated

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and most of the minor faults were encountered in Longwall roadways.The throw of the faults varies from 0.30m to 165m.

The sequence of coal seams occurring within this property is given below:

Seams/ Parting	Lithology	Thickness range (m)
KAMTHI FORMATION		
Parting	Sandstone with thin clay/shale and thin coal bands	80.00 – 110.00
A/Queen Seam	Coal and shaly coal with intercalation of shale and carbonaceous shale	6.47 – 14.58
Parting	Medium to coarse grained grayish white sandstone	13.91 – 23.35
B-Seam	Shale with thin coal bands.	0.26 – 0.91
Parting	Medium to coarse grained grey sandstone with sub-ordinate shale and coal bands.	16.29 – 36.50
D-Seam	Coal and shaly coal	1.29
Parting	Medium to coarse grained sandstone	12.31
E/King seam	Coal	0.58
Parting	Medium to coarse grained sandstone	

The thick seam (Queen) and the king seam are persistent throughout the area. Since the qualitative E/King seam was extensively exploited and exhausted while the other seams (B & D Seams) are though persistent, due to low thickness, they are not considered for extraction.

Only the Queen seam which is persistent and workable has been considered for assessment. Hence, the description of Queen Seam has been dealt while brief accounts of the rest of the seams are furnished below.

'E/King' seam

This seam is the basal most workable coal seam in JK 5 area, Yellandu coal belt.

This seam was exhaustively exploited in Yellandu coal belt by Britishers. Only one bore hole (Q/382) was drilled to prove the king seam, where this seam is virgin on the JK 5 dip side. The thickness of the seam proved in this borehole is 0.58m.

'D' seam

This seam overlies the king seam with a parting thickness of 12.31m. This seam was also proved only in borehole (Q/382) and the thickness is 1.29m. But regional data

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shows that this seam is persistent but does not attain workable thickness in the coal belt. This serves as marker horizon.

'B' seam

This seam overlies the 'D' seam with a parting thickness ranging from 16.29m to 36.50m.This seam was proved in 5 boreholes and thickness of this seam varies from 0.26m to 0.91m, shows not attain workable thickness. This also serves as marker horizon.

The Seam wise thickness and Geological reserves of Queen Seam available within the block are as follows:

Seam	Thickness Range (m)	Avg.Thickness (m)	Grade	Geol. Res. (Mt)
Queen Seam	6.47 – 14.58	11.50	G/F	118.78

Status of Mining

The King seam was extensively developed and depillared over most part of the coal belt in the pre-independence period by Bord & Pillar method of mining. Queen seam is being extracted by longwall method from 155m to 370m depth. The areas which are not amicable for longwall is being extracted by conventional method.

3.2.2.3 JK OPENCAST PROJECT

The total property is divided in to two blocks, namely JK OC - I and JK OC - II.

JK OC – I is covered under Yellandu coal belt. The location of the Block is bounded by Latitude N17^{0}20'00" to 17^{0}30'00" and Longitude E80^{0}16'00" to 80^{0}23'00" and is covered in Survey of India Toposheet No.65C/6.

JK OC–II (Madampalli)

JK OC–II is covered under Yellandu coal belt. The location of the property is bounded by Latitude N17^{0}31'52" to 17^{0}32'52" and Longitude E80^{0}20'14" to 80^{0}20'46" and is covered in Survey of India Toposheet No.65C/6. The area of the mine property is 0.714 sq.km. This OC Block (OC-II) started in the year 1993 and completed in 2004-05.

Physiography

The area forms gently undulating plains that are imperfectly drawn and dotted with hills. The topographic elevation of the area ranges from 180 m to 220 m above MSL.

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Structure

The general trend of the coal measures in this property is NNW to SSE with West-South Westerly dips of 9^0 to 11^0. One fault with throw of 19m was observed. The sequence of coal seams occurring within this property is presented below:

Seams/ Parting	Lithology	Thickness range (m)
Roof	Medium to coarse grained feldspathic sandstone with shale and clay bands.	19.80 – 69.04
A/Queen Seam	Composite seam with shale and carb.shale bands	6.00 – 18.00
Parting	Medium to coarse grained grey sandstone	7.32 – 16.85
B-Seam	Thin coal seam	0.45 – 1.35
Parting	Medium to coarse grained grey sandstone	23.58
C-Seam	Coal with shale bands	1.22

The Queen and King seams are persistent throughout the area. Queen seam is the top most seams of coal horizons occurring in the block. King seam, the bottom most seams in chronology and occurring about 65m below the Queen seam, had also been exploitated by conventional underground method more than half a century ago. The remaining seams (B & C) being deep seated, thin and lenticular in nature with impersistent thickness in this block, are not workable.

The Seam wise thickness and Geological reserves available within the block are as follows:

Seam	Thickness Range (m)	Grade	Geol. Res. (Mt)
Queen Seam	6.00 – 18.00	G	28.00

Status of Mining

Previously, this block was developed by Bord & Pillar method and now standing pillars are being extracted by Opencast. Queen Seam is only workable and occurs in most part of the area.

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3.3 QUALITY & GRADE

The quality/Grade of the coal seams is categorized based on their UHV range and specific gravity of different grades is presented below:

Grade	Specific Gravity	UHV (K.Cal/Kg)
B	1.45	5600 - 6200
C	1.50	4940 – 5600
D	1.55	4200 – 4940
E	1.60	3360 – 4200
F	1.68	2400 – 3360
G	1.76	1300 - 2400

The quality details of workable seams in Yellandu Additional Mining Lease are given below:

3.3.1 21 Incline

Sl. No.	Seam	Technology	Moisture (%)	Ash (%)	UHV (K.Cal/Kg)	Avg. Grade
1	Index	HS	4.36	40.93	2650	F
2	Queen Seam	SDL	3.64	39.26	2980	F
		BG	3.27	43.28	2476	F
21 Incline Overall			3.76	41.64	2635	F

3.3.2 JK 5 Incline.

Sl. No.	Seam	Technology	Moisture (%)	Ash (%)	UHV (K.Cal/Kg)	Avg. Grade
1	Queen Seam (Top)	HS &LW/RH	3.28	49.32	1641	G
2	Queen Seam (Bottom)	HS &LW/RH	3.96	40.22	2803	F
JK 5 Overall			3.72	43.47	2388	G

3.3.3 JK Opencast

Mine	Seam	Technology	Moisture (%)	Ash (%)	UHV (K.Cal/Kg)	Avg. Grade
JK OC	Queen Seam	Opencast	3.36	51.60	1317	G

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3.4 RESERVES

The total geological reserves proved in the property are 157.13 Mt within an area of 17.41 sq.km. proposed for renewal of Yellandu Additional Mining Lease.

3.4.1 METHOD OF ESTIMATION OF RESERVES

1) Indian standard procedure for reserves estimation was adopted while calculating the reserves in this area.
2) Iso-chore method is adopted for the calculation of the thickness and the reserves, with suitable modifications as required.
3) The area is calculated with the help of a Digital Planimeter and the volume is arrived at by multiplying the area with the average seam thickness at that respective point.
4) For calculating the thickness in a particular sector, the average Iso-chore values in the nearest borehole falling in the segment are considered.
5) The area where the seam thickness reduces to less than 1.5m is eliminated from the assessment.
6) The reserves calculation has been limited to two seams viz., Index, Queen Seams and other seams has been excluded from the purview of estimation owing to its unworkable thickness and poor grade.
7) For estimation of coal reserves the specific gravity of the respective grade is considered.
8) Heave zones for the faults have been excluded from the reserves calculation.
9) 10% deduction has been made to account for unforeseen geological disturbances and other factors to arrive at the net reserves.

3.4.2 GEOLOGICAL RESERVES (MT)

Seam	21 Incline(Part)	JK-5 Incline	JK-OC	Grand Total (MT)
INDEX	2.15	--	--	2.15
QUEEN	8.20	118.78	28.00	154.98
TOTAL	10.35	118.78	28.00	157.13

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CHAPTER-4

MINE BOUNDARY, MODE OF ENTRY, RESERVES & MINE LIFE

4.0 BOUNDARY OF YELLANDU ADDITIONAL MINING LEASE AREA PROPOSED FOR RENEWAL

South side	Madampalli Village
North side	21 Incline group of mines
West side	Usirikayalapalli village
East side	Yellandu Town

There are three working mines existing in the Yellandu Additional Mining Lease area proposed for renewal namely, part of the Yellandu 21 Incline, JK-5 Incline and JK Opencast Mine.

4.1 YELLANDU 21-INCLINE

4.1.1 Mine Boundaries

South side	JK-5 Incline
North side	21 Incline group of mines
West side	Polampalli Incline (Abandoned). Boundary fault (F_1F_1) between 21 Incline (Part) and Polampalli Incline
East side	JK -5 Incline.

4.1.2 Mine Entries

Details of the tunnels:

The following are the details of the entries existing into the mine:

Sl. No.	Description	Length/ Depth (m)	Area of Cross section (Sq.m.)	Purpose	Remarks
1	24 Main Incline	130	7.56	Intake	Upto Queen Seam
2	24 Manway Incline	120	6.30	Intake	Upto Queen Seam
3	Centenary Main Incline	120	11.76	Intake	Upto Queen Seam
4	Centenary Belt Incline	120	13.50	Intake	Upto Queen Seam
5	Strutt Pit Down-cast	149	18.09	Intake	Upto Queen Seam
6	Millenium Tunnel	550	12.50	Intake	Upto Queen Seam
7	Strutt Pit Up-cast (220HP Fan)	149	18.09	Return	Upto Queen Seam
8	Centenary Up-cast (190HP Fan)	27	28.27	Return	Upto Queen Seam

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4.1.3 Reserves

21 Incline is a very old mine and most of the reserves are extracted before 1947. The balance extractable reserves in the total mine area is 8.50 Mt and the left over life of the mine is around 19 years.

The details of reserves in the part of the mine which is covered under Yellandu Additional Mining Lease proposed for Renewal (for an area of 60.53 Ha) are as follows:

1) Geological Reserves (Mt)		10.35
Loss of reserves		
i) Mine boundary	0.80	
ii) Faults	0.26	
iii) Roads, Railway etc.	1.76	
Total	2.82	
2) Mineable reserves (Mt)		**6.77**
Loss of reserves		
i) Panel barrier	1.35	
ii) Horizon losses	1.20	
iii) Goaf/Technology losses	1.44	
Total	3.99	
3) Extractable reserves (Mt)		2.78

Out of the total extractable reserves covered under Yellandu Additional Mining Lease area (Proposed for Renewal) of 2.78Mt, the reserves already extracted are 0.30 Mt and the balance reserves to be extracted are 2.48 Mt.

4.1.4 Life of the Mine

Life of the above area is around five years at the rate of 5.10 LTPA production.

4.2 JK-5 Incline

4.2.1 Mine Boundaries

South side	North Mine Boundary of JK -OC
North side	21 Incline group of mines
West side	Fault (F2-F2)
East side	Abandoned Inclines (No.1,2,3&4)

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4.2.2 Mine Entries

Details of the tunnels:

The following are the details of the entries existing into the mine:

Sl. No.	Name	Length (m)	Width (m)	Height (m)	Purpose
1	29 Dip Tunnel	112	4.2	2.5	Belt conveyor and Travelling roadway
2	26 Dip Tunnel	105	4.2	3.0	Haulage for material transport
3	72R MID	140	4.2	2.5	Haulage
4	72R MWD	160	4.2	2.5	Return airway and Traveling roadway

Air Shaft

Sl. No.	Number/Name of the shaft	Diameter (mts)	Depth (mts)	Workings of different seams connected with shaft	Purpose
1	Batten shaft	4.7	142.5	Queen seam and King seam	Return air shaft
2	Batten shaft	3.0	144.42	Queen seam and King seam	Return air shaft
3	Osman pit	5.3	228.135	Queen seam and King seam	Intake air shaft

4.2.3 Reserves

The details of reserves are presented below:

1) Geological Reserves (Mt)		**118.78**
Loss of reserves		
i) Mine boundary	7.30	
ii) Faults	9.80	
iii) Roads, Railway, Nallahs etc.	3.89	
Total	20.99	
2) Mineable reserves (Mt)		**97.79**
Loss of reserves		
i) Panel barrier	19.55	
ii) Horizon losses	31.29	
iii) Goaf/Technology losses	11.74	
Total	62.58	
3) Extractable reserves (Mt)		**35.21**

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Out of the total extractable reserves of 35.21 Mt, the reserves already extracted are 18.80 Mt and the balance reserves to be extracted are 16.41 Mt.

4.2.4 Life of the Mine

The balance life of the mine is around 32 years at the rate of 5.00 LT per annum.

4.3 JK-OPENCAST MINE

4.3.1 Mine Boundaries

South side	A line drawn adjacent to BH.No.M/182 and BH.No.M/185 in east west direction.
North side	JK -5 under ground mine
West side	JK -5 under ground mine
North East side	Incrop of Queen seam

The total area is divided into two mines namely, OC-I and OC-II (Madampalli). OC-I is again made into five blocks namely, Block-A, Block-B, Block-C, Block-D and Block-E. The extraction of coal in Blocks A, B, C and D was already completed. Presently, **Block-E is under operation** with shovel – Dumper combination and ancillary equipment like motor grader, dozer, water sprinkler etc. The overburden is excavated by hydraulic excavators and transported by 35 T dumpers to dump yard.

The reserves in OC-II (Madampalli) are already extracted and reclamation has been done.

4.3.2 Reserves

The details of reserves in are presented below:

Sl. No.	Mine/Block	Geological reserves(Mt)	Extractable reserves(Mt)	Reserves already extracted(Mt)	Balance reserves (Mt)
1	JK OC - I				
	Block-A	3.40	3.06	3.06	--
	Block-B	2.12	1.91	1.91	--
	Block-C	2.86	2.57	2.57	--
	Block-D	4.96	4.50	4.50	--
	Block-E	8.13	7.43	4.85	2.58
2	JK OC – II (Madampalli)	6.53	5.88	5.88	--
	Total	28.00	25.35	22.77	2.58

4.3.3 Life of the Mine

The balance life of the mine is around 4 years at the rate of 7.0 LT per annum.

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CHAPTER-5

MINING

5.0 GENERAL

Yellandu Additional Mining Lease hold Area is covering two working underground mine viz. Part of 21 Incline, JK.5 Incline and one Opencast mine namely JK Opencast.

5.1 DESCRIPTION OF MINES:

5.1.1 21-Incline

There are two workable seams in this mine, namely Index and Queen.

The gradient of the seams is varying from 1 in 4 to 1 in 10.

Presently coal is being exploited from this mine by Hand Section, SDLs and Blasting Gallery method with an annual output of 5.10 LT. The details are as follows:

Sl. No.	Technology	Nos. on Roll	Production (LTPA)
1	Hand section	2 Drills	0.80
2	SDLs	6 Nos.	1.80
3	Blasting Gallery	1 unit	2.50
	Total		5.10

5.1.2 JK- 5 Incline

There is one workable seam, existing in the mine called Queen Seam.

The gradient of the seams is varying from 1 in 3.8 to 1 in 7. At present coal is being exploited from this mine by hand section and Longwall technology with an annual output of 5.00 LT. The details are as below:

Sl. No.	Technology	Nos. on Roll	Production (LTPA)
1	Handsection	5 Drills	2.00
2	Longwall	1 unit	3.00
	Total		5.00

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5.1.3 JK-Opencast Mine

There is one workable seam, existing in the mine called Queen Seam.

The gradient of the seam is varying from 1 in 5 to 1 in 7.

At present, coal is being exploited from this mine by opencast method with Shovel Dumper combination with an annual rated output of 7.0 LT.

5.2 METHOD OF MINING

The workable seams in Yellandu additional mining leasehold area is not outcropping anywhere and is incropping at a depth of 30m on an average.

The coal is being extracted by conventional Bord & Pillar method (Hand section, SDLs), Long wall technology, Blasting Gallery method and O/C method.

I) Bord & Pillar

After completing the development, depillaring operations will be taken up panel by panel by caving. The panels are designed in such a way that the depillaring operations will be completed within incubation period.

II) Development of Seams & Depillaring operations

5.2.1 21-Incline

5.2.1.1 Method of Work

At 21-Incline, there has been mechanization culture since 1980s. Shuttle cars, LHDs and SDLs were successfully worked in this mine. Index seam in MM1 panel was depillared using SDLs whereas in MM3, MM4, MM7, MM5, MM8 and MM9 panels, the Index seam was depillared using Conventional LHDs owing to favorable gradient and low seam.

5.2.1.2 Blasting Gallery Method

Extraction of Queen Seam in the developed panels by Blasting Gallery Method is proposed for improving productivity and greater safety and coal conservation as brought out below:

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Safety Aspect

Queen seam in this mine is a thick seam having an average thickness of 9.5m. This seam was developed in Top section along stone roof over almost whole of the mine take area. This seam had been depillared in few panels by conventional multi-section Bord and pillar method. The following element of danger exists in the conventional multi-section Bord & Pillar method.

- Strata Control: The slow rate of retreat with conventional hand section, strata control problems like crushing of stooks/ribs and loss of timber were common phenomenon in these panels.
- Fire Problems: In this method, large quantity of coal is left in the goaved out area consequently increasing the risk of spontaneous heating.
- More persons in the hazardous zone: Comparatively more number of persons are deployed in the actual area of extraction in a conventional depillaring district especially in multi-section depillaring. This significantly increases the exposure of more persons in active working zone.
- Support system: The system supports in hand section has a drawback. Inspite of utmost care in blasting of working faces, the supports get dislodged, leaving dangerous condition where the supports are absolutely required.
- Scarcity of timber: Timber supports are still pre-dominant in conventional depillaring due to their case in handling and economics. With the depletion of forest resources, the availability of timber supports will not be adequate to meet the needs.

Conservation Aspect:

In conventional multi-section Bord and pillar method, a partition of more than three meters has to be ensured invariably, between top and bottom sections. This results in the loss of coal, which would be irretrievable once the depillaring operations are completed. The percentage of extraction in thick seams by this method would be around 30% only. On the other hand, the percentage of extraction with Blasting Gallery method has been about 70% with better safety to the workmen in the panel.

Keeping these facts in view, the introduction of Blasting Gallery method is felt to be the optimum solution to extract the identified blocks in 21 Incline amenable for Blasting Gallery method. Five blocks in the developed area have been identified for this purpose. These blocks are named MM1, MM-3, MM-4, MM-5, and MM-7. These blocks are in the dip side property of the mine. The Index seam over these five blocks has been already depillared and the goaf is settled. The top section is developed along stone roof over almost whole of the area and bottom section is

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partly developed along floor stone. The size of pillars from center to center in these blocks is varying from a maximum of 28m x 30m to 36m x 42m. The width and height of developed galleries are 3.0m to 4.2m and 2.2 m to 3.0m respectively. The minimum and maximum depth of the identified blocks varies from 150m – 230m.

The horizon thickness of Queen Seam, where Blasting Gallery will be applied, varies from 9.0m to 10.50m and the average gradient varies from 1 in 8 to 1 in 17. The depth range is from 150-230m.The development plans of Index Seam, Queen Seam Top section and Queen Seam Bottom section are given in Plate Nos. XVI, XVII and XVIII respectively.

Principles of Blasting Gallery Method

The basic principle of Blasting Gallery Method is to recover coal in a thick seam by drilling and blasting the roof and sides of galleries located at the bottom of the seam and placed at regular intervals. The width of the pillar left between 2 adjacent galleries is generally between 8 to 13m.

Ring holes up to 10-15m long drilled in the roof and sides of galleries at regular distances varying between one and two meters by means of a Crawler mounted Jumbo drill. Blasting is done with explosive cartridges separated by inert spacers and detonating fuses so that the explosive is distributed uniformly. Special Permitted Explosive (P-3) by name 'Belgex-coal R' is used for Ring Blasting in the Blasting Gallery projects.

Presently, an explosive by name "Belgex Coal (R)" is being used for gallery long hole blasting in below ground coal mines/seams of first degree gassiness.

Loading is carried out by Load Haul Dumpers fitted with remote control system, which enables the operator to stand under the supported roof and operate the LHD to load the blasted coal. The LHDs bring coal from the faces and discharge into armored chain conveyor. These ACC feed a belt conveyor network which transport coal to the surface.

In general, the Blasting Gallery Method of work for extraction of developed pillars consists of:

- Each of the blocks identified for Blasting Gallery will be divided into panels and sub-panels depending upon the amount of coal available, rate and progress of extraction and incubation period. These sub-panels and panels will have isolation stoppings.

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- Driving rooms of 4m x 3m section and 60m long galleries along the floor of the seam. These galleries will be superimposed with the top section galleries. Further, galleries will be driven along floor of the middle of the pillars. The width of the pillar left between two adjacent Blasting Gallery galleries depend upon the size of the already development pillars.

A sketch showing the Method of Mining is presented in fig. 5.1.

5.2.1.3 Roof Supporting

In order to withstand abutment pressures created by the proximity of the goaf area, it is necessary to set up roof supports in the galleries nearby extraction line so as to keep freeway for the mobile equipment (Jumbo drills and LHDs). The supporting is done with steel girders fitted on two hydraulic props of 40T each. Galleries up to 40m from the face are kept supported by the above method.

5.2.1.4 Line of Extraction

In order to keep proper control of the roof caving, the line of extraction will be maintained at 45^0 to 60^0 angles from the level. Due to this face line angle, one half pillar is standing between two adjacent faces on a length depending upon the face line orientation. In case of weak immediate roof strata, part of this pillar could be left in the goaf after completion of ring blasting. It must be wide enough to prevent the local roof fall for a while after blasting but narrow enough to collapse in the goaf and prevent the main roof fall from being delayed. In case of hard roof, there is no need for leaving any rib in the goaf.

Coal Transport

In the Blasting Gallery, coal is loaded at the face by Load Haul Dumpers fitted with remote control system, which unable the operator to stand under the supported roof and operate the LHD. The LHD transports and discharges in to Armored Chain Conveyors fitted with lump breakers, which feed on to a belt conveyor network, through which coal transports to surface.

Material Transport

Light material can be transported by man winding shaft (Strutt Pit No.1 shaft) and heavy materials by the existing haulage system from 24 Incline. Additional haulage circuit can be extended further in queen seam bottom section to its place of requirement by direct / endless haulers.

Longwall technology was not proposed in this mine as the seam floor contour forming a basin deposit which is not suitable.

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5.2.2 JK-5 Incline

5.2.2.1 Long wall Technology

The Queen seam is a composite thick seam with coal and shale bands. The thickness varies from 10m to 23m in the property. The gradient varies from 1 in 3.8 to 1 in 7. Floor of the seam consists of fine grained sand stone or the shale. Immediate roof of the seam consists of grey sand stone more than 1m thick sometimes embedded with pebbles. As in most of the area the thickness is more than 10m thick, it is proposed to work this thick seam by retreating longwall method with modern technology i.e. with powered shield supports and shearer for greater safety and percentage extraction of coal.

The main dip headings and skeleton development for formation of longwall panels done by road headers. The areas not amenable for longwall mining are being extracted by conventional Bord & Pillars depending upon the thickness of the seam.

The Queen seam is being extracted in two sections i.e. bottom section and top section with a parting of 3 meters. Extraction of Top seam and bottom section extraction are in progress. In the bottom section two pairs of gate roadways driven along the floor of the seam by road headers and two gate roadways are connected at specified distance to form a longwall panel.

The size of the panels is mainly governed by the incubation period and experience in the already operating projects. Panels having width of 100-150 mtr. are giving good results during extraction, such as regular caving, less pillar crushing, good recovery of coal and materials, etc.

5.2.2.2 Support

The main function of support system in gate roadway is to keep in position the immediate roof. In general about 3m above working section is considered as immediate roof, but in adverse condition even up to 7m is considered as immediate roof for calculation of support system.

Gate Roadway

The gate roadways are supported with roof bolting with channels and wire mesh (2" X 2") with intermediate bolts. The length of the bolt is not less than 1.8m. As the gate roadways are supported totally by the roof bolting, the stability of roadway depends on the method of roof bolting. In the 4.2m gallery to maintain stability, vertical steel prop is proposed at the middle of the gate roadway. The distance of 30m from face is supported with 150mm X150mm ISMB support on 40T yielding

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hydraulic props. Further the distance of 5m from face would be supported with 1250mm length link bars coupled with open circuit hydraulic props and ISMB cross members.

Longwall face

The main support at the face is proposed by chock shields to meet the roof loading. These shields will be provided with forward cantilevers and face sprags with a view to support the newly exposed roof.

5.2.2.3 Transport

Coal Transport

Transport of coal from underground to surface and to the coal handling plant forms an important link in the successful operation of any mine

In the initial stages when the development is carried out by road headers, the main transporting system will be by rope haulage. Direct hauler installed on the surface will be operate in the main Incline feeding empties and drawing loads to the surface and to supply materials. After the tunnels reach the bottom of the seam, one direct hauler will be installed U/G to operate in the main dip to draw the production from the road headers and supply of materials. Required numbers of direct and endless haulers are provided at suitable places.

At long wall face an armored face conveyor will carry the coal cut and loaded by the Shearer. This face conveyor advances towards the face as the Shearer cuts the coal, by the rams fitted to the shields. This will deliver the coal to the gate belt conveyor via stage loader. The gate belt conveyors will deliver the coal to the trunk belt conveyor which transports to the surface.

Material Transport

By the time the production from mechanized faces starts coming, the main hauler and other haulers retained for transporting machinery and other materials underground. Each Road header face in the seam is provided with an endless hauler for material transport. In addition, for shield supports transportation from surface to the actual place of longwall face 4 Nos. of rail hugger transporters and one number face chock transporter provided.

Transport of men

Transport arrangement of men belowground is essential when the walking distances is long from the surface. The maximum distance for travel underground comes to

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about 5 kms to the longwall panel at the farthest end. The man riding arrangement not only reduces the strain of the workman but also reduce the walking time from the surface to the working place. As such, man riding arrangement provided at this mine. The main man riding arrangement will consists of slow speed direct haulers and man riding cars with all necessary safety devices.

5.2.2.4 Mine Ventilation

The standard of ventilation planned in view the coal mines regulations and circulars issued by DGMS from time to time, to create better environments and comfortable working conditions for higher efficiency, with increased safety.

A fan of 8400m^3/minute air capacity of 225 KW installed in the mine.

The air so split, at each working district and longwall face have independent air circuit. This not only ensures the supply of fresh air to each working face but also reduces the overall resistance of the mine thus improving the ventilation efficiency of the mine.

5.2.3 JK.OPENCAST MINE

5.2.3.1 Opencast Mining

The total area is divided into two blocks namely, OC-I and OC-II. OC-I is again made into five blocks namely, Block-A, Block-B, Block-C, Block-D and Block-E. The extraction of coal in Blocks A, B, C and D was already completed. Presently, Block-E is under operation with shovel – Dumper combination with ancillary equipment like motor grader, dozer, water sprinkler etc. The overburden is excavated by hydraulic excavators and transported by 35 T dumpers to dump yard.

The method of work comprises of –

A) Removal of OB to expose coal seam.
   - i) Initial opening of Box cut
   - ii) Removal of top soil and intermediate hard rock.

B) Extraction of coal

A Removal of Overburden:

i) Initial opening of Box cut

Box cut is made where-

a. The mining block area is free from geological disturbances and coal and OB transport distances are minimum.

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b. The block is opened by a Box-cut with access road located at the middle of the property on the south side of the exhausted Block-A. The main haul road extended along dip by maintaining the average gradient at not more than 1 in 16.

ii) Removal of top soil and intermediate hard rock.

Top soil excavated and transported with HEMM. In case of difficulty in excavation, blasting will be done to loosen the top soil. Overburden above the Queen seam removed with hiring of HEMM including drilling, loading and transporting. Blasting done departmentally. The OB bench height around 8.0 to 10.0 m. The width of the benches around 20m for facillating the movement of HEMM.

B Extraction of coal

Seam exposed after removal of Over burden , a 8-10 m high and 20m wide bench formed in coal by drilling, blasting and loading by 3-3.5 Cu.m shovel with supporting HEMM. Care taken to blast and fill the already developed underground galleries for movement of HEMM.

5.3 TECHNOLOGY EXISTING – MINEWISE

As on date, the existing technology mix of both the Mines is as follows:

Sl. No.	Mine	Technology				
		H/S drills	SDLs	Blasting Gallery	Longwall	
1	21 Incline	2	6	1		
2	JK-5 Incline	5	-	-	1	
3	JK.OC	-	-	-	-	Shovel-Dumper Combination
	Total	7	6	1	1	

The development plans are given in Plate No. XVI to XXI.

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5.4 MINE WISE, TECHNOLOGY WISE PRODUCTION PROGRAMME FOR THE NEXT FIVE YEARS FROM 2005-06 TO 2009-10 AS FOLLOWS:

(Production in Lakh Tonnes)

Mine	21-Incline (Lakh Tonnes)				JK-5 Incline (Lakh Tonnes			JK.OC (Lakh Tonnes)	Total (Lakh Tonnes)
Year	H/S drills	SDL	Blasting Gallery	Total	H/S drills	Long-wall	Total	Shovel-Dumper Combination	
2005-06	0.80	1.80	2.50	5.10	2.00	3.00	5.00	4.82	14.92
2006-07	0.80	1.80	2.50	5.10	2.00	3.00	5.00	7.00	17.10
2007-08	0.80	1.80	2.50	5.10	2.00	3.00	5.00	7.00	17.10
2008-09	0.80	--	2.50	5.10	2.00	3.00	5.00	7.00	17.10
2009-10	0.80	--	2.50	5.10	2.00	3.00	5.00	--	10.10

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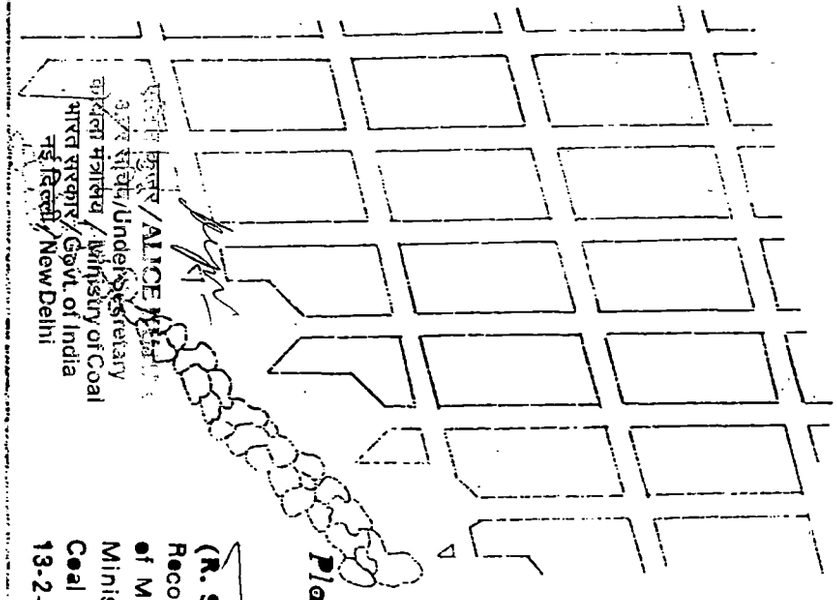
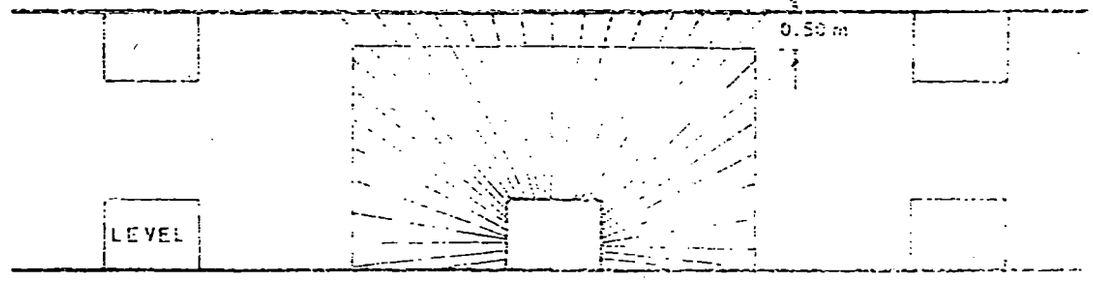
BLASTING GALLERY OPERATIONS

ROOMS PROGRESS



RING DRILLING PROGRESS



LEVEL CROSS SECTION

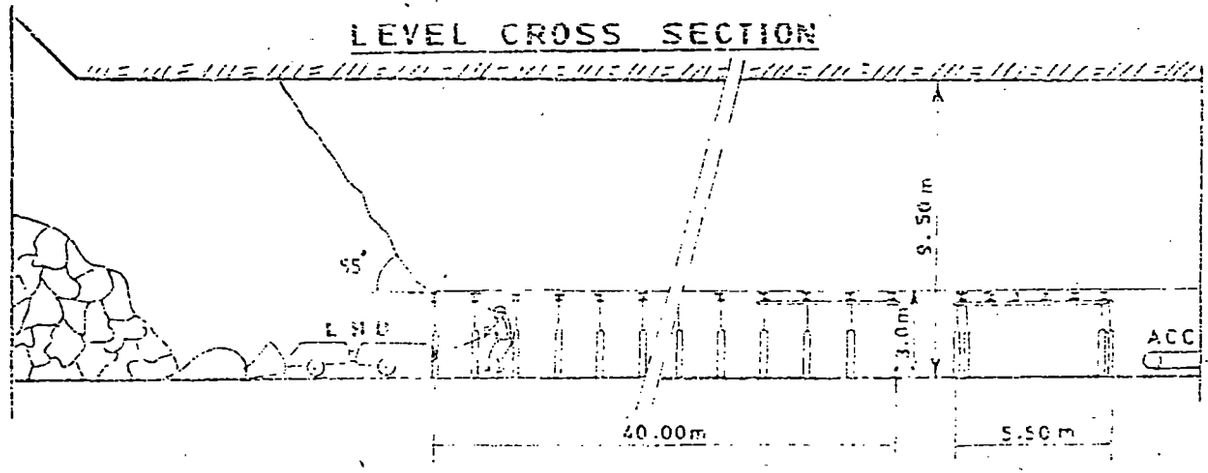


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Fig. 5.1

CHAPTER-6

BLASTING

6.0 GENERAL

Underground

After the shot holes are drilled in the coalface, the holes are blasted using explosives and detonators approved by DGMS.

Opencast

Deep holes are drilled with help of Heavy Machinery and blasted using explosives approved by DGMS. Mining of coal is done by Blasting.

6.1 BROAD BLASTING PARAMETERS

Underground

Conventional drilling with electric hand held machine using diamond/turbine drill road and concentric/eccentric drill bits are being used to make 42mm diameter shot holes. Solid blasting method with P5 explosives and milli-second delay detonators is being practiced in development area, ordinary blasting method with permitted explosives and an Instantaneous detonator is being practiced in depillaring area for breaking coal. These practices have been well established in SCCL and the same is being followed in these mines also.

Opencast

The details of blasting in JK.OC Project area given in the following table:

Sl. No.	Particulars	Unit	Over-burden	Coal
1	Bench Height	M	10	4.5
2	Working Bench Width	M	30	30
3	Bench Slope	Deg.	70	70
4	Inclination of blast hole	-	Vertical	Vertical
5	Blast hole diameter	Mm	150	150
6	Depth of blast holes	M	11	5.5
7	Spacing	M	4	4
8	Burden	M	4	3
9	Explosive column length	M	5	2.5
10	Decking length	M	2	0.5
11	Stemming length	M	4	2.5
12	Powder factor	Kg/cu.m	0.32	0.23
13	Charge per hole	Kg	51.20	18.75
14	Yield per hole	Cu.m	16	12

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Blasting Gallery

In this method thick seam is extracted by drilling and blasting roof and sides of galleries, driven at the bottom of the seam at regular intervals. The width of the pillar left between two adjacent galleries is between 8-13m. Ring holes up to 10-15m long are drilled in the roof and sides of the galleries at regular distances varying between 1 to 2m by crawler mounted jumbo drill. Blasting is done with explosive cartridges separated by inert spacers and detonating fuse so that the explosive is distributed uniformly along the length of the hole.

6.2 TYPE OF EXPLOSIVES TO BE USED

Underground

Permitted explosives, Milli-second delay/Instantaneous detonators and approved multi shot exploders are being used for blasting operations in these mines. Precaution and conditions as laid down in CMR 1957 and permission granted by DGMS from time to time are being complied scrupulously.

Opencast

Slurry Explosives and SMS Explosives are being used for blasting operations in O/C mines.

Blasting Gallery

P-3 Explosives are being used for blasting operations in Blasting Gallery method.
Ex. Belgex coal R

6.3 STORAGE OF EXPLOSIVES

Based on the powder factor of 0.3 Kg/Cu.m for over burden and 0.2 Kg/ Cu.m of coal and calendar programme of excavation, the requirement of the explosive will be 2.82tones/day.

Storage capacity required for explosive corresponding to 7 days requirement would be 20 tones. Existing magazine of capacity 45 tones is sufficient for the project. This storage capacity will cater to the needs of secondary blasting also.

Similarly, for Underground mine also an explosive storage magazine of sufficient capacity is provided on surface to cater the need of daily, and weekly blasting.

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CHAPTER-7

DISPOSAL OF WASTE

7.0 GENERAL

The working mines existing in Yellandu Additional Mining Lease hold area are underground mines and O/C mine. Construction of all the mines is completed. Production is directly dispatched to consumers.

7.1 UNDER GROUND

Coal coming out of the mines is not washed or treated other wise. Separation of stone/shale etc., coming along with production is done manually. and these stone/shale separated is being used for filling subsidence/low lying area.

However, so far some debris is produced from interseam tunnels.

The debris so produced is mainly used for track ballasting in underground itself and also for strengthening of the surface bank head.

7.2 OPENCAST

The type of rejects from opencast mine (JK.OC) is mainly overburden.

In the initial years, the excavated OB will be dumped at predetermined locations outside the quarry since, backfilling of OB into quarry can commence only after sufficient de-coaled area is available.

During the process of extraction of coal, the overlying strata consist of top soil and sedimentary rock formation shall be removed separately as OB.

The top soil excavated from the quarry shall be dumped separately at predetermined places for an initial period and will be subsequently utilized in spreading over external dumps as well as backfilled areas as a part of reclamation. According to the availability of the non-active dump zone, top soil shall be spread over the OB dumps for taking up plantation.

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CHAPTER-8

PUMPING & DRAINAGE

8.0 QUANTITY OF MAKE OF WATER

The area is dissected by small rills, which are seasonal. All these rills join into Bugga vagu. Mine-wise make of water is given in Table-8.1.

The total make of water into the mines are estimated to be 6572 Gallons/minute.

8.1 PUMPING ARRANGEMENTS AND METHOD OF TREATMENT OF WATER

Adequate pumping arrangement to deal with make of water has been provided at every mine. The seepage of water from the faces and other faces is being collected and pumped into main sump in stages. From main sumps the water is pumped out to surface by adequate capacity pumps.

On surface the pumped out water is discharged into filter beds where it is filtered, treated and supplied for drinking and other industrial purpose. The excess water is let out into the open drain to join the main drainage system of the area.

8.2 QUALITY OF WATER

The water samples collected from the mine indicate that the water is potable quality and also Suitable for irrigation. The water will be treated and supplied for domestic purpose.

Mine-Wise, make of water for Renewal of Yellandu Additional Mininig Lease.

Table-8.1

Name of the Mine	Make of water (GPM)
No.21 Incline	862
JK.5 Incline	4860
JK.OC	850
Total	6572

Sufficient number and capacity of pumps have been provided to deal with the make of water. The details of pumps (mine-wise) are presented below:

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Table-8.2

Capacity of the Pumps			Name of the Mine		
HP/KW	LPS	Head (m)	No.21 Incline	JK.5 Incline	JK.OC
350/275		300		4	
240/175	55	250		4	
190/140	40	230	3		
100/78.6		68		3	
90/70.74		75		1	
75/55	25	150	5	6	1
40/30	20	90		7	
15/11	12	45	2	2	
125/92	45	55	1		3
Total			11	27	4

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CHAPTER-9

USE OF MINERAL

The Singareni Collieries Company Limited (SCCL) is the only coal producing industry in South India. The coal produced from SCCL is used to meet the energy needs and supplied to various coal based industries/consumers in South India. The major supplies are to Thermal Power Stations (Kothagudem Thermal Power Station & Vijayawada Thermal Power Station), Cement Industries, Paper (Bhadrachalam paper boards) and other industries.

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CHAPTER-10

MINERAL BENEFICIATION

10.0 SEAM-WISE COAL GRADES OF YELLANDU COAL BELT IS AS MENTIONED BELOW:

Seam	Grade
Index	F
A/Queen	D-G
E/King	B

10.1 BENEFICIATION

No beneficiation is being carried out. Coal is being dispatched to consumers directly from CSP after crushing and screening. The rejects from coal handling plant in the form of shale, stone etc, are collected and used for filling of surface cracks in the subsidence area.

The computed equilibrated analytical data as proximate analysis on 60% RH at 40° C are given below:

Seam	Moisture (%)	Ash (%)	UHV (K.Cal/Kg)
Index	2.7-3.2	25.2-41.1	2795-3646
Queen	2.1-5.7	21.8-51.7	1618-3526

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CHAPTER-11

SURFACE TRANSPORT

The coal produced from the working mines in Yellandu Additional Leasehold area is being dispatched by road to Coal Handling Plant-Yellandu by trucks. From there it is being dispatched to consumers by Rail.

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CHAPTER-12

SITE SERVICES

Unit workshops already exist at every mine. Power supply is from APSEB through company's network in mining areas. Water from the mines are pumped and delivered into filter beds provided at the mines and residential colonies. Filtered water is being supplied for drinking and industrial purposes.

The service buildings such as office, stores, first aid room, canteen, rest shelter, lamp room etc., already exist at mines premises satisfying with the provisions of the statute. The site service layouts are shown in Plate No.XXII, XXIII & XXIV.

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CHAPTER-13

EMPLOYMENT POTENTIAL

The employment at the working mines as on 01.06.2005 is as mentioned below:

Sl. No.	Name of the Mine	Total employment
1	21-Incline	1756
2	JK-5 Incline	1945
3	JK-O/C	903
	Total	4604

There is no scope for further increase in employment as all the mines are working at their full capacity.

Mine-wise, allocation-wise manpower deployment is given in Annexure No. VA & VB.

A general organization chart which is in operation in the mines is given in Annexure No.VIA,VIB,VIC&VID.

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CHAPTER-14

ENVIRONMENTAL MANAGEMENT PLAN

14.0 GENERAL

Yellandu additional Mining Lease hold area covers part of mining block of working mine namely 21 Incline and cover entire mining blocks of working mines of JK-5 Incline and Yellandu opencast mine. Out of these 3 mines environmental clearance had been obtained in respect of JK-5 Incline. The remaining 2 mines were opened before the advent of EIA Notification 1994. Consent for operating these mines under Air and Water Acts had been obtained from A.P.Pollution Control Board and being revalidated from time to time.

14.1 BASELINE INFORMATION

14.1.1 Location

Yellandu additional mining lease hold area for which renewal is being sought is located in between Longitude 80°18'00" to 80°22'00" and latitude 17°30'00" to 17°36'00".The area is covered in Survey of India Topo-sheet No.65 C/6. It is situated in Singareni and Yellandu Mandal of Khammam District of A.P.State. It covers a total area of 1741.00 Ha.

14.1.2 Post Project Data Generation

Environmental Monitoring for air and water quality in the Yellandu Mining area including this mining lease hold area is being carried out regularly for the purpose of renewing consents under Air and Water Acts for the APPCB for the existing mines and submission of monitored data to APPCB and MOEF in respect of environmentally cleared project JK-5Incline.

During the above monitoring period, all the 2 underground mines and one opencast mine in lease hold area are covered for environmental quality monitoring. Other than mines, no other industries are located at 10 Kms. from the boundary of this lease hold area.

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14.1.2.1 Water Environment

Sources of water pollution

i) Effluents from mines, coal handling plants, service buildings and workshop/maintainace sheds containing greases, oil and suspended particle.
ii) Effluents from residential colony.
iii) Storm water causes soil erosion.
High turbidity, grease and oil film on water may not allow proper oxygenation of water. This may affect the aquatic life.

Monitoring

The water quality study in the lease hold area involved the assessment of quality of

(i) Mine discharge of existing coal mines
(ii) CSP and Domestic effluents.
(iii) Ground water from dug/bore wells.

Accordingly, 5 sampling locations of above respective categories were selected which are situated in and around the mining lease area as given below:

1. Mine discharges of Yellandu OC-II and JK-5 incline.
2. Effluent discharges of Strut Pit CSP and JK colony.
3. Bore well at Santhinagar.

Water samples from the above locations have been collected and analyzed during period January 2001 to June 2004 and compared with the relevant standards. The analytical results of these samples are given from Table No.14.1 to 14.5

From the Mine Discharge characteristics analysis data it has been observed that, all the parameters values are well within limits as per the standards G.S.R.742(E), dt.25.09.2000, standards for coalmines in the leasehold area.

From the domestic effluents characteristics analysis data it has been observed to be well within limits as per the standards G.S.R.801 (E).

The analysis results of ground water collected from Santhinagar bore well shows that the all parameters are well within in the limits as per ground water standards IS 10500-1991.

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14.1.2.2 Air Environment

Sources of Air pollution

Suspended particulate matter in air below 5 micron size is a major health hazard which may cause pneumoconiosis/silicosis among workers in mines.

Impact air pollution on surface will not be much because of natural vegetation in the area which has the capacity to cleanse the gases and dust particles off the atmospheric air without effecting its own growth.

Monitoring

Monitoring of Ambient Air Quality (AAQ) is also being conducted in the mining lease area to assess the air quality parameters such as Suspended Particulate Matter (SPM), Sulphur-Di-Oxide (SO2) and Oxide of Nitrogen (NOx).

The 4 AAQ Stations selected for representing baseline air quality status in the lease area are given below:

1. Yellandu OC-II
2. JK-5 incline
3. Santhinagar Village
4. JK colony

All the above 4 stations situated within 10 Kms. radius of lease hold area. At each location, 24 hours air samples were collected for the parameters of respirable dust, total suspended particulate matter, sulphur dioxide and oxides of nitrogen, once in 15 days at each station. The summary of Ambient air quality data for the above stations during period January 2001 to June 2004 are presented in Table No.14.6 to 14.9.

The summary of air quality data indicates that all the parameters in and around the mining lease area as well as at surrounding residential area are well within the prescribed standards vide GSR 742 (E).

14.1.2.3 Noise Environment

Sources of noise pollution

Sources of noise pollution due to mining activity in the lease area are

i) Main mechanical ventilators of mines,

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ii) Coal handling plant,
iii) Loading and unloading of coal,
iv) Transport of coal bytrucks on surface.

Impact of noise

Apart from detrimental effects on the health of workers which are close to the sources of noise, it may have adverse effect on the general calmness of the area.

Monitoring

The Noise level survey was also carried out at some major noise generating sources in the leasehold area as well as in the residential colonies.

The results of the noise levels monitored are given in the Table14.10

14.1.3 Topography and Drainage

The plains are gently undulating and are poorly to moderately drained. The topographic elevation of the area ranges from 415m above Mean Sea Level in the hills (Marrigutta) through 238m above Mean Sea Level in the northern part to 170m above Mean Sea Level in the South with a gentle slope towards the western side. There are number of isolated mounds dotting the area aligned in NNW –SSE Direction. The average basin slope is 27 m/ km.

There is no effective drainage developed in this area the overall drainage density of this area is about 1Km/sq.Km.

14.1.4 Land Use Pattern

14.1.4.1 within 10 Kms Radius

Land use pattern with 10 km. radius including the renewal lease area is given below:

Sl.No.	Description	Area in hectares	Percentage
1	Unirrigated land	12642.77	33.29%
2	Irrigated land	1579.90	4.16
2	Forest land	20454.38	53.86%
3	Cultivable waste land	1391.70	3.66%
4	Area not available for cultivation	1908.70	5.03%
	Total	37977.45	100%

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Main agricultural produce in the area are Paddy, Maize, Millets and Jowar within 10 kms radius zone.

Other than mines, no other industries are located in and around 10 kms. Radiuses of the lease hold area.

14.1.4.2 Mining Lease Area

The total area for which renewal is being sought is only 1741.00 Ha. out of the existing 3626.00 Ha. Of land held under Yellandu Additional Mining Lease. The 1741.00 Ha. of land comprises of 71.5 Ha. of forest land and 1669.5 Ha. of Non-forest land. The forest land in the mining lease area, forms part of Yellandu Reserved Forest and Chimalaphadu Reserved Forest of Kothagudem division, with part compartment Nos. 51 and 78/79 respectively.

14.1.5 Flora & Fauna of the Area

Within 10 Kms. Radius no important flora and fauna are exists which may get affected due to the mining activity.

The important species of flora found in this area are sundra, anduga, bamboo, garga, gumpini, and tapsi and yeura ponaku.

The important species of fauna found in this area are panther, jungle cat, sloth bear, wolf, wild dog, hare, nilagai, sambar, rhesus monkey.

14.1.6 Climatic Conditions

The area experiences a tropical climate with hot and dry summer from March to Middle of June, a good monsoon from middle of June to September and a pleasant winter from October to February.

Rainfall

The average rainfall per annum of this is 1090.90mm. The maximum and minimum temperatures recorded in this area are 47.2°C and 9.4 °C respectively.

The minimum and maximum relative humidity is 49% and 76% respectively.

The wind speed varies from 4 to 10.90 KMPH with the percentage of calm days varying from 39.08-40.89%. The predominant wind direction during winter is North – East. During summer predominant wind direction is towards South. During monsoon predominant wind direction is towards North-East. During post monsoon predominant wind direction is towards South-East and West.

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14.1.7 Archaeological & Other Important Places/Monuments

There is no national park, wild life sanctuary, national monument, tourist attractions, historical monument, important landscape etc., over the leasehold area or nearby.

14.2 ENVIRONMENTAL IMPACT ASSESSMENT STATEMENT

14.2.0 General

It is proposed to continue to work the coal seams in the lease hold area by underground and opencast method. The impact on environment by underground method of work is minimal when compared to opencast method. As per Water, Air, and Noise analysis data (Table-14.1 to 14.10) there is be very little change in Air, Water and Noise parameters of environment. However, the impact on the environment is analyzed below in detail in order to arrive corrective measures.

14.2.1 Water

Normally the mine discharge water pumped out from the mine will be re-utilised for industrial purposes, plantation and drinking water supply at the project. Balance water, if any, will be discharged after necessary treatment into nearby natural streams.

The mine effluents may not appreciably affect the quality of surface water including water bodies and ground water. However the effluents from mining colony may adversely affect the quality of water in the area if not treated, and hence remedial measures mentioned in Para-14.3.2 are being followed

14.2.2 Air

The mining activities will generate large quantities of dust during drilling, blasting, loading, unloading, transportation operations, coal handling plant at surface and the exhaust air of the mines from the fan house. However remedial measures stated in Para-14.3.3 are being followed to keep the concentration of air quality parameters within the prescribed limits.

14.2.3 Noise

Noise levels have not increased in the surrounding area due to the working of mine exhaust fan and other machinery, movement of vehicles etc, and hence remedial measures stated in Para-14.3.4 are being followed.

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14.2.4 Land Degradation

After the mines are sufficiently developed the final operations of extraction will be started. Due to the extraction of coal, the overlying strata will cave in, ultimately resulting in the subsidence of surface area in underground mining operations. The subsidence will be more in shallow depths and will decrease as the depth increases. There will be impact on land due to subsidence particularly at shallow depth of workings. Hence remedial measures mentioned in Para-14.3.5 are being followed.

Opencast mining operations will cause change in topography and landscape in the core and adjoining buffer zone, since it involves excavating the surface layers of overburden to expose the coal seam and dumping of overburden outside the quarry.

Hence remedial measures mentioned in Para-14.3.5 are being followed.

14.3 ENVIRONMENTAL MANAGEMENT PLAN

14.3.1 General

The corrective actions that are taken to minimise the environmental degradation in respect of each affected parameter are discussed here.

14.3.2 Water

The control measures adopted for controlling water pollution in underground mines and opencast mines are as follows:

1. The mine discharge water which may contain coal fines needs sedimentation before discharge into the natural water course/open land. The treatment facilities such as sedimentation, filtration and chlorination will be provided for mine discharge, so as to conform to the effluent standards as prescribed by MOEF.

2. Provision of oil and grease traps in HEMM workshops for cleaning effluents and their subsequent recycling.

3. Construction of garland drains along the dumps and along the lease area to restrict the suspended solids entering into the natural water regime as well as to prevent storm water entering the lease area.

4. The mine water shall be used for dust suppression, greenbelt development, etc.
5. Establishing septic tanks followed by soak pits shall treat the domestic wastewater generated from the mine office.

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6. Check dams/rock fill dams would be constructed wherever necessary to reduce siltation and suspended solids.

7. The Phreatic surface levels shall be monitored at periodical intervals throughout life of the project to assess the impact of mining on water table.

8. Water pumped out from underground workings will be discharged in the natural surface drains after allowing the suspended matter to settle in a settling tank. Water required for drinking purposes will be filtered and then supplied to colonies.

9. Domestic effluent from township shall be collected and carried through a separate net work of sewage system. The sewage shall be passed through septic tanks and soak pits before allowing it to drain in to natural surface courses.

Due to mining operations the water table has not been affected to a large extent.

In this area, the attitude of phreatic surface is being monitored periodically on long-term basis since 1997. It fluctuates from 1.3 to 11.50 m during pre- monsoon period (May) to 0.3 to 7.95 m below ground level in post-monsoon (October) period. The depth of the open wells varies from 4.5 to 13.85 m.

The excess mine water after sedimentation will be let out into nearby Vagu/Nallahs which will be used by downstream local population for their agricultural purposes and excess water collected in nearby irrigation tank will percolate down to sub-surface facilitating recharging of aquifers.

Pumping of water from underground mine workings will be stopped after the mining operations are completed. As a result of the above the re-charging of the aquifers will take place after the abandoned underground workings are fully water logged. The water table is also expected to go up.

14.3.3 Air

The following control measures are being implemented to reduce the dust pollution and gaseous emissions in underground mines and opencast mines.

- To avoid the dust generation from the drilling operations, wet drilling methods will be adopted.

- Drill machines will be equipped with dust collectors.

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- Use of appropriate explosives for blasting and avoiding overcharging of blast holes.
- Effective water spraying arrangements in underground working places as well as at coal loading bunkers at surface.
- Effective water spraying arrangements along coal transport route and at coal handling plant.
- Watering of haul roads and other roads at regular intervals at opencast mines.
- Dust suppression by hydro-jet spraying at receiving point and loading point.
- Provision of green belt by vegetation for trapping dust.
- Greenbelt development along the haul roads, along the boundaries of the lease area, workshop, around fan house, with in the mine premises and around Coal handling plant.
- Plantation over overburden dumps.
- Black topping of coal transport route.
- Periodic maintenance of vehicles.
- Water spraying shall be done in the underground coal faces and along transport system to reduce air borne in the mine.
- Plantation of trees around fan houses and coal handling plants.
- Dust suppression by water spraying in coal handling plant. Provision of covered structures for coal conveyor belts.
- Controlling the exhaust fumes from diesel operated trucks by providing proper filters, cleaners and proper maintenance of trucks.

The Coal Mines Regulations, 1957 framed under the Mines Act, 1952 provide for enforcement of certain standards to reduce occupational health hazards in mines due to dust. Provisions have also been made in these regulations for conforming to stipulated standards of ventilation to maintain the concentration of noxious gases in the underground mine environment within the limits. These regulations are applicable to work zones of coal mines and enforced by Director General of Mines Safety (Govt. of India), Dhanbad. These steps automatically take care of the ambient air quality also around the coal mining areas.

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14.3.4 Noise

The following control measures are to be undertaken in underground mines and opencast mines to bring down the noise levels.

- Proper maintenance of plant and machinery and improvement on design of machines.
- Lining of chutes in coal handling plants for noise absorption.
- Acoustically designed operator's cabin in HEMM.
- Use of personal protective devices i.e., earmuffs and earplugs by workers, working in high noise activity centres.
- Creation of wide green belts of dense foliage between mine areas, around mine fan and residential colonies.
- The greenbelt with species of rich canopy around the lease area and along the roads will further attenuate the noise levels.
- The main mechanical ventilators shall be provided with evasee to dampen the noise.
- Regular noise level monitoring will be done periodically for taking corrective action wherever required.
- Energy absorbing anti-vibration pads will be provided on all machine mountings to reduce vibration and noise.
- Chutes and transfer points in CHP shall be lined with water resistant rubber linings for noise absorption.
- Regular maintenance and prompt replacement of worn out parts of machines and vehicles.
- Wide green belt of trees around industrial installations and in around colony area shall dampen the noise level.
- Workers exposed to more than 90db (A) noise level will be provided with ear muffs.

It is expected that with above control measures taken, noise levels will be 85-90 dB(A) in underground/surface installations and with in prescribed limits 45 dB(A) in residential area.

14.3.5 Land

During the depillaring operations in underground mines, the cracks, if any, formed, mostly at shallow depth of mining, due to subsidence activities are being filled up and leveled. In view of the above 3-dimensional subsidence prediction studies will be

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conducted by Banaras Hindu University/ Varanasi, and the Subsidence Management Plan recommended by BHU will be implemented.

In opencast mines topsoil excavated from the site will be spread over the reclaimed Backfilled area and external OB dump.

- Taking up Plantation along the boundary of the lease area, with in the mine premises, around fan house and residential colonies.
- Regular filling of subsidence cracks and regular monitoring of subsidence will be done.
- Taking up Plantation along external OB dumps and reclaimed backfilled area.
- Garland drains will be provided around the external dumps to divert the flow of water and check dams/ rock-fill dams will be constructed at appropriate places in order to control erosion and siltation of surface water bodies.
- After opencast operations some of the land will be left as void. The void can be utilised as a potential water body by the local people for irrigation and other purposes.
- In existing opencast project of in this mining lease area greenbelt was developed around dump yard, quarry and mine boundary in area of 172.5 Ha with 4,45,800 plants. In existing underground project of in this mining lease area (JK-5 incline) green belt was developed in an area of 97.27 Ha.

In existing opencast project of in this mining lease area greenbelt was developed around dump yard, quarry and mine boundary with 1, 36,900 plants.

SCCL has its own Plantation and Timber Management Department, for carrying out afforestation and environmental plantation programme. This department is headed by a senior officer deputed by State Forest Dept., supported by qualified officers and adequate trained field staff. The services of forest officers on deputation are also utilised in this department. Plantation carried out in all SCCL areas from 1966 is given as Table No. 14.11.

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14.3.6 Adequacy of Funds for Environmental Management Plan

In respect of JK-5 incline and Yellandu OC-II which are falling in this mining lease area; fund provision has been made for environmental management activities as given below:

Sl. No.	Name of the Project	Direct Capital (Rs. Lakhs)	Recurring cost in Rs./T of coal
1	JK-5 INCLINE	68.10	2.18
2	Yellandu opencast-II	93.67	37.56

For the remaining mines the expenditure for environmental management activities is being met from the revenue budget.

14.4 SOCIO-ECONOMIC MEASURES

The mines, service facilities and township in this rural and backward region is providing and will provide secondary employment opportunities to many of the local people. Traders and private entrepreneurs have grown in the region. This provides indirect employment to the local people.

The township has complete service facilities like recreation, shopping, sports, education, parks, sanitation, medical services, post office, bank, police station etc. The population of the neighbouring villages is also being benefited to some extent due to above-mentioned infrastructure developed on account of mines in the lease hold area.

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Table 14.1

Water quality Data - Yld OC-II Mine discharge

Dato of sampling	Parameter			
	pH	TSS	COD	O&G
	Concentration in mg/Lit except pH			
	Standard			
	5.5-9.0	200	NS	10
28.01.01	7.67	24	25	BDL
27.02.01	7.86	19	17	BDL
26.03.01	7.58	22	26	BDL
25.04.01	6.97	14	4	BDL
28.05.01	7.21	27	6	BDL
27.06.01	7.34	19	5	BDL
23.07.01	6.85	17	9	BDL
28.08.01	7.4	14	6	BDL
25.09.01	7.22	29	7	BDL
18.10.01	7.42	37	6	BDL
30.11.01	7.85	19	8	BDL
16.12.01	7.19	16	4	BDL
30.12.01	7.96	28	11	BDL
10.01.02	7.82	19	4	BDL
30.01.02	7.11	26	9	BDL
05.02.02	7.94	44	6	BDL
26.02.02	8.22	13	3	BDL
28.03.02	7.8	27	6	BDL
10.04.02	7.22	21	7	BDL
21.04.02	7.69	33	6	BDL
11.05.02	7.41	19	5	BDL
29.05.02	7.36	16	4	BDL
26.06.02	7.5	22	8	BDL
14.07.02	7.2	19	9	BDL
27.07.02	7.67	33	11	BDL
10.08.02	7.8	46	15	BDL
27.08.02	7.75	58	19	BDL
09.09.02	7.8	46	15	BDL
25.09.02	7.58	59	17	BDL
08.10.02	7.48	43	23	BDL
26.10.02	7.75	58	37	BDL
11.11.02	7.63	74	46	BDL
26.11.02	7.82	68	55	BDL
12.12.02	7.78	55	72	BDL
25.12.02	7.61	44	65	BDL
08.01.03	7.68	36	73	BDL
27.01.03	7.59	49	72	BDL
10.02.03	7.64	55	68	BDL
24.02.03	7.75	43	51	BDL
11.03.03	7.78	36	45	BDL
26.03.03	7.71	41	26	BDL
13.04.03	7.58	42	51	BDL
28.04.03	7.58	42	51	BDL
11.05.03	7.59	43	52	BDL
29.05.03	7.61	44	56	BDL

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Date of sampling	Parameter			
	pH	TSS	COD	O&G
	Concentration in mg/Lit except pH			
	Standard			
	5.5-9.0	200	NS	10
11.06.03	7.82	41	48	BDL
26/6/03	7.85	35	42	BDL
07/09/2003	7.72	41	48	BDL
29/7/03	7.58	39	56	BDL
08/09/2003	7.62	42	58	BDL
26/8/03	7.56	39	62	BDL
13/9/03	7.65	36	58	BDL
27/9/03	7.55	42	65	BDL
13/10/03	7.38	46	67	BDL
26/10/03	7.28	57	54	BDL
11/10/2003	7.22	45	45	BDL
24/11/03	7.18	41	39	BDL
12/11/2003	7.31	36	47	BDL
27/12/03	7.21	32	49	BDL
13/1/04	7.32	39	57	BDL
25/1/04	7.47	45	71	BDL
02/10/2004	7.41	44	68	BDL
26/2/04	7.42	51	74	BDL
03/07/2004	7.48	48	76	BDL
30/3/04	7.37	39	65	BDL
04/11/2004	7.22	41	54	BDL
25/4/04	7.34	46	37	BDL
14/5/04	7.15	34	49	BDL
27/5/04	7.23	28	46	BDL
13/6/04	7.24	38	52	BDL

TSS - Total Suspended Solids
COD - Chemical Oxygen Demand
O & G - Oil and Grease

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Table 14.2

Water quality data - JK-5 Mine Discharge

Date of sampling	Paramoter			
	pH	TSS	COD	O&G
	Concentration in mg/Lit except pH			
	Standard			
	5.5-9.0	200	NS	10
28.01.01	6.99	21	8	BDL
27.02.01	7.02	16	4	BDL
26.03.01	7.18	27	11	BDL
25.04.01	7.71	21	6	BDL
28.05.01	6.87	15	8	BDL
27.06.01	7.55	18	7	BDL
27.07.01	7.62	22	6	BDL
28.08.01	7.24	19	9	BDL
25.09.01	7.8	20	6	BDL
18.10.01	7.85	14	9	BDL
30.11.01	7.11	16	4	BDL
16.12.01	8.23	31	4	BDL
30.12.01	7.6	24	16	BDL
08.01.02	7.66	19	4	BDL
29.01.02	7.91	26	3	BDL
07.02.02	8.23	44	6	BDL
25.02.02	7.54	13	3	BDL
27.03.02	7.91	27	6	BDL
10.04.02	6.97	18	3	BDL
21.04.02	7.31	9	2	BDL
11.05.02	7.04	14	2	BDL
29.05.02	7.22	12	3	BDL
26.06.02	7.58	18	7	BDL
14.07.02	7.55	15	6	BDL
27.07.02	7.1	26	9	BDL
10.08.02	7.7	38	13	BDL
27.08.02	7.91	64	15	BDL
10.09.02	7.7	38	13	BDL
25.09.02	7.62	44	11	BDL
08.10.02	7.65	36	17	BDL
26.10.02	7.84	45	25	BDL
11.11.02	7.91	62	33	BDL
26.11.02	7.74	46	79	BDL
12.12.02	7.65	54	86	BDL
25.12.02	7.52	63	82	BDL
08.01.03	7.44	55	64	BDL
27.01.03	7.63	58	66	BDL
10.02.03	7.81	44	81	BDL
24.02.03	7.83	37	62	BDL
11.03.03	7.72	32	56	BDL
26.03.03	7.71	41	26	BDL
13.04.03	7.63	39	62	BDL
28.04.03	7.63	39	62	BDL
11.05.03	7.64	40	63	BDL
29.05.03	7.59	42	65	BDL
11.06.03	7.65	36	59	BDL

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Date of sampling	Parameter			
	pH	TSS	COD	O&G
	Concentration in mg/Lit except pH			
	Standard			
	5.5-9.0	200	NS	10
26.06.03	7.71	33	54	BDL
9.07.03	7.68	38	61	BDL
29.07.03	7.68	39	66	BDL
08/09/2003	7.58	34	65	BDL
26/8/03	7.62	41	71	BDL
13/9/03	7.58	38	66	BDL
27/9/03	7.46	33	70	BDL
13/10/03	7.34	35	72	BDL
26/10/03	7.24	28	67	BDL
11/10/2003	7.12	22	55	BDL
24/11/03	7.17	20	46	BDL
12/11/2003	7.49	31	52	BDL
27/12/03	7.51	29	65	BDL
13/1/04	7.45	35	66	BDL
25/1/04	7.56	42	68	BDL
02/10/2004	7.32	39	75	BDL
26/2/04	7.35	44	65	BDL
03/07/2004	7.55	38	72	BDL
30/3/04	7.41	44	61	BDL
04/11/2004	7.35	52	67	BDL
25/4/04	7.42	38	55	BDL
14/5/04	7.28	47	56	BDL
27/5/04	7.12	41	51	BDL
13/6/04	7.36	56	63	BDL

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Table 14.3

Water Quality Data - Strut Pit CSP Effluent

Date of sampling	Parameter			
	pH	TSS	COD	O&G
	Concentration in mg/Lit except pH			
	Standard			
	5.5-9.0	200	NS	10
28.01.01	6.86	44	96	1.44
27.02.01	6.71	59	87	2.01
26.03.01	6.88	37	81	1.77
25.04.01	6.14	67	86	1.26
28.05.01	6.85	81	77	1.77
27.06.01	6.51	56	82	1.56
23.07.01	6.82	49	122	2.1
28.08.01	7.46	72	94	1.6
25.09.01	7.9	54	102	2.74
18.10.01	7.85	82	146	2.4
30.11.01	7.14	60	110	1.65
16.12.01	6.94	78	126	2
30.12.01	7.61	49	72	1.45
11.01.02	7.61	69	162	3.85
30.01.02	7.94	85	112	3.6
05.02.02	8.26	74	82	2.1
26.02.02	7.6	106	119	2.8
29.03.02	7.23	67	144	4.3
10.04.02	7.39	107	119	1.21
21.04.02	8.44	81	155	1.48
11.05.02	7.92	92	142	2.01
29.05.02	8.19	118	126	1.84
26.06.02	7.63	62	95	1.42
14.07.02	7.77	69	132	1.51
27.07.02	8.18	69	86	1.36
10.08.02	8.13	84	174	1.59
27.08.02	7.43	72	154	1.56
10.09.02	8.13	84	74	1.59
25.09.02	7.3	123	216	1.98
08.10.02	7.25	134	245	2.11
26.10.02	7.32	122	216	1.97
11.11.02	7.43	135	254	2.19
26.11.02	7.33	156	285	2.54
12.12.02	7.24	142	292	2.67
25.12.02	7.21	128	275	2.42
08.01.03	7.35	114	253	2.24
27.01.03	7.35	116	235	2.14
10.02.03	7.28	92	164	1.98
24.02.03	7.32	75	132	1.65
11.03.03	7.27	63	96	1.54
26.03.03	7.29	59	104	1.49
13.04.03	7.41	71	102	1.84
28.04.03	7.41	71	102	1.84
11.05.03	7.42	72	103	1.84
29.05.03	7.44	81	108	1.84
11.06.03	7.36	64	92	1.82
26.06.03	7.44	59	85	1.67
07.09.03	7.51	62	78	1.85
29.07.03	7.46	56	84	1.94
08.09.03	7.64	54	82	2.12

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Dato of sampling	Parameter			
	pH	TSS	COD	O&G
	Concentration in mg/Lit except pH			
	Standard			
	5.5-9.0	200	NS	10
26.08.03	7.58	42	68	1.87
13.09.03	7.69	47	61	2.13
27.09.03	6.92	56	72	1.88
13.10.03	6.97	58	75	1.74
26.10.03	6.85	62	85	1.89
11.10.03	6.99	55	75	1.79
24.11.03	7.12	62	78	1.68
12.11.03	7.53	57	88	1.94
27.12.03	7.25	45	75	1.65
13.01.04	7.01	52	83	1.28
25.01.04	7.35	78	105	2.57
02.10.04	7.56	61	94	2.34
26.02.04	7.38	56	78	1.2
03.07.04	7.56	52	89	1.4
30.03.04	7.65	57	75	1.02
04.11.04	7.48	64	88	1.57
25.04.04	7.53	59	74	1.34
14.05.04	7.34	59	76	1.48
27.05.04	7.41	63	78	1.27
13.06.04	7.41	61	81	1.24

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Table 14.4

Water Quality Data - Treated domestic Effluent of JK Colony

Date of sampling	Parameter			
	pH	TSS	COD	O&G
	Concentration in mg/Lit except pH			
	Standard			
	5.5-9.0	200	NS	10
28.01.01	8.19	66	121	2.71
27.02.01	7.87	57	98	3.99
26.03.01	7.92	72	106	2.11
25.04.01	6.66	67	89	1.24
28.05.01	7.21	92	126	1.39
27.06.01	6.84	69	117	1.55
23.07.01	6.85	74	74	1.72
28.08.01	7.4	56	126	2.24
26.09.01	7.26	69	69	1.6
18.10.01	7.23	46	74	2.2
30.11.01	8.11	89	69	1.6
16.12.01	7.65	60	109	2.7
30.12.01	7.4	74	114	2.4
11.01.02	7.91	46	126	3.8
30.01.02	8.36	77	91	2.6
05.02.02	7.28	94	146	4.66
26.02.02	7.65	116	119	3.72
29.03.02	7.95	52	156	4.91
11.04.02	8.11	96	172	1.45
21.04.02	7.72	84	142	2.09
11.05.02	8.06	102	156	1.84
29.05.02	8.42	72	121	2.11
26.06.02	6.69	49	108	1.8
14.07.02	7.69	56	124	1.64
27.07.02	7.21	44	118	2.13
10.08.02	7.05	76	145	2.42
27.08.02	7.21	85	132	2.33
10.09.02	7.05	76	145	2.42
25.09.02	7.15	98	234	2.27
08.10.02	7.2	125	276	2.32
26.10.02	7.4	138	254	2.52
11.11.02	7.22	144	282	3.11
26.11.02	7.17	120	275	2.92
12.12.02	7.22	132	264	2.31
25.12.02	7.14	118	252	2.17
08.01.03	7.22	1224	284	2.56
27.01.03	7.22	135	267	2.56
10.02.03	7.14	85	186	2.11
24.02.03	7.18	64	156	1.9
11.03.03	7.22	58	135	1.75
26.03.03	7.27	54	129	1.85
13.04.03	7.22	61	142	2.12
28.04.03	7.22	61	142	2.12
11.05.03	7.23	62	143	2.13
29.05.03	7.31	65	139	2.13
11.06.03	7.29	55	139	2.04
26.06.03	7.15	44	124	1.94
9.07.03	7.22	49	118	2.12
29.07.03	7.33	42	107	2.46

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Date of sampling	Parameter			
	pH	TSS	COD	O&G
	Concentration in mg/Lit except pH			
	Standard			
	5.5-9.0	200	NS	10
26.06.03	7.15	44	124	1.97
07.09.03	7.22	49	118	2.12
29.07.03	7.33	42	107	2.46
08.09.03	7.28	41	102	2.48
26.08.03	7.46	47	116	1.98
13.09.03	7.55	41	108	2.21
27.09.03	7.36	52	114	2.56
13.10.03	7.29	55	119	2.61
26.10.03	7.31	67	109	2.75
11.10.03	7.22	54	99	2.65
24.11.03	7.34	58	104	2.18
12.11.03	7.65	69	112	3.07
27.12.03	7.35	75	102	2.79
13.01.04	7.58	67	122	2.16
25.01.04	7.64	67	94	1.18
02.10.04	7.68	71	118	2.57
26.02.04	7.51	65	88	1.5
03.07.04	7.85	58	104	1.7
30.03.04	7.72	65	112	0.65
04.11.04	7.89	77	104	0.34
25.04.04	7.75	68	93	0.45
14.05.04	7.78	67	88	0.35
27.05.04	7.67	72	94	0.22
13.06.04	7.84	61	75	0.27

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Table 14.5

Water Quality Data - Borewell at Shantinagar

Date of sampling	Parameter			
	pH	TSS	COD	O&G
	Concentration in mg/Lit except pH			
	Standard			
	5.5-9.0	200	NS	10
11.04.02	7.24	5	4	BDL
21.04.02	7.58	9	3	BDL
11.05.02	7.08	10	2	BDL
29.05.02	7.56	7	3	BDL
26.06.02	6.85	6	2	BDL
14.07.02	7.23	7	3	BDL
27.07.02	7.15	4	4	BDL
10.08.02	7.2	14	8	BDL
27.08.02	7.17	9	5	BDL
09.09.02	7.2	14	8	BDL
25.09.02	7.21	22	13	BDL
08.10.02	7.15	14	16	BDL
26.10.02	7.21	9	12	BDL
11.11.02	7.35	12	15	BDL
26.11.02	7.28	14	19	BDL
12.12.02	7.12	11	25	BDL
25.12.02	7.06	9	18	BDL
08.01.03	7.13	8	15	BDL
27.01.03	7.12	7	16	BDL
10.02.03	7.35	11	19	BDL
24.02.03	7.42	7	14	BDL
11.03.03	7.35	8	11	BDL
26.03.03	7.41	11	14	BDL
13.04.03	7.12	9	14	BDL
11.05.03	7.13	8	15	BDL
29.05.03	7.23	11	17	BDL
11.06.03	7.22	9	15	BDL
26.06.03	7.18	8	14	BDL
07.09.03	7.26	11	21	BDL
29.07.03	7.45	12	19	BDL
08.09.03	7.53	11	18	BDL
26.08.03	7.62	14	16	BDL
13.09.03	7.58	16	14	BDL
27.09.03	7.63	21	18	BDL
13.10.03	7.59	24	21	BDL
26.10.03	7.48	22	18	BDL
11.10.03	7.35	19	15	BDL
24.11.03	7.25	16	12	BDL
12.11.03	7.38	14	9	BDL
27.12.03	7.21	12	14	BDL
13.01.04	7.67	15	21	BDL
25.01.04	7.57	12	19	BDL
02.10.04	7.74	12	19	BDL
26.02.04	7.62	11	15	BDL
03.07.04	7.69	9	13	BDL
30.03.04	7.58	11	19	BDL
04.11.04	7.66	13	15	BDL
25.04.04	7.55	10	18	BDL
14.05.04	7.66	10	12	BDL
27.05.04	7.58	12	15	BDL
13.06.04	7.7	12	14	BDL

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Table No.14.6

Ambient air quality Data - YLD OC-II

Date of sampling	SPM	RPM	SO2	NOx
	Concentration in ug/M3			
	Standards			
	600	300	120	120
29.01.01	571	186	19	27
28.02.01	586	214	16	25
26.03.01	499	155	18	24
25.04.01	527	149	12	19
28.05.01	569	131	13	17
27.06.01	414	102	12	18
23.07.01	578	132	11	14
28.08.01	486	114	12	16
26.09.01	506	102	14	19
17.10.01	576	94	13	19
29.11.01	467	76	14	20
17.12.01	575	103	15	21
30.12.01	647	137	15	19
10.01.02	505	130	16	22
30.01.02	359	72	11	14
04.02.02	439	106	14	18
27.02.02	389	94	14	20
28.03.02	414	111	13	19
10.04.02	671	131	18	27
21.04.02	584	94	16	31
11.05.02	637	120	19	24
29.05.02	645	139	17	28
26.06.02	493	112	11	14
14.07.02	465	94	10	13
27.07.02	418	82	8	10
10.08.02	365	61	7	9
27.08.02	312	88	7	8
10.09.02	422	105	8	8
25.09.02	488	142	9	10
08.10.02	372	118	8	9
26.10.02	348	129	9	11
11.11.02	350	106	11	14
26.11.02	312	97	9	12
12.12.02	278	84	12	13
25.12.02	341	95	13	17
08.01.03	377	114	10	13
27.01.03	378	114	11	14
10.02.03	418	134	12	13
24.02.03	389	125	13	14
11.03.03	416	132	12	15
26.03.03	407	129	11	14
13.04.03	420	136	10	13
28.04.03	421	139	11	14
11.05.03	423	140	12	14
29.05.03	387	132	12	14

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Date of sampling	SPM	RPM	SO2	NOx
	Concentration in ug/M3			
	Standards			
	600	300	120	120
11.06.03	368	124	11	15
26.06.03	334	108	12	15
9.07.03	318	102	11	13
29.07.03	296	98	9	11
9.08.03	279	93	8	10
26.08.03	289	98	8	12
13.09.03	273	91	7	10
28.09.03	263	87	6	9
13.10.03	298	98	8	12
26.10.03	298	103	5	11
10.11.03	304	99	8	8
24.11.03	305	105	7	9
11.12.03	305	96	11	15
27.12.03	278	83	9	14
13.01.04	303	101	10	13
25.1/04	275	94	6	8
02/10/2004	351	117	11	12
26/2/04	306	101	10	11
03/07/2004	310	107	10	9
30/3/04	308	92	11	10
04/11/2004	345	101	12	11
25/4/04	383	108	10	13
14/5/04	435	125	8	13
27/5/04	442	135	9	11
13/6/04	336	102	7	11
25/6/04	308	98	8	11

SPM - Suspended Particulate Matter
RPM - Respirable Particulate Matter
SO_2 - Sulphor dioxide
NO_X - Oxides of Nitrogen

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Table No.14.7

Ambient air quality Data - JK - 5 Incline

Date of sampling	SPM	RPM	SO2	NOx
	Concentration in ug/M3			
	Standards			
	600	300	120	120
28.09.00	428	87	22	27
24.10.00	397	66	19	16
27.11.00	488	79	26	32
24.12.00	355	92	20	25
28.01.01	481	149	14	22
27.02.01	396	122	15	23
25.03.01	422	139	13	21
24.04.01	447	121	14	18
27.05.01	517	151	11	17
26.06.01	311	67	10	18
22.07.01	468	86	14	19
27.08.01	537	122	12	16
25.09.01	510	81	15	19
17.10.01	528	102	15	19
29.11.01	616	131	16	20
17.12.01	476	85	14	18
30.12.01	607	140	15	20
11.01.02	431	93	14	17
30.01.02	346	66	12	14
04.02.02	404	98	14	17
26.02.02	415	94	13	18
29.03.02	385	82	12	16
10.04.02	511	102	14	18
21.04.02	494	82	13	24
11.05.02	631	127	15	29
29.05.02	507	134	13	25
26.06.02	326	65	10	10
14.07.02	465	94	10	13
27.07.02	298	52	7	9
10.08.02	324	33	6	8
27.08.02	276	63	7	9
10.09.02	298	76	8	9
25.09.02	318	84	7	8
08.10.02	336	82	9	11
26.10.02	296	95	8	10
11.11.02	265	84	12	15
26.11.02	285	91	11	14
12.12.02	343	118	13	15
25.12.02	305	107	11	14
08.01.03	265	86	12	15
27.01.03	269	82	12	13
10.02.03	322	98	11	12
24.02.03	316	104	17	13

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Date of sampling	SPM	RPM	SO2	NOx
	Concentration in ug/M3			
	Standards			
	600	300	120	120
11.03.03	344	112	11	14
26.03.2003	343	114	9	13
13.04.03	354	113	12	15
28.04.03	379	128	13	14
9.05.03	381	129	14	15
29.05.03	345	118	11	13
11.06.03	352	135	10	12
26.06.03	329	121	11	13
9.07.03	330	114	12	14
29.07.03	313	106	11	12
08/09/2003	288	97	10	11
26/8/03	280	92	9	12
13/9/03	276	99	8	11
28/9/03	292	103	9	12
13/10/03	285	100	7	10
26/10/03	276	89	6	8
11/10/2003	235	90	5	5
24/11/03	240	85	9	11
12/11/2003	280	102	10	12
27/12/03	277	91	11	13
13/1/04	279	84	12	14
25/1/04	229	72	7	9
02/10/2004	323	108	10	13
26/2/04	286	97	11	14
03/07/2004	299	92	10	12
30/3/04	326	101	12	11
04/11/2004	294	87	11	13
25/4/04	350	96	12	12
14/5/04	389	121	9	10
27/5/04	373	118	7	9
13/6/04	342	97	8	9
25/6/04	312	91	9	10

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Table 14.8

Ambient air quality Data - Shanthinagar Village

Date of sampling	SPM	RPM	SO2	NOx
	Concentration in ug/M3			
	Standards			
	600	300	120	120
29.09.2K	298	28	21	19
25.10.2K	322	26	17	22
28.11.2K	239	19	16	19
25.12.2K	302	26	22	19
29.01.01	122	21	12	16
28.02.01	139	18	11	17
26.03.01	141	27	11	15
25.04.01	155	41	13	18
28.05.01	178	39	12	19
27.06.01	133	26	12	18
23.07.01	173	27	11	16
28.08.01	142	20	10	14
26.09.01	103	34	12	17
17.10.01	146	24	6	10
29.11.01	168	28	7	12
16.12.01	150	21	6	10
30.12.01	192	32	8	14
10.01.02	182	34	6	9
30.01.02	144	23	5	7
04.02.02	167	29	6	9
27.02.02	159	38	7	11
28.03.02	159	32	7	12
10.04.02	221	36	9	17
21.04.02	159	42	10	15
11.05.02	178	27	8	16
29.05.02	205	49	8	15
26.06.02	157	26	7	9
14.07.02	146	22	6	7
27.07.02	118	18	7	6
10.08.02	123	15	5	5
27.08.02	94	22	5	6
10.09.02	71	19	6	5
08.10.02	114	35	6	7
26.10.02	92	28	5	6
11.11.02	94	23	7	7
26.11.02	78	25	6	8
12.12.02	98	36	7	7
25.12.02	108	46	5	6
08.01.03	126	42	6	8
27.01.03	146	52	6	8
10.02.03	185	61	7	9
24.02.03	169	57	6	7
11.03.03	155	52	7	9
26.03.03	149	51	7	7

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Date of sampling	SPM	RPM	SO2	NOx
	Concentration in ug/M3			
	Standards			
	600	300	120	120
13.04.03	155	51	6	8
28.04.03	159	54	7	9
9.05.03	161	55	8	9
29.05.03	159	48	7	7
11.06.03	144	46	6	6
26/6/03	126	41	7	8
07/09/2003	136	44	8	10
29/7/03	126	41	9	10
08/09/2003	117	38	8	9
26/8/03	122	41	9	10
13/9/03	118	46	8	9
28/9/03	126	42	7	8
13/10/03	115	35	5	9
26/10/03	98	24	8	12
11/10/2003	104	25	5	5
24/11/03	97	22	9	12
12/11/2003	122	35	8	7
27/12/03	96	29	7	7
13/1/04	83	31	8	9
25/1/04	77	32	5	6
02/10/2004	119	41	7	7
26/2/04	111	38	6	6
03/07/2004	115	40	6	7
30/3/04	117	36	7	8
04/11/2004	116	42	6	5
25/4/04	93	37	9	6
14/5/04	88	42	6	8
27/5/04	92	38	8	10
13/6/04	81	29	6	7
25/6/04	105	34	7	8

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Table 14.9

Ambient air quality Data - JK Colony

Date of sampling	SPM	RPM	SO2	NOx
	Concentration in ug/M3			
	Standards			
	600	300	120	120
28.09.00	204	19	12	15
24.10.00	171	21	14	17
27.11.00	156	25	11	13
24.12.00	167	20	13	16
28.01.01	129	22	9	14
27.02.01	142	19	12	18
25.03.01	131	24	10	16
24.04.01	131	22	10	17
27.05.01	154	29	9	14
26.06.01	122	19	8	13
22.07.01	175	29	8	11
27.08.01	134	17	8	10
25.09.01	189	34	10	14
17.10.01	160	23	6	10
29.11.01	189	37	6	9
17.12.01	137	20	7	12
30.12.01	169	29	6	11
11.01.02	168	27	7	11
30.01.02	128	21	8	10
04.02.02	155	34	7	12
26.02.02	157	40	8	13
29.03.02	162	38	6	11
10.04.02	213	24	8	14
21.04.02	175	19	9	13
11.05.02	158	37	7	12
29.05.02	204	49	8	17
26.06.02	148	23	8	10
14.07.02	152	27	6	8
27.07.02	126	24	5	7
10.08.02	106	21	5	6
27.08.02	73	19	6	6
10.09.02	98	34	5	5
25.09.02	126	38	6	6
08.10.02	147	49	5	6
26.10.02	109	33	6	7
11.11.02	129	41	7	8
26.11.02	125	38	8	9
12.12.02	143	45	7	8
25.12.02	126	42	6	7
08.01.03	114	39	8	9
27.01.03	135	48	5	6
10.02.03	168	56	6	7
24.02.03	155	53	6	7
11.03.03	142	49	6	7

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Date of sampling	SPM	RPM	SO2	NOx
	Concentration in ug/M3			
	Standards			
	600	300	120	120
26.03.03	91	53	9	9
13.04.03	139	48	8	9
28.04.03	141	47	7	8
9.05.03	143	48	8	9
29.05.03	120	39	6	7
11.06.03	114	35	7	8
26/6/03	104	32	6	6
07/09/2003	119	38	6	8
29/7/03	111	35	7	9
08/09/2003	99	32	8	8
26/8/03	90	28	7	9
13/9/03	80	24	6	8
28/9/03	100	34	7	9
13/10/03	85	30	7	8
26/10/03	88	27	9	10
11/10/2003	120	35	8	8
24/11/03	90	30	7	9
12/11/2003	96	27	8	8
27/12/03	81	25	6	8
13/1/04	110	36	8	8
25/1/04	85	27	6	5
02/10/2004	89	28	6	7
26/2/04	100	34	7	8
03/07/2004	97	36	7	7
30/3/04	121	45	6	8
04/11/2004	138	55	7	7
25/4/04	106	44	8	8
14/5/04	111	53	8	9
27/5/04	130	85	5	7
13/6/04	164	71	7	8
25/6/04	154	67	8	10

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Table-14.10

SUMMARY OF NOISE LEVELS

Sl. No.	Source of noise	Levels in dB(A)
A	In and around the mine	
1	300 HP main fan	88
2	150 Hp hauler	87
3	350 HP pump	87
4	Belt gear head	82
B	In and around the residential areas	
1	Colony	42
2	Hospital	46
3	School	46

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Table 14.11

STATEMENT SHOWING THE PLANTATIONS RAISED IN SCCL AREAS DURING 1966 TO 2004

Sl. No	Area	Block plantation		OB dump plantation		Avenue plantation		Clonal plantation		Free distribution of seedlings				Grand Total	
		Ha.	No. of seedlings	Ha.	No. of seedlings	Km.	No. of seedlings	Ha.	No. of seedlings	Fruit bearing	Misc.	Total 11 + 12	Total Area Ha.	Area Ha.	Seedlings
1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16
1	Kothagudem	588	978654	153	722619	50	18879	42	73580	69200	30109	99309	25	808	1893041
2	Yellandu	202	351859	497	1443901	8	6980	17	15000	36533	6763	43296	2	718	1861036
3	Manuguru	231	554661	380	1884121	17	4207	45	67645	7170	10000	17170	4	660	2527804
4	Bellampalli	718	1062095	14	174875	22	53609	251	352004	80008	82980	162988	60	1043	1805571
5	Godavarikhani	1170.76	2260400	1264.24	3645563	13	62653	163	178488	36795	148687	185482	97	2695	6332586
6	Bhoopalapalli	22				14	4848			7000		7000	10	32	11848
	Total:	2931.76	5207669	2308.24	7871079	110	151176	518	686717	236706	278539	515245	198	5956	14431886

Note: 1) During 2004, 112008 seedlings were planted as replacement, besides dibbling of 15314 of seeds.
2) During 2004, Avenue Plantation was taken-up covering a distance of 24 Km.

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CHAPTER 15

PROGRESSIVE MINE CLOSURE PLAN

15.0 INTRODUCTION

The present proposal for renewal of Yellandu Additional Mining lease for an area of 1741.00 Ha. is an existing property,which was executed on 15-04-1974 and valid up to 14-04-2004 (Period of 30 years). Yellandu Additional Mining Lease hold Area is covering two working underground mine viz. Part of 21 Incline, JK.5 Incline and one Opencast mine namely JK Opencast, which are located in Yellandu and Singareni Mandal of Khammam district of Andhra Pradesh State.

The Yellandu Additional mining lease hold area proposed for renewal is covered in survey of India Toposheet No.65C/6 with North Latitudes $17^0$30'00" to $17^0$36'00" and East Longitudes 80^0 18'00" to 80^0 22'00".

The District headquarter is Khammam at 48 kms. Mahabubabad – Kothagudem PWD road passes over the lease hold area.Nearest airport is Hyderabad at a distance of 263 kms.

The existing land use pattern in Yellandu Additional mining lease is as under:

Sl. No.	Land details	Area (Ha)
1	Forest land	71.50
2	Non-Forest land	1669.50
	Total	1741.00

The mining is proposed by conventional Bord & Pillar method (Hand Section & SDLs), Blasting Gallery Method, Long Wall method and O/C mining.

There is no processing of coal as it is being dispatched to consumers directly from CSP after crushing and screening.

15.1 REASONS FOR CLOSURE

The mine will be closed after exhaustion of economical recoverable coal in lease hold area. The mines may be closed on account of other unforeseen reasons i.e., force measures or government directions etc for which information and notice will be sent to concerned Govt. authorities and departments

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15.1.1 Statutory Obligations

Since the Mining Plan is being submitted for approval to Ministry of Coal, the statutory obligations will be complied with as specified by MOC or MoEF.

15.1.2 Closure Plan Preparation

Name & address of applicant:

The Singareni Collieries Company Limited,
P.O. Kothagudem Collieries - 507 101.
Dist. Khammam
State: Andhra Pradesh

Phones:

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

Name & address of Recognised Qualified Person

Shri R.S.MANTRI,
Addl.General Manager, (Project Planning)
The Singareni Collieries Company Limited,
P.O. : Kothagudem Collieries - 507 101,
Dist.: Khammam, State: Andhra Pradesh.

15.2 MINE DESCRIPTION

15.2.1 Geology

The southern tract of Pranhita Godavari Valley Coalfield which is falling in Andhra Pradesh is termed as Godavari Valley Coalfield (GVCF). This basin houses a thick pile of fluviatile continental sediments with cumulative thickness of about 5000m. This basin covers an area of about 17000 sq.km in the districts of Adilabad, Karimnagar, Warangal and Khammam.

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Based on geological and structural setup, the Godavari basin is divided into sub-basins. The Godavari Valley Coalfields is in turn divided into a number of coal belts on further geological conditions.

Yellandu Addational Mining Lease hold area is a part of Yellandu Coal belt of Godavari Valley Coalfield. The belt extends for over a length of 20 km from one end to the other actually the coal measures extend for a length of around 12 kms.

The Yellandu coal belt is an important coal Mining area constituting a major outlier of the main Godavari Valley Coalfield being located about 20 km to further west of the main Gondwana basin in its south central part. Incidentally, it is of historic importance to note that the coal mining in the entire GVCF for that matter in South India was first started in the Yellandu coal belt long back in 1889. This belt is bound by N Latitude $17^0$34'02" to $17^0$39'24".and E Longitude $80^0$18'58" to $80^0$21'59"and falls mostly in the Survey of India Toposheet No.65C/6, while a small portion of the southern extension of the coal belt falls in the Toposheet No.65C/7. It is covered by Yellandu Coal belt covering an area of 60.00 Sq.kms

The geological map of Yellandu Addational Mining Lease property is presented in Plate No.III

Stratigraphic Succession

The stratigraphic succession of Yellandu coal belt coal belt is as given below:

Age	Group	Formation	General Lithology.	Max. Thickness (m)
Recent	--	--	Soil cover.	3
PERMIAN	LOWER GONDWANA	KAMTHI	Ferrugenous sandstones and clays.	60+
		BARAKAR	Dominantly sandstones with few regionally persistent coal seams and sub-ordinate shale/clays.	300
		TALCHIR	Greenish sandstones, clay/shales and boulder beds etc.	60+
---------- Unconformity ----------				
Pre-Cambrian		PAKHAL	Quartzites, Phyllites, Crystalline Lime stones etc	--
Achaean			Hornblende gneisses granite etc	--

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Structure

As the exposures are scanty and no data is available on the basement configuration and relief, the structure has been largely interpreted from the sub-surface borehole data. A perusal of this data shows that it is a shallow, asymmetrical synformal mining basin with a trans-basinal fault along the axis, traces in the southern part of the belt. It shows a closure of the beds in the northern part of the basin, where the axis runs in NNW-SSE direction with a gentle SSE plunge, probably extending up to the Central part of the basin.

As many as 11 major faults were delineated with the help of the borehole data and mine plans. Some of these faults at times form convenient natural block boundaries for the miners.

The sub-surface data has established the occurrence of eight correlatable 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. Of these the most important is the E/King seam because of its good quality and persistent occurrence over a considerable area extent with a good workable thickness. However, other seams like B, C, D and 5 Incline seams though are persistent and attain workable thickness only in small patches.

As stated earlier, the E/King seam and the A/Queen seams are the only two productive coal seams out of eight coal seams established in this coal belt. The sequence of coal seams of the Barakar Formation of the Yellandu coal belt is given below:

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Sequence of coal seams of Barakar Formation in Yellandu coal belt.

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
Talchir Formation	Greenish sandstone	60+

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15.2.2 Reserves

The details of the total reserves available and the reserves already extracted in the mines located in Yellandu additional mining lease are as follows:

Details of extracted and balance reserves of Mines in Yellandu Additional Mining Lease.

Reserves (Mt)	21-Incline (Part)	JK-5 Incline	JK-OC	Total
Total extractable reserves	2.78	35.21	25.35	63.34
i) Already extracted	0.30	18.80	22.77	41.87
ii) Balance reserves	2.48	16.41	2.58	21.47

15.2.3 Method of Mining

The workable seams in Yellandu additional mining leasehold area is not outcropping anywhere and is incropping at a depth of 30m on an average.

The coal is being extracted by conventional Bord & Pillar method (Hand section & SDLs), Longwall technology, Blasting Gallery method and OC method.

(A) Bord & Pillar

After completing the development, depillaring operations are being take-up panel by panel by caving. The panels are designed in such a way that the depillaring operations will be completed within incubation period.

(B) 21 Incline

At 21 Incline, there has been mechanization culture since 1980s. Shuttle cars, LHDs and SDLs were successfully worked in this mine. Index seam in MM1 panel was depillared using SDLs whereas in MM3, MM4, MM7, MM5, MM8 and MM9 panels, the Index seam was depillared using Conventional LHDs owing to favorable gradient and low seam.

Blasting Gallery Method

Extraction of Queen Seam in the developed panels by Blasting Gallery Method is proposed for improving productivity and greater safety and coal conservation as brought out below:

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Safety Aspect

Queen seam in this mine is a thick seam having an average thickness of 9.5m. This seam was developed in Top section along stone roof over almost whole of the mine take area. This seam had been depillared in few panels by conventional multi-section Bord and pillar method. The following element of danger exists in the conventional multi-section Bord & Pillar method.

- Strata Control: The slow rate of retreat with conventional hand section, strata control problems like crushing of stooks/ribs and loss of timber were common phenomenon in these panels.
- Fire Problems: In this method, large quantity of coal is left in the goaved out area consequently increasing the risk of spontaneous heating.
- More persons in the hazardous zone: Comparatively more number of persons are deployed in the actual area of extraction in a conventional depillaring district especially in multi-section depillaring. This significantly increases the exposure of more persons in active working zone.
- Support system: The system supports in hand section has a drawback. Inspite of utmost care in blasting of working faces, the supports get dislodged, leaving dangerous condition where the supports are absolutely required.
- Scarcity of timber: Timber supports are still pre-dominant in conventional depillaring due to their case in handling and economics. With the depletion of forest resources, the availability of timber supports will not be adequate to meet the needs.

Principles of Blasting Gallery Method

The basic principle of Blasting Gallery Method is to recover coal in a thick seam by drilling and blasting the roof and sides of galleries located at the bottom of the seam and placed at regular intervals. The width of the pillar left between 2 adjacent galleries is generally between 8 to 13m.
Ring holes upto 10-15m long drilled in the roof and sides of galleries at regular distances varying between one and two meters by means of a Crawler mounted Jumbo drill. Blasting is done with explosive cartridges separated by inert spacers and detonating fuses so that the explosive is distributed uniformly. Special Permitted Explosive (P-3) by name 'Belgex Coal (R)' is used for Ring Blasting in the BG projects. Presently, an explosive by name "Belgex Coal (R)" is being used for gallery long hole blasting in below ground coal mines/seams of first degree gassiness.

Loading is carried out by Load Haul Dumpers fitted with remote control system, which enables the operator to stand under the supported roof and operate the LHD

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to load the blasted coal. The LHDs bring coal from the faces and discharge into armored chain conveyor. These ACC feed a belt conveyor network which transport coal to the surface.

In general, the Blasting Gallery Method of work for extraction of developed pillars consists of:

- Each of the blocks identified for BG will be divided into panels and sub-panels depending upon the amount of coal available, rate and progress of extraction and incubation period. These sub-panels and panels will have isolation stoppings.
- Driving rooms of 4m x 3m section and 60m long galleries along the floor of the seam. These galleries will be superimposed with the top section galleries. Further, galleries will be driven along floor of the middle of the pillars. The width of the pillar left between two adjacent BG galleries depend upon the size of the already development pillars.

A sketch showing the Method of Mining is presented in fig. 5.1.

(C) JK-5 Incline

Long wall Technology

The Queen seam is a composite thick seam with coal and shale bands. The thickness varies from 10m to 23m in the property. The gradient varies from 1 in 3.8 to 1 in 7. Floor of the seam consists of fine grained sand stone or the shale. Immediate roof of the seam consists of grey sand stone more than 1m thick sometimes embedded with pebbles. As in most of the area the thickness is more than 10m thick, it is proposed to work this thick seam by retreating longwall method with modern technology i.e with powered shield supports and shearer for greater safety and percentage extraction of coal.

The main dip headings and skeleton development for formation of longwall panels done by road headers. The areas not amenable for longwall mining will be extracted by conventional Bord and pillars depending upon the thickness of the seam.

The Queen seam is extracting in two sections i.e. bottom section and top section with a parting of 3 meters. Extraction of Top seam and bottom section extraction are in progress. In the bottom section two pairs of gate roadways driven along the floor of the seam by road headers and two gate roadways are connected at specified distance to form a longwall panel.

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The size of the panels is mainly governed by the incubation period and experience in the already operating projects. Panels having width of 100-150 mtr. are giving good results during extraction, such as regular caving, less pillar crushing, good recovery of coal and materials, etc.

(D) JK.OPENCAST MINE

Opencast Mining

The total area is divided into two mines namely, OC-I and OC-II. OC-I is again made into five blocks namely, Block-A, Block-B, Block-C, Block-D and Block-E. The extraction of coal in Blocks A, B, C and D was already completed. Presently, Block-E is under operation with shovel – Dumper combination with ancillary equipment like motor grader, dozer, water sprinkler etc. The overburden is excavated by hydraulic excavators and transported by 35 T dumpers to dump yard.

The method of work comprises of –

A) Removal of OB to expose coal seam.
   i) Initial opening of Box cut
   ii) Removal of top soil and intermediate hard rock.
B) Extraction of coal

A Removal of Overburden:

i) Initial opening of Box cut

Box cut is made where-

a. The mining block area is free from geological disturbances and coal and OB transport distances are minimum.
b. The block is opened by a Box-cut with access road located at the middle of the property on the south side of the exhausted Block-A. The main haul road extended along dip by maintaining the average gradient at not more than 1 in 16.

ii) Removal of top soil and intermediate hard rock.

Top soil excavated and transported with HEMM. In case of difficulty in excavation, blasting will be done to loosen the top soil. Overburden above the Queen seam removed with hiring of HEMM including drilling, loading and transporting. Blasting done departmentally. The OB bench height around 8.0 to 10.0 m. The width of the benches around 20m for facilitating the movement of HEMM.

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B Extraction of coal

Seam exposed after removal of Over burden , a 8-10 m high and 20m wide bench formed in coal by drilling, blasting and loading by 3-3.5 Cu.m shovel with supporting HEMM. Care taken to blast and fill the already developed underground galleries for movement of HEMM.

The coal extracted by 3-3.5M^3 shovels and 35 T rear dumpers.

Sl. No	Description		OC
01	Working bench	Height (M)	6
		Width (M)	25
02	Ultimate Pit	Height(M)	6
		Width(M)	6
		Overall Slope	45^0

15.2.3.1 Extent of mechanization & Machinery Deployed

As on date, the existing technology mix of both the Mines is as follows:

Sl. No.	Mine	Technology				
		H/S drills	SDLs	Blasting Gallery	Longwall	
1	21 Incline	2	6	1		
2	JK-5 Incline	5	-	-	1	
3	JK.OC	-	-	-	-	Shovel-Dumper Combination
	Total	7	6	1	1	

JK.OC

Type of Machine	Nos	Size/Capacity	Make	H.P
Shovel	05	3.3M3	BEML	
Dumpers	30	35T		
Dozers	3	BD 155		324
Dozers	2	BD	HITACHI	300
Drills	2	150mm	RECP	250
Drills	1	150mm	LMP-1& RECP-2	300
Crane	4	8T	ESCORT	
Crane	1	40T	TATA	
Motor Graders	2	GD 605	BEML	145
Water sprinkler	4	28KL	BEML	350

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15.2.3.2 The Mine Wise, Technology Wise Production Programme for the Next Five Years from 2005-06 to 2009-10 is as Follows:

(Production in Lakh Tonnes)

Mine	21-Incline (Lakh Tonnes)				JK-5 Incline (Lakh Tonnes			JK.OC (Lakh Tonnes)	Total (Lakh Tonnes)
Year	H/S drills	SDL	Blasting Gallery	Total	H/S drills	Long-wall	Total	Shovel-Dumper Combination	
2005-06	0.80	1.80	2.50	5.10	2.00	3.00	5.00	4.82	14.92
2006-07	0.80	1.80	2.50	5.10	2.00	3.00	5.00	7.00	17.10
2007-08	0.80	1.80	2.50	5.10	2.00	3.00	5.00	7.00	17.10
2008-09	0.80	--	2.50	5.10	2.00	3.00	5.00	7.00	17.10
2009-10	0.80	--	2.50	5.10	2.00	3.00	5.00	--	10.10

15.2.4 Mineral Beneficiation

Since coal (ROM) is directly used as solid fuel by industries, hence no beneficiation is proposed.

15.3 REVIEW OF IMPLEMENTATION OF MINING PLAN

The status and implementation of conditions of Mining Plan for the Proposed Yellandu Additional Mining Lease is enclosed as Annexure I.

15.3.1 Protection of Environment

i) Effect of Subsidence on Surface

UG Mining

After the mines are sufficiently developed the final operations of extraction will be started. Due to the extraction of coal, the overlying strata will cave in, ultimately resulting in the subsidence of surface area in underground mining operations. The subsidence will be more in shallow depths and will decrease as the depth increases. There will be impact on land due to subsidence particularly at shallow depth of workings. Hence remedial measures mentioned below are followed

During the depillaring operations in underground mines, the cracks, if any, formed, mostly at shallow depth of mining, due to subsidence activities are being filled up and leveled. In view of the above 3-dimensional subsidence prediction studies will be conducted by Banaras Hindu University/ Varanasi, and the Subsidence Management Plan recommended by BHU will be implemented.

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Opencast Mining

Opencast mining operations will cause change in topography and landscape in the core and adjoining buffer zone, since it involves excavating the surface layers of overburden to expose the coal seam and dumping of overburden outside the quarry. Hence remedial measures mentioned below are followed.

In opencast mines topsoil excavated from the site will be spread over the reclaimed backfilled area and external OB dumps.

- Taking up Plantation along the boundary of the lease area, with in the mine premises, around fan house and residential colonies.
- Regular filling of subsidence cracks and regular monitoring of subsidence will be done.
- Taking up Plantation along external OB dumps and reclaimed backfilled area.
- Garland drains will be provided around the external dumps to divert the flow of water and check dams/ rock-fill dams will be constructed at appropriate places in order to control erosion and siltation of surface water bodies.
- After opencast operations some of the land will be left as void. The void can be utilised as a potential water body by the local people for irrigation and other purposes.
- In existing opencast project of in this mining lease area greenbelt was developed around dump yard, quarry and mine boundary in area of 172.5 Ha with 4, 45,800 plants. In existing underground project of in this mining lease area (JK-5 Incline) green belt was developed in an area of 97.27 Ha .

In existing opencast project of in this mining lease area greenbelt was developed around dump yard, quarry and mine boundary with 1, 36,900 plants.

SCCL has its own Plantation and Timber Management Department, for carrying out afforestation and environmental plantation programme. This department is headed by a senior officer deputed by State Forest Dept., supported by qualified officers and adequate trained field staff. The services of forest officers on deputation are also utilized in this department. Plantation carried out in all SCCL areas from 1966 is given as Table 14.11.

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15.4 CLOSURE PLAN

15.4.1 Mined–Out Land

Rehabilitation process in Mined-out land shall be designed to restore, physical, chemical and biological qualities of the area disturbed by the mining to a level acceptable to all concerned.

Rehabilitation process in Mined-out land shall focus on the following –

- Restoring the land to its pre-mining land use or to a use, that is consistent with the surrounding land fabric.

- Maintaining the long-term stability of mining affected lands to match with the community and commercial needs. Development such as parklands, flora & Fauna sanctuaries, pisciculture ponds and playgrounds with ecological, tourist and commercial values can be planned.

The following proposals are to be implemented for reclamation and rehabilitation of Mined out land for restoring the actual site for future use:

1. Vegetations: The surface areas affected by mining activities shall be re-vegetated preferably with native species and with necessary soil treatment. A nursery shall also be developed. The area upon closure can be utilized for commercial forestry/fodder cultivation.

2. All buildings and other concrete structures shall be razed down and the waste shall be dumped in low lying areas or voids of under ground mines and top soil shall be spread over for re-vegetation.

3. Support & Transport infrastructures: All buried infrastructure like tanks, pipes, cables, shall be removed. If the same are required to be maintained for future use the same shall be documented. The main mining site and secondary access roads shall be kept in a condition to access for monitoring/ inspection. The roads, bridges, culverts etc., which are not required to maintain shall be raised and restored for planting with local vegetation.

4. Equipment & Electrical Infrastructures (RCC Pillars, Electrical Cables, Transformers, etc) shall be dismantled. Off-site equipment shall be dismantled, but may remain in place if there is a future potential use of it.

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5. Surface Equipment & Heavy machinery like Mining equipment (winding engine, hoists, pumps, conveyors, etc.), Shall be removed from the site by the proponent.

6. Heavy Machinery, Underground Equipment like conveyors, powered roof supports, etc. and Heavy Machinery infrastructure like trains, motor vehicles, drills, etc. shall be removed from the site after proper checking for any contamination.

   If it is technically and economically feasible to do so, underground infrastructures (crushers, rails, metal structures, water and air pipes, etc.) and equipment (fans, pumps, etc.) shall be removed from the site.

   During rehabilitation, particular attention shall be made towards equipment, heavy machinery and underground infrastructure areas to detect any hydrocarbon contamination and, if applicable, take remedial action.

7. Underground & Open pit work

   All surface openings to underground work sites shall be backfilled and leveled to blend in with the surrounding topography, or shall be blocked by RCC wall.

8. Water Resource Management

   The area where the mine dewatering ponds are established shall be restored and leveled and the site revegetated; so as to establish the natural drainage of the area.

9. Sanitary installation

   After being emptied decommissioned septic tanks shall be removed or completely filled with gravel, sand, earth or inert material. Wastewater treatment ponds (domestic waste) shall be emptied and backfilled or provided drainage so as not to create stagnant water ponds.

   Sewage sludge from treatment ponds shall be used as fertilizer, and if not suitable for use as fertilizer shall be disposed in a sanitary landfill or other authorized site.

10. Petroleum products and Hazardous waste

    The rehabilitation of all petroleum products sites used for storage of fuels and lubricants and the measures taken to rehabilitate these sites shall be made as per Hazardous Waste (M&H) Rules, 1989.

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All surface or buried petroleum product tanks, pipes and storage vessels shall be removed from the site.

All hazardous waste shall be removed from the mining site after activities are permanently shut down. Used oil shall be sent to an authorized recycling/re-use site. Other hazardous waste shall be properly disposed, preferably by sending to an authorized site for disposal, treatment, recycling or reuse.

11. Socio-economic changes etc.

The options like undertaking commercial forestry, fodder cultivation, fuel wood growing shall be reviewed in the Mined out land for having a gainful resource for the neighboring local Communities.

Reclamation

JK OPENCAST MINE

The mined out area is proposed to back fill by OB in a systematic manner. The bench height in back filling is 30 meters.

Similarly the backfilling will continue till the end of the life of the mine.

The total land degradation due to mining activity shall be as under.

Quarry	82.04 Ha.
Dumps	101.84 Ha

	183.88 Ha

Proposed reclamation

Up to end of the 5th year	161.012 Lakh cubic meters
Up to March 2005	238.00 Lakh cubic meters

The back filled area shall be blanketed with cover of top soil, which will stacked separately during the mining of first five year. Thus mined out land is proposed to reclaim and converted back in to field or grassland.

15.4.2 Water Quality Management

Sources of water pollution

i) Effluents from mines, coal handling plants, service buildings and workshop/maintainace sheds containing greases, oil and suspended particle.

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ii) Effluents from residential colony.
iii) Storm water causes soil erosion.
High turbidity, grease and oil film on water may not allow proper oxygenation of water. This may affect the aquatic life.

Monitoring

The water quality study in the lease hold area involved the assessment of quality of

(i) Mine discharge of existing coal mines
(ii) CSP and Domestic effluents.
(iii) Ground water from dug/bore wells.

Accordingly, 3 sampling locations of above respective categories were selected which are situated in and around the mining lease area as given below:

1. Mine discharges of Yellandu OC-II and JK-5 Incline
2. Effluent discharges of Strut Pit CSP and JK colony
3. Bore well at Santhinagar.

Water samples from the above locations have been collected and analyzed during period January 2001 to June 2004 and compared with the relevant standards. The analytical results of these samples are given from Table No.14.1 to 14.5

From the Mine Discharge characteristics analysis data it has been observed that, all the parameters values are well within limits as per the standards G.S.R.742(E), dt.25.09.2000, standards for coalmines in the leasehold area.
From the domestic effluents characteristics analysis data it has been observed to be well within limits as per the standards G.S.R.801 (E).

The analysis results of ground water collected from Santhinagar bore well shows that the all parameters are well within in the limits as per ground water standards IS10500-1991.

15.4.2.1 Environmental Impact Assessment Statement

Water

Normally the mine discharge water pumped out from the mine will be re-utilised for industrial purposes, plantation and drinking water supply at the project. Balance water, if any, will be discharged after necessary treatment into nearby natural streams.

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The mine effluents may not appreciably affect the quality of surface water including water bodies and ground water. However the effluents from mining colony may adversely affect the quality of water in the area if not treated, and hence remedial measures mentioned in Para-15.4.2.2 are being followed.

15.4.2.2 Environmental Management Plan

The corrective actions that are taken to minimize the environmental degradation in respect of water are discussed here.

Water

The control measures adopted for controlling water pollution in underground mines and opencast mines are as follows:

1. The mine discharge water which may contain coal fines needs sedimentation before discharge into the natural water course/open land. The treatment facilities such as sedimentation, filtration and chlorination will be provided for mine discharge, so as to conform to the effluent standards as prescribed by MOEF.
2. Provision of oil and grease traps in HEMM workshops for cleaning effluents and their subsequent recycling.
3. Construction of garland drains along the dumps and along the lease area to restrict the suspended solids entering into the natural water regime as well as to prevent storm water entering the lease area.
4. The mine water shall be used for dust suppression, greenbelt development, etc.
5. Establishing septic tanks followed by soak pits shall treat the domestic wastewater generated from the mine office.
6. Check dams/rock fill dams would be constructed wherever necessary to reduce siltation and suspended solids.
7. The Phreatic surface levels shall be monitored at periodical intervals throughout life of the project to assess the impact of mining on water table.
8. Water pumped out from underground workings will be discharged in the natural surface drains after allowing the suspended matter to settle in a settling tank. Water required for drinking purposes will be filtered and then supplied to colonies.

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9. Domestic effluent from township shall be collected and carried through a separate network of sewage system. The sewage shall be passed through septic tanks and soak pits before allowing it to drain in to natural surface courses.

Due to mining operations the water table has not been affected to a large extent.

In this area, the attitude of phreatic surface is being monitored periodically on long-term basis since 1997. It fluctuates from 1.3 to 11.50 m during pre- monsoon period (May) to 0.3 to 7.95 m below ground level in post-monsoon (October) period. The depth of the open wells varies from 4.5 to 13.85 m.

The excess mine water after sedimentation will be let out into nearby Vagu/Nallahs which will be used by downstream local population for their agricultural purposes and excess water collected in nearby irrigation tank will percolate down to sub-surface facilitating recharging of aquifers.

Pumping of water from underground mine workings will be stopped after the mining operations are completed. As a result of the above the re-charging of the aquifers will take place after the abandoned underground workings are fully water logged. The water table is also expected to go up.

15.4.2.3 Hydro-geological Environ of Yellandu Mining Lease Area

The extent of area proposed for renewal of mining lease is 1741.0 ha, comprising 71.5 Ha of forest area and 1669.5 ha of non-forest area.

Morphology

The area forms a narrow and elongated valley trending in north- north west to south –south east direction and bound by low lying hillocks of cuesta type with intervening depressions. The plains are gently undulating and are poorly to moderately drained. The topographic elevation of the area ranges from 415m above Mean Sea Level in the hills (Marrigutta) through 238m above Mean Sea Level in the northern part to 170m above Mean Sea Level in the South with a gentle slope towards the western side. There are number of isolated mounds dotting the area aligned in NNW –SSE Direction. The average basin slope is 27 m/ km.

There is no effective drainage developed in this area the overall drainage density of this area is about 1Km/sq.Km.

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Climate

The area experiences a typical tropical climate with distinct hot summer from March to June with maximum temperature shooting up to 47°C with occasional dust storms, a fairly good monsoon spreading from middle of June to September and mild winter from October to January.

Rainfall

The annual rainfall of this area monitored from 1963 to 2003 at Yellandu, the nearest gauging station, indicates the annual rainfall to vary widely from 557.6 mm (1979) to 1612.6mm (1983), with an average of 1077.5 mm and a median of 1054.5 mm. The maximum monthly rainfall is 636.2(July1988).

Hydrogeology

The attitude of phreatic surface in this area is being monitored periodically since 1997 on long term basis. It varies over a wide range from 2.30 to 11.50m during pre-monsoon and 1.80m to 9.00m during post - monsoon period. The depth of the shallow open wells of this area ranges from 5.50 to 12.00m, with a dia of 1.0 to 4.0m.

Ground Water Budgeting

The mean annual rainfall of this area is 1077.5 mm. Within 10 km radius of the block, this amounts to 338.3 MCuM / Year.

Precipitation = Run off + Evaporation +Re-charge (P = Ro + E + Rc)

1. Surface Run Off

For hilly and forest terrain with slopes of 10 - 30 % like the present block area, the run off coefficient is 0.5

Run off = Run off coeff. X P

= 0.5 X 1077.5= 538.75 mm / year or 169.17 MCuM / Year

2. Ground water re-charges

Recharge at a point = 107.75 mm

Recharge in 10 km radius area = 107.75 mm x 314 sq. km

= 33.83MCuM / Year

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3. Evaporation

Substituting the run off and recharge values in the above mentioned equation, the evaporation is computed to be

E = 1077.5 – (538.75 + 107.75) = 431.00 mm/year or 135.33 MCuM/Year

4. Ground water draft

a. Domestic consumption

As per 2001 census, the total population of this area is 1, 19,335. Of this, about 20,000 people live in the colonies of SCCL. These colonies are supplied the water pumped out of the mines. The Yellandu town populations of 42,421 are supplied water from Yellendulapadu tank. It is presumed that the rest of the population of about one 60,000 depend exclusively on groundwater at the rate of 60 litres/day. Amounting to: 3600 m3 / day or 1.31 MCuM /year.

b. Agricultural requirement

Within the 10 Km radius of the area crops like Paddy, chillies, and vegetables are being irrigated by ground water in an area of 1227 ha. in Kharif and Rabi seasons. Presuming that its water requirement is 120 cm per ha. The consumption amounts to:

1227 ha x 120 cm =1472 ha.m or 14.72 MCum /year.

b. Inflow of water into the coal mines

There are two under ground coal mines and two open cast mines within 10 km radius of the lese area. The quantum of water presently being pumped from these mines and its utilization is as follows:

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SL. No.	NAME OF THE MINE	TOTAL QUANTITY OF WATER(m^3/ day)			
		PUMPED PER DAY	DOMESTIC USE	INDUSTRIAL USE	*LET OUT INTO THE STREAM
1	21 Inc.	6500	6275	225	-
2	J.K-5 Inc.	26150	9810	12420	3920
3	J.K. OC	5935	0	1760	4175
	Total	38585	16085	14405	8095
*being utilized for irrigation of down stream-side lands.					

The total water pumped from the above mines is 38585 m^3/ day or 14.08 M Cum per year.

Thus, the total ground water draft as on date is 30.11 MCuM / year, leaving a net surplus reserve of 3.72 MCuM / year.

Based on the above data a flow diagram of hydrologic system is prepared and enclosed.

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MONTHLY RAINFALL DATA – YELLANDU

Year	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Total
1963	0.0	0.0	0.0	0.0	0.0	166.6	232.3	361.8	128.1	138.3	0.0	0.0	1027.1
1964	0.0	33.2	3.8	0.0	0.0	180.7	163.5	338.8	276.6	106.1	0.0	0.0	1102.7
1965	0.0	0.0	71.1	0.0	0.0	85.9	559.1	185.3	134.7	16.2	0.0	0.0	1052.3
1966	21.3	0.0	0.0	20.1	0.0	73.8	371.3	152.3	206.4	19.1	0.0	4.5	868.8
1967	0.0	0.0	80.2	22.3	0.0	171.7	479.1	359.5	171.1	16.8	0.0	0.0	1300.7
1968	6.1	9.7	28.5	0.0	20.4	172.6	210.2	49.9	255.1	156.2	7.1	0.0	915.8
1969	0.0	0.0	0.0	0.0	308.7	68.2	414.8	174.2	327.7	80.7	51.0	35.0	1460.3
1970	0.0	0.0	42.4	0.0	48.0	293.0	172.7	333.6	127.1	69.2	0.0	0.0	1086.0
1971	0.0	91.0	77.0	40.5	149.0	126.5	109.0	257.4	125.9	113.4	0.0	0.0	1089.7
1974	0.0	0.0	0.0	0.0	0.0	171.5	143.5	168.4	196.0	286.4	2.8	0.0	968.6
1975	0.0	51.5	0.0	0.0	90.0	166.2	205.9	154.2	286.7	242.6	0.0	0.0	1197.1
1976	0.0	0.0	0.0	13.1	18.2	108.9	543.9	364.8	100.2	46.6	71.9	0.0	1267.6
1977	0.0	0.0	7.8	38.4	16.2	35.2	190.0	126.4	34.0	46.4	108.8	9.6	612.8
1978	8.8	28.8	0.0	19.2	25.8	402.6	300.6	338.2	159.0	88.0	33.0	0.0	1404.0
1979	0.0	38.6	0.0	45.2	23.0	72.0	79.9	91.8	145.3	34.0	27.8	0.0	557.6
1980	0.0	0.0	0.0	66.4	15.8	240.8	332.6	195.2	265.0	60.6	0.0	0.0	1176.4
1981	0.0	0.0	31.4	0.0	64.0	172.8	385.1	353.0	240.6	21.8	5.0	0.0	1273.7
1982	0.0	0.0	0.0	5.8	44.2	189.8	304.0	404.2	51.8	110.2	0.0	0.0	1110.0
1983	0.0	0.0	0.0	3.4	36.6	161.6	302.2	522.6	355.8	230.4	0.0	0.0	1612.6

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Year	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Total
1984	2.0	0.0	32.2	3.8	3.8	68.6	292.6	151.8	191.6	98.6	27.2	0.0	872.2
1985	0.0	0.0	0.0	0.8	26.9	152.0	261.4	342.9	17.8	130.8	0.0	0.0	932.6
1986	11.6	61.6	0.0	37.4	18.0	82.2	102.0	421.4	115.2	78.0	45.8	3.6	976.8
1987	33.6	5.0	66.6	37.0	55.2	57.6	396.0	272.6	130.8	43.6	42.2	0.0	1140.2
1988	0.0	0.0	0.0	48.4	8.6	152.4	636.2	245.2	169.4	35.5	0.0	0.0	1295.7
1989	0.0	0.0	36.4	0.0	17.6	122.0	446.4	331.8	177.6	26.2	11.2	0.0	1169.2
1990	0.0	7.0	74.4	0.0	231.0	78.8	198.0	228.6	75.8	134.0	8.4	0.0	1036.0
1991	18.0	2.0	0.0	0.0	0.0	266.8	325.8	155.8	119.2	57.6	16.0	0.0	961.2
1992	16.4	0.0	0.0	0.0	10.2	138.6	228.6	210.0	175.2	94.0	11.4	0.0	884.4
1993	0.0	0.0	5.2	26.6	64.0	94.6	324.6	109.0	301.6	77.8	0.0	5.8	1009.2
1994	0.0	6.6	0.0	14.2	43.6	27.0	310.8	0.0	23.6	340.6	42.0	0.0	808.4
1995	55.2	0.0	0.0	0.0	18.4	94.6	271.8	188.0	204.3	242.1	0.0	0.0	1074.4
1996	0.0	0.0	0.0	0.0	0.0	156.3	272.8	340.1	143.2	35.8	65.0	0.0	1013.2
1997	19.0	0.0	4.0	67.7	16.2	99.0	192.4	252.3	122.1	86.5	21.6	20.3	901.1
1998	2.0	80.6	0.0	16.4	13.3	70.5	424.8	232.6	168.8	145.8	4.5	0.0	1159.3
1999	0.0	0.0	0.0	10.8	82.8	101.7	304.8	250.8	263.0	35.4	5.2	0.0	1054.5
2000	0.0	32.2	0.0	4.4	34.6	193.2	211.8	428.1	15.2	45.8	4.6	4.6	974.5
2001	0.0	0.0	0.0	73.0	14.2	159.4	162.4	313.6	156.6	92.8	22.4	0.0	994.4
2002	111.6	0.0	0.0	25.2	54.8	149.8	217.2	469.2	34.8	74.8	1.0	0.0	1138.4
2003	0.0	32.4	2.4	21.2	4.2	108.0	467.4	307.8	251.2	311.8	0.0	35.0	1541.4
MEAN	7.8	12.3	14.4	17.0	40.4	139.3	296.1	261.1	165.2	104.4	16.3	3.0	1077.5

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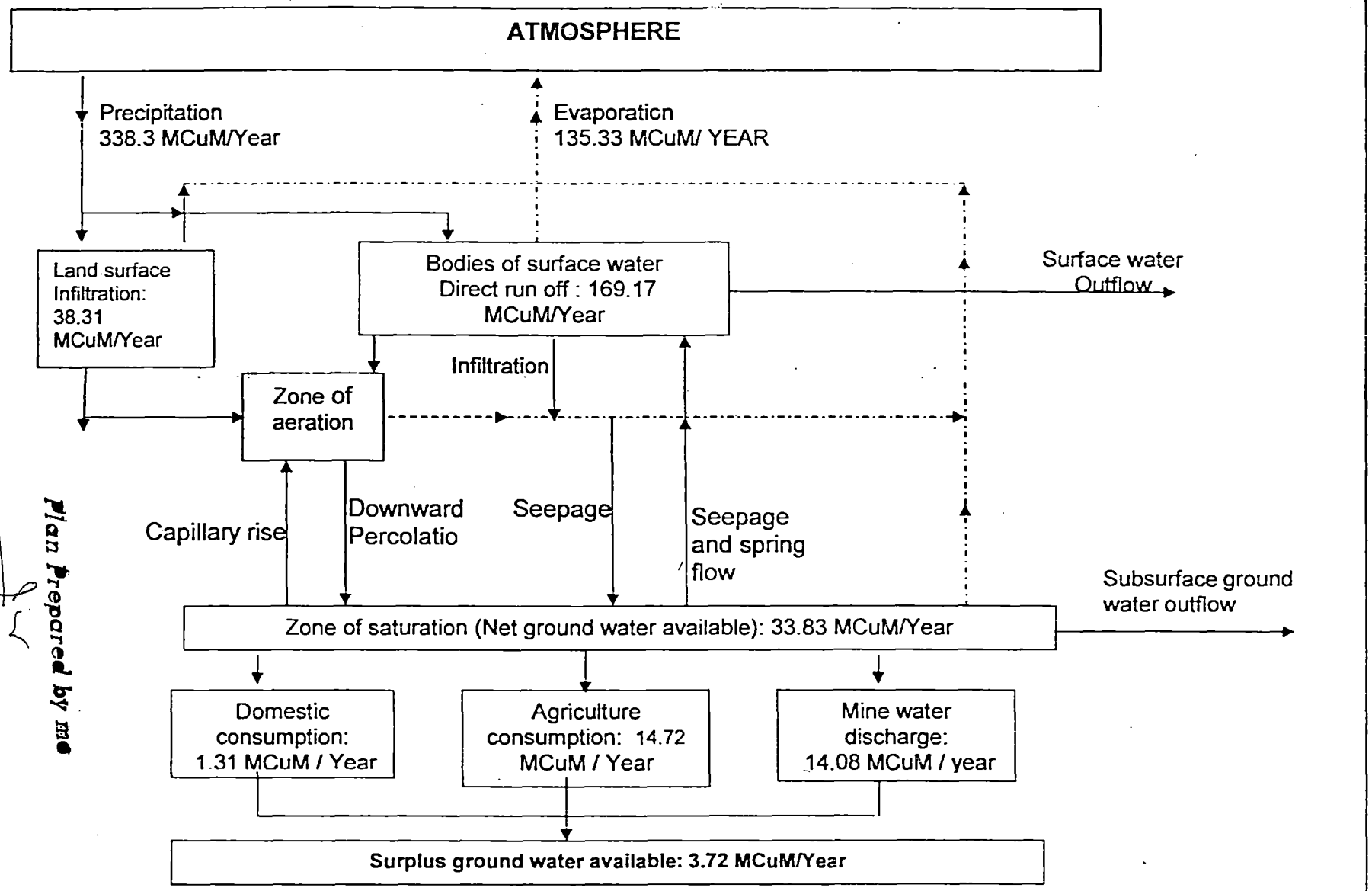
FLOW DIAGRAM OF HYDROLOGIC SYSTEM IN NATURAL CONDITIONS



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15.4.3 Air Quality Management

Sources of Air pollution

Suspended particulate matter in air below 5 micron size is a major health hazard which may cause pneumoconiosis/silicosis among workers in mines.

Impact air pollution on surface will not be much because of natural vegetation in the area which has the capacity to cleanse the gases and dust particles off the atmospheric air without effecting its own growth.

Monitoring

Monitoring of Ambient Air Quality (AAQ) is also being conducted in the mining lease area to assess the air quality parameters such as Suspended Particulate Matter (SPM), Sulphur-Di-Oxide (SO2) and Oxide of Nitrogen (NOx).

The 4 AAQ Stations selected for representing baseline air quality status in the lease area are given below:

1. Yellandu OC-II
2. JK-5 Incline
3. Santhinagar Village
4. JK colony

All the above 4 stations situated within 10 Kms. radius of lease hold area. At each location, 24 hours air samples were collected for the parameters of respirable dust, total suspended particulate matter, Sulphur-di-oxide and oxides of nitrogen, once in 15 days at each station. The summary of Ambient air quality data for the above stations during period January 2001 to June 2004 are presented in Table No.14.6 to 14.9.

The summary of air quality data indicates that all the parameters in and around the mining lease area as well as at surrounding residential area are well within the prescribed standards vide GSR 742 (E).

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15.4.3.1 Environmental Impact Assessment Statement

Air

The mining activities will generate large quantities of dust during drilling, blasting, loading, unloading, transportation operations, coal handling plant at surface and the exhaust air of the mines from the fan house. However remedial measures stated in Para-15.4.3.2 are being followed to keep the concentration of air quality parameters within the prescribed limits.

15.4.3.2 Environmental Management Plan

Air

The following control measures are being implemented to reduce the dust pollution and gaseous emissions in underground mines and opencast mines.

- Water spraying shall be done in the underground coal faces and along transport system to reduce air borne in the mine.
- Plantation of trees around fan houses and coal handling plants.
- Dust suppression by water spraying in coal handling plant. Provision of covered structures for coal conveyor belts.
- Controlling the exhaust fumes from diesel operated trucks by providing proper filters, cleaners and proper maintenance of trucks.
- To avoid the dust generation from the drilling operations, wet drilling methods will be adopted.
- Drill machines will be equipped with dust collectors.
- Use of appropriate explosives for blasting and avoiding overcharging of blast holes.
- Effective water spraying arrangements in underground working places as well as at coal loading bunkers at surface.
- Effective water spraying arrangements along coal transport route and at coal handling plant.
- Watering of haul roads and other roads at regular intervals at opencast mines.
- Dust suppression by hydro-jet spraying at receiving point and loading point.
- Provision of green belt by vegetation for trapping dust.
- Greenbelt development along the haul roads, along the boundaries of the lease area, workshop, around fan house, with in the mine premises and around Coal handling plant.
- Plantation over overburden dumps.
- Black topping of coal transport route.
- Periodic maintenance of vehicles.

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The Coal Mines Regulations, 1957 framed under the Mines Act, 1952 provide for enforcement of certain standards to reduce occupational health hazards in mines due to dust. Provisions have also been made in these regulations for conforming to stipulated standards of ventilation to maintain the concentration of noxious gases in the underground mine environment within the limits. These regulations are applicable to work zones of coal mines and enforced by Director General of Mines Safety (Govt. of India), Dhanbad. These steps automatically take care of the ambient air quality also around the coal mining areas.

15.4.4 Waste Management

The working mines existing in Yellandu Additional Mining Lease hold area are underground mines and O/C mine. Construction of all the mines is completed. Production is directly dispatched to consumers. Coal coming out of the mines is not washed or treated other wise. Separation of stone/shale etc., coming along with production is done manually and these stone/shale separated is being used for filling subsidence/low lying area.

However, so far some debris is produced from interseam tunnels.

The debris so produced is mainly used for track ballasting in underground itself and also for strengthening of the surface bank head.

The type of rejects from opencast mine (JK.OC) is mainly overburden.

In the initial years, the excavated OB will be dumped at predetermined locations outside the quarry since, backfilling of OB into quarry can commence only after sufficient de-coaled area is available.

During the process of extraction of coal, the overlying strata consist of top soil and sedimentary rock formation shall be removed separately as OB.
The top soil excavated from the quarry shall be dumped separately at predetermined places for an initial period and will be subsequently utilized in spreading over external dumps as well as backfilled areas as a part of reclamation. According to the availability of the non-active dump zone, top soil shall be spread over the OB dumps for taking up plantation. Waste generated during the first five year plan period is proposed to dump at outside. The waste dump is proposed of 30m height in three lifts, each individual lift of 10m to keep land degradation bare minimum. Back filling is proposed partly in 5th year and onward for decoaled area. A garland drain is proposed all around the dump to arrest surface runoff of rain water in monsoon. It is proposed to stabilize inactive slope of the waste dump by plantation. The quantity of Over burden, and area of land degradation shall be as under.

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Quantity of OB and land degradation

Year	Top soil (L.Cub.m)		OB (L.Cub.m)		Swelled up volume(L.Cub.m)				Area required (Sq.Mtrs)			
					Top soil		OB		Top soil		OB	
	E	OC II	E	OC II	E	OC II	E	OC II	E	OC II	E	OC II
1993-94		1.35		4.785		1.580		1.555		0.79		2.70
1994-95		1.85		28.986		2.165		26.252		1.08		15.58
1995-96		1.90		31.203		2.223		33.298		1.11		19.75
1996-97		2.75		43.796		3.218		47.123		1.61		27.97
1997-98		2.15		23.121		2.516		22.756		1.26		32.00
1998-99		0.00		33.729		0.000		34.226		0.00		0.80
1999-00	0.34	2.00	1.190	17.521	0.380	1.298	1.330	16.831	0.21	2.55	0.86	3.00
2000-01	0.48	1.00	17.221	7.704	0.540	0.000	19.200	7.514	0.31	0.00	12.44	0.00
2001-02	0.00	0.00	0.890	10.645	0.000	0.000	0.990	9.076		0.00		0.04
2002-03	0.66	0.00	9.380	12.850	0.740	0.000	10.480	15.370	0.42	0.00		0.00
2003-04	0.70	0.00	24.410	1.100	0.780	0.000	27.220	6.211	0.45	0.00		0.00
2004-05	0.80	0.00	28.590	10.566	0.890	0.000	31.880	10.566	0.51	0.00		0.00
Total	2.98	13.00	81.680	226.006	3.330	13.000	91.080	233.807	1.90	8.40	13.30	101.84

15.4.5 Top soil Management

The thickness of top soil cover at JK OC in the leasehold area is approximately 3 to 4 mtrs. The top soil, which will encountered during mining of first five years stacked separately and it covered with Eucalyptus, Tumma, Kanuga, Babool & Bamboo species for preserving the soil nutrients and biomes. A total top soil mined separately and stacked given below:

SL. No.	Description	Block-E	OC-II
1	Top soil thickness in Mtrs	3 to 4 mtrs	3 to 4 mtrs
2	Top soil raised and stocked	2.98 Lakh cubic meters	13 Lakh cubic meters

15.4.6 Tailing dam management

Since there is no processing and beneficiation of coal hence it is not applicable.

15.4.7 Infrastructure

The infrastructure proposed in Mining Plan shall maintain up to the end of the life of the mine. Proper maintenance of infrastructure shall be carried out for their physical stability. A detailed programme for dismantling and disposal of building structure support and other infrastructure provided. Final mine closure plan submitted to MOC, New Delhi and concerned authorities.

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15.4.8 Disposal of Mining Machineries

Most of the machineries used for mining activity shall be shifted to other mines after closure of mines.

15.4.9 Safety & Security

Every entrance to a mine from the surface and the top and all entrances between the top and bottom securely fenced. When there are no persons belowground, every walk able entrance from the surface to belowground provided with a substantial gate, closed and locked. When such entrance is not used as a means of ingress, it permantely closed to prevent persons entering. This is provided under RULE (68) of CMR1957.

Any haulage road or tramline passes over a public road, suitable gates provided to prevent danger to public from a moving tub, set or train of tubs or locomotive. Every such gate fitted with a danger signal and warning lamp. Where occupied buildings are situated with in the 15 meters of haulage road or tramline, a substantial fence provided between such buildings and haulage road and maintained. This is provided under RULE (97) of CMR 1957.

Where any mine or seam or section is abandoned or has been discontinued, the owner of the mine submit to chief inspector two true copies of the up-to-date plan and section of the workings of the mine or seam or section. Every such copy shall show the bearing and distance of at least one of the shafts or openings of the mine from a trijuction or revenue pillar or from any other prominent and permanent surface feature, the position of all water dams built belowground (with their dimensions and other particulars of constructions) and also the spot levels at the end of the workings. This is provided under RULE (61) of CMR 1957.

15.4.10 Disaster Management & Risk Assessment

Mining and allied activities are associated with several potential hazards to both the employees and the public at large. A worker in a mine should be able to work under conditions, which are adequately safe and healthy. At the same time the environmental conditions should be such as not to impair his working efficiency. This is possible only when there is adequate safety in underground mines. Hence mine safety is one of the most essential aspects of any working mine. Indeed safety of the mine and the employees is taken care of by the Mines Act 1952.

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15.4.10.1 IDENTIFICATION OF HAZARDS

There are various factors which can create disaster in coal mine industry. These hazards are as follows:

(a) Mines gases
(b) Mine fires and spontaneous heating
(c) Explosives and Shot firing
(d) Explosion in the mine
(e) Blasting
(f) Subsidence
(g) Inundation
(h) Overburden
(i) Heavy Machinery

The coal mining activity has several disaster prone areas. A check list depicting likely disaster events due to the mining activity is presented in Table-14.1 and identification networks for hazards are depicted in Figures-14.2.

(a) MINE GASES

The following gases are found in underground coalmines:

(a) Carbon monoxide (CO)
(b) Carbon-dioxide (CO_2)
(c) Methane (CH_4)
(d) Hydrogen Sulphide (H_2S)
(e) Sulphur-di-oxide (SO_2)

The production of these noxious and inflammable gases beyond tolerable limits in underground mines creates environmental hazards. The factors, which are responsible for the production of these noxious and inflammable gases, are as follows:

(a) Inhalation by man
(b) Blasting and explosion
(c) Underground fire
(d) Spontaneous combustion
(e) Coal dust explosion
(f) Decay of timber
(g) Bacterial action
(h) Slow oxidation of coal and
(i) Distillation of coal

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(b) Mine Fire and Spontaneous Heating: The various factors governing mine fire and spontaneous heating in underground mines are as follows:

i) Chemical composition of coal
ii) Friability
iii) Presence of iron pyrite
iv) Nature of adjoining strata
v) Depth of the seam
vi) Thickness of the seam and
vii) Geological disturbances

(c) Explosives and Shot firing

Explosives:

The main danger from explosives in u/g coalmine is the ignition of firedamp. It may take place in the following ways.

- By incompletely detonated explosive: Such explosive may continue, to burn like an ordinary combustible material.
- By incandescent particles coming out of the shot hole after blasting and contact with coal dust or gas.
- By the flame and hot gases.
- By the compression wave of the blast, which may compress the gases in the cracks connected with the shot hole and raise the temperature of the compressed gas to such an extent as to ignite it.20 fold compression is known to be sufficient to ignite all inflammable mixtures of firedamp and air

Shot firing:

Common causes of accidents due to shot firing are as follows:

- Not taking proper cover. This is the most common cause of personnel injury due to explosives. It is essential that the shot firer shall himself take adequate cover and see that all workmen in the vicinity of a shot are removed to safe place. No place in direct line with a shot can be regarded as safe and every person should be protected by at least one right-angled corner All approaches to the danger zone should beguarded by sentries or other wise so as to prevent anyone entering inadvertently.
- Failing to warn persons in an adjoining place in to which the blasted rock may be thrown, as is possible when two galleries are about to join and partition is thin.

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- Carelessness in handling detonators causing them to explode
- Carelessness whilst charging a hole, e.g. tamping too forcibly in the neighborhood of the detonator or ramming the primer cartridge in to a hole of insufficient diameter.
- Firing a shot when persons are at the shot hole due to instructions being misunderstood.
- Returning to the face too early after firing a round of shots or before authorized to do so by the shot-firer.
- Dealing with misfired shots otherwise than in the prescribed manner.

(d) Explosion in Mines

An explosion is a sudden process of combustion of great intensity accompanied by spontaneous release of large amount of heat energy and in which the original gas or solid substance like coal dust is instantaneously converted into gaseous products. An explosion is invariably accompanied by violence on a large scale. Explosions in coal mines are due to (1) firedamp and/or 2) coal dust. Firedamp has been the cause of explosion in coal mines due to moisture in dangerous proportion with the result that in every mine adequate step should be taken to prevent a firedamp explosion. Possible causes of explosion can be attributed to the following factors: 1) Flames Naked lights, damaged flame safety lamps and contrabands, 2) Heated surface – overheated lamp gauges, electrically heated wires, heated rock surface, incandescent coal, overheated broken blocks, unlubricated haulage rollers, rope friction, conveyor troughs rubbing against its support, 3) Sparks – Electric sparks and arcs, static sparks from compressed air pipes, friction sparks from iron pyrites, friction spark from light metal alloys, and 4) Explosives – Resulting into flame and hot gases, compressive wage set up by explosives, especially in a break adjacent to the shot hole, incandescent particles ejecting from the shot hole, incompletely detonated explosives, etc.

(e) Blasting

Most of the accidents from blasting occur due to the projectiles, as they may sometimes go even beyond the danger zone, mainly due to overcharging of shot holes as a result of certain special features of the local ground. Fly rocks are encountered during initial and final blasting operations. Vibrations also lead to displacement of adjoining areas. Dust and noise problems are commonly encountered during blasting operations.

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(f) Subsidence

Subsidence is an important aspect of underground mining activity. Underground mining operations can give rise to undesirable effect, such as, 1) Damage to surface installations, like buildings, railways, roads, pipelines for water supply, power line, etc., 2) produce fractures in another coal seam, immediately above the one being currently exploited, 3) cause fractures, on the surface, which may in turn cause flooding of the underground working by drawing water from the sources on the surface. 4) Cause damage to other mining installations, and as well 5) affect roots of the vegetation.

(g) Inundation

An inundation is a irruption of water or other liquid matter or any wet material that likely to follow from workings of the same mine or of an adjoining mine.

(h) Overburden

The high overburden dumps may cause land slides. 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. Carbonaceous shales and thin coal partings when dumped along with overburden or backfilled in quarries may lead to fire hazards. Siltation of rivers, canals may also cause run off from overburden dumps.

(i) Heavy Machinery

Most of the accidents during transport of dumpers, trucks and other heavy vehicles are often attributable to mechanical failures, in which the factor of human errors cannot be ruled out.

15.4.10.1 Disaster Management in Mining Industry

(a) Measures taken to avoid mine gases are as follows:

- The quantity of inflammable gas given out in each ventilation district should be determined at least once in a month and similarly borehole samples once in a quarter.
- The quantity of air sent into each district should be such as to keep the percentage of inflammable gases in the district return airway below a percentage of 0.75 to 1.25 at any place in the mine.
- Flameproof apparatus has to be installed at each and every working face to monitor the weather in the area of development or depillaring in each

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and every discontinued gallery as also in all other places, where the percentage of CH4 in the general body exceeds 0.2%.

- Flame safety lamps; air sampling and analysis should continuously monitor the state of atmosphere near the stopping.
- There should be strict adherence to latest safety manuals and statutory acts.
- A suitable mechanical ventilator installed on the surface should ventilate working.
- Approved types of store dust particles should be provided at the specified places.
- A ventilation officer in each and every operative area should assist the Manager.
- Adequate quantity of air should be coarsed to well within meters of the working face, and
- Air samples should be frequently collected of the roof of the working face and analysed timely for the presence of CH_4.

(b) Measures to Avoid Fires in the Underground Mine are as under:

- Check the workers, before the proceed underground, for matchbox, lighters and other contrabands,
- Do not allow burning of fire inside the mine and also within 15m of an Incline/pit,
- Avoid welding of headgear pulley or the headgear frame unless adequate timely precautions are taken,
- Avoid welding in underground repair shops without adequate precautions.
- Restrict the storage of inflammable and combustible material like oil, grease, timber etc.
- Remove all wood cuttings as also oily and greasy cotton wastes out of the mine.
- Install the electrical cables and equipment with due cares and maintains them properly with regular inspections.
- Use only approved safety lamps, which should be taken underground in locked condition.
- Machinery to be used underground should be meticulously assembled and properly operated so as to ascertain that during use it does not cause any dangerous sparks or for that matter generate any hot surface.
- Break blocks of underground machinery like haulage engines, locomotives, etc should be adjusted periodically to avoid their overheating and
- Avoid at any cost accumulation of dangerous static electric charges on the equipment using air by earthing.

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(c) Measures to avoid accidents due to explosives and shot firing:

The following precautions to be taken to avoid accidents due to explosives and shot firing:

- Person handling explosives or engaged or assisting in the preparation of charges or in the charging of holes shall not smoke or carry or use a light other then an enclosed light, electric torch.
- Person shall not take any light other than an electric torch in to any explosive magazine.
- The owner, agent or manager shall take adequate steps to prevent pilferage of explosive during its storage, transport and use in the mine.
- Person shall not have explosives in his possession except as provided for in this regulation.
- Any person finding any explosive in or about a mine shall deposit the same in the magazine or store premises. Every such occurrence shall be reported to the manager in writing.
- All precautionary measures as laid down in the regulation to be taken.

(d) Measures to prevent explosions are as under:

Fire damp explosion:

- For avoiding dangerous accumulation of firedamp it must rest below the lower limit of explosibility.
- Avoiding sources of ignition, which may cause the firedamp accumulation to explode.
- Proper ventilation of the mine is the keynote to prevent dangerous build-up of firedamp.
- Besides this, regular inspection of places where firedamp may accumulate is very essential in addition to making provision of proper ventilation.
- To prevent formation and timely dissemination of the coal dust from the workings and the roadways and
- The motors, switchgears and transformers should always be provided with flameproof enclosures.

Coal dust explosion:

- Reducing the formation of coal dust in the working faces, haulage roads etc.
- Preventing its spread.

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- Rendering the coal dust harmless by wetting it with water or mixing the same with inert stone dust.
- Making provision of stone dust barriers or water barriers.
- Water spraying at loading points, transfer points as also over the loaded coal tubs help in reducing the dissemination of coal dust and
- Dust at the transfer points should be collected with free use of dust extractor.

(e) Measures Suggested to avoid accidents due to blasting are as under:

- Shots shall not be fired except during the hours of day light or until adequate provision is made of artificial light; then the holes charged on any particular day shall be fired on the same day.
- Shots, if fired after hours of day light should be muffled so that the flying fragments from the blasting material do not project beyond a distance of 10 meters from the place of blasting,
- Adequate shelters or other protection shall be provided at all times,
- The shot fired shall give sufficient warning by effective signals over the entire area falling within a radius of 400 meters,
- Where any permanent building or structure of permanent nature not belonging to the owner lies within the danger zone the aggregate maximum charge in all the holes fired at any particular time shall not exceed 2 kg. But then if blasting is done with at least half second delay of the detonator even a maximum charge of 2 kg can be used with facility in each hole,
- If a Single shot exploder is used or if blasting is done with ordinary detonator, the shot-firer shall not fire more than sixty shots in one shift, but if multishot exploder is used the number can be one hundred and twenty,
- During the approach and progress of electrical storm adequate precautions shall be taken and
- That no shot hole shall be drilled in the overburden above the underground galleries.

(f) Measures to Avoid Subsidence:

- Long faces: Long faces or longer width of panel are to be preferred to reduce the number of rib-sides, where differential movements occur resulting in high subsidence.
- Rapid face Advantage: Temporary interruptions in face advance should be scrupulously avoided as the rapid face advance necessarily aims at diffusing the rib side conditions to control the subsidence.

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- Development of diverging faces: It is advantageous to develop diverging faces extending up to the next cross cuts to facilitate one time controlled subsidence.
- Solid packing: The more completely the roof is packed, the lesser will be the total subsidence at the surface point. Then the smaller the width of the unpacked long wall face or unpacked area of roof, the smaller will be the amplitude of the subsidence.
- Partial extraction: In development by the board and pillar method particular advantage is taken of quite a good proportion of coal in pillars to reduce the surface damage. On the same analogy, a scheme is developed for partial extraction by short width long wall panels with pillars of coal left in situ in between. By this method of partial extraction it has now been observed that the resulting subsidence is only a fraction of the seam thickness and that the subsidence basin is flat and well spread giving rise to almost negligible strain for causing the subsidence.
- Harmonic extraction: In this method the working in two or more seams are so advanced simultaneously as to cancel the strains caused by another seam at a different level, resulting in a bare minimum subsidence on the surface.
- Splitting of faces: To control the subsidence due to travelling strains the long wall faces or working in a panel are split into two units, which are so advanced in steps with a fixed interval in between, such that the strains induced by the two faces or units have a tendency to cancel each other.
- Protective coal pillars: A subsidence can be controlled very effectively by leaving the protective coal pillars below the ground surface. Indeed, this method is adopted particularly to prevent damage to the important features on the surface.

(g) Measures to avoid Inundation:

- Working place approached within a distance of 60m of any other working (likely to contain accumulation of water) shall not be extended further unless it is examined physically and found to be free from accumulation of water.
- Whenever seepage of water is noticed at any place of working, such working shall be immediately stopped. The height of such working shall not extend 2.4m and at least one borehole near the center of working place shall be maintained with sufficient number of flank bore holes on each side. All such boreholes drilled above and below the workings at intervals of not more than 5m. Such boreholes constantly maintained 3m in advance of the working.

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(h) Measures to prevent the danger of overburden are as follows:

- A sturdy stone wall should be built around the toe of each active dump at a distance of about 50 m from the toe,
- Where overburden material contains coal, people would often approach the dump at night to pilfer the carbonaceous material. Hence, patrolling by guard has to be introduce to nip the nocturnal activity, of pilferage in the bad,
- To prevent result the failure of overburden slopes, especially during rainy season, following precautions need to be taken against this hazard :
  - Proper terracing of the dump slopes, with maximum bench height of 10 meters,
  - In portions where the dumping operations have come to an end, the slope angle should be flattened by about 5° lower than the angle of repose which varies from site to site but it is generally expected to be around 22°,
- Planting vegetation as early as possible over the overburden dump slopes,
- The drainage channels along the overburden dump toe provide additional protection,
- While doing this, a distance of over 15 m should be left between the overburden dump and the coal bench, and
- If the quarry is abandoned, the coal bench and overburden dump should be separated from each other by digging a trench of 6 to 10 m width upto the non-carbonaceous and/or incombustible rock below the coal seam.

(i) Measure to Prevent Accidents due to Trucks and Dumpers are as under

- All transportation within the main working should be carried out directly under the supervision and control of the management,
- The vehicles must be maintained in good condition and checked thoroughly at least once a week by the competent person authorized for the purpose by the Management,
- Road signs should be provided at each and every turning point specially for the guidance of the drivers at the night,
- To avoid danger while reversing the trackless vehicles especially at the embankment and tipping points, all areas for reversing of lorries should as far as possible be made man free, and
- A statutory provision of the fences, constant education, training etc. will go a long way in reducing the incidents of such accidents.

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EMERGENCY PLAN: Manager having workings belowground prepares general plan of action for use in case of fire, explosion or other emergency occurs. This plan prepares under rule 199(A) of CMR 1957. The plans outline the duties and responsibilities of each mine official and key man including telephone operators. All officials and key man thoroughly instructed in their duties to avoid contradictory orders and confusion. The emergency plan provide for mock rehearsals at regular intervals. Manager submits the copy of the emergency plan to regional inspector for approval. The emergency plan for u/g coal mine is presented in table 15.3.

15.4.11 Care & Maintenance during Temporary Discontinuance

In case of any discontinuance due to any enforcing circumstances or Court order etc., the mine shall be remaining under the charge of Mines Manager with supporting staff and equipment to take care of provision of rules and regulations applied. Notices of temporary closure shall be served to respective department and concerned authorities. In case of re-opening, the procedure led by DGMS shall be strictly followed and the notices for reopening shall be sent to all respective department and concerned authorities.

15.5 ECONOMIC REPERCUSSIONS OF CLOSURE OF MINE AND MANPOWER RETRENCHMENTS

The equipment and statutory supervisory staff shall transfer to another operating mines with option of voluntary retirement scheme. The details of retirement scheme proposed to submit in final mine closure plan.

15.6 TIME SCHEDULE OF ABANDONMENT

The life of the mine may shorten or lengthened accordingly to the rate of production, which is entirely dependent on market demand.

15.7 ABANDONMENT COST

Since there is no habitant exists in the leasehold area hence it is not applicable.

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Table-15.1: CHECK LIST FOR LIKELY DISASTER IN UNDERGROUND MINE

RISKS / ACTIVITIES	FIRE HAZARDS		HUMAN RISKS		SUBSIDENCE		ECOLOGICAL RISKS		
	MAJOR	MINOR	SEVERE	NON-SEVERE	MAJOR	MINOR	LAND	AIR	WATER
DRILLING BLASTING	X		X		X		X	X	X
EXTRACTION OF COAL		X	X		X		X	X	X
COAL STORAGE	X			X			X	X	X
TRANSPORTATION OF COAL		X		X			X	X	X
USE OF COMPRESSOR AND MACHINERY		X		X			X	X	X
PUMPING / DEWATERING						X	X		X
DEPILLARING AND DEVELOPMENT WORK			X		X		X	X	X

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IDENTIFICATION OF HAZARDS

Table-15.2

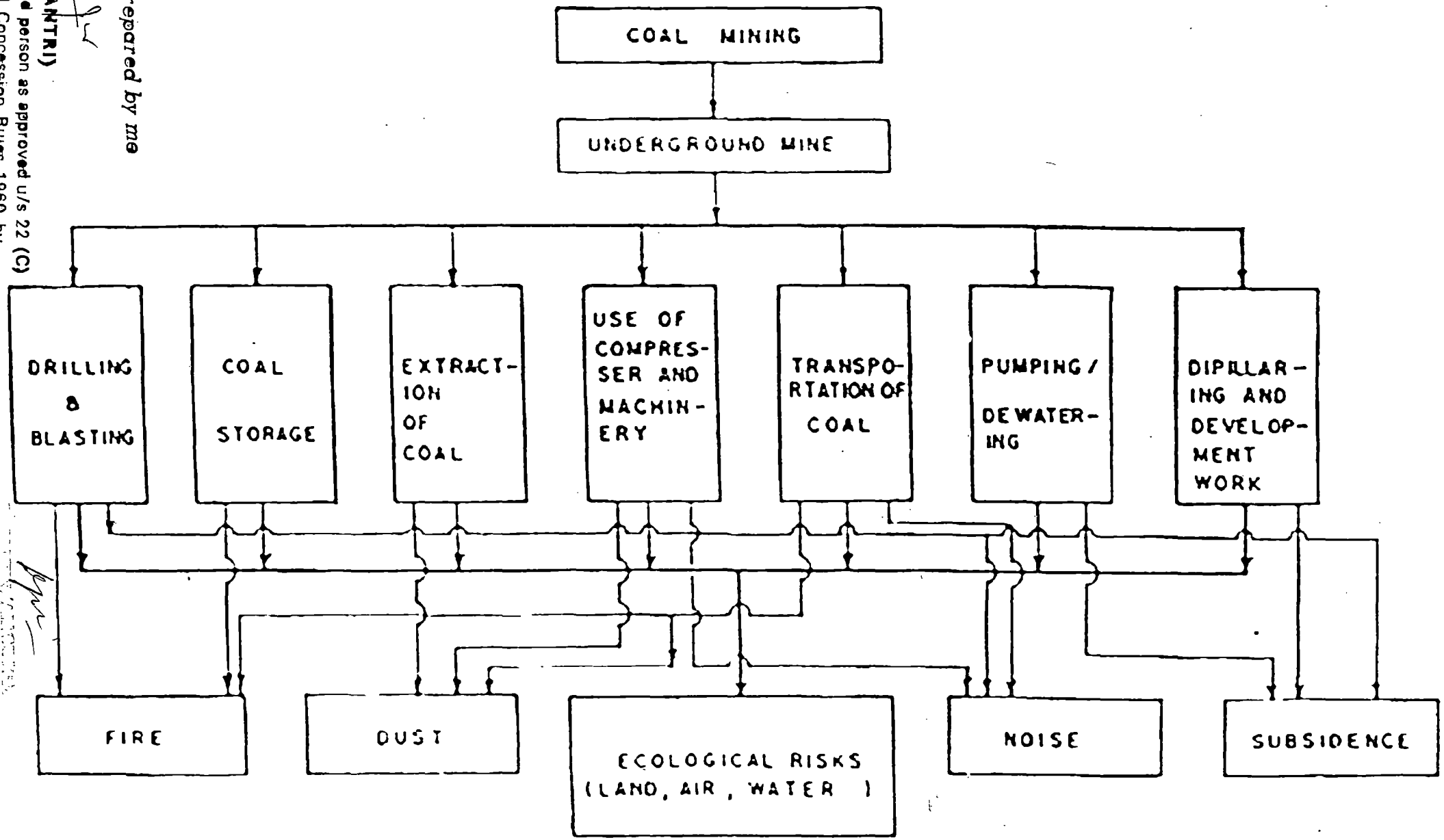
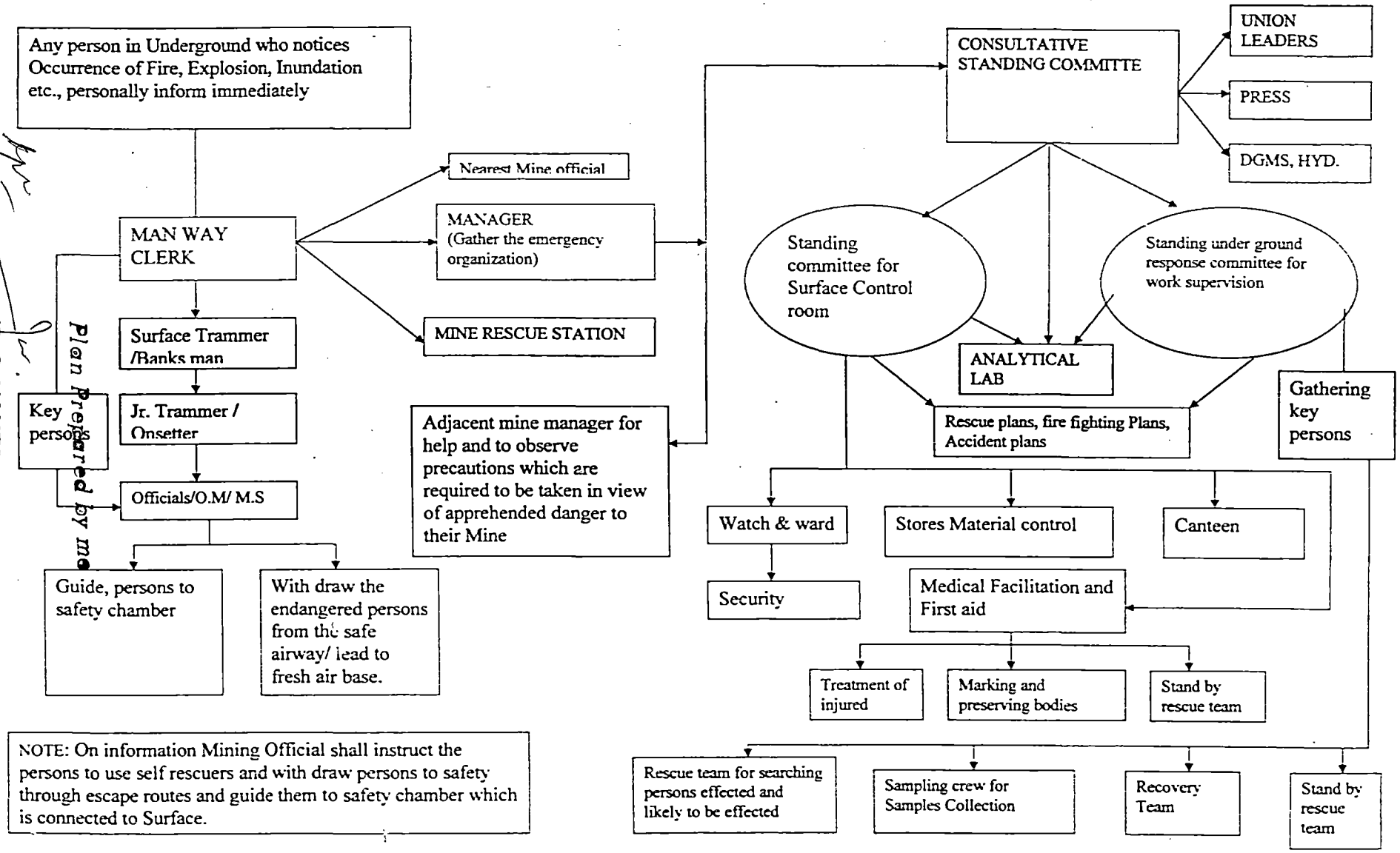


Table-15.3 EMERGENCY ORGANISATION PLAN

IN THE EVENT OF FIRE, INNUNDATION, EXPLOSION, ROOF FALL, SIDE FALL OR ANY DANGEROUS OCCURANCE

(For Underground Coal Mine under regulation No: 199A of CMR-1957)



NOTE: On information Mining Official shall instruct the persons to use self rescuers and with draw persons to safety through escape routes and guide them to safety chamber which is connected to Surface.

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Recognised person as approved u/s 22 (C) of Mineral Concession Rules 1960 by Ministry of Coal & Mines, Department of Coal vide No 13016/18/2003-CA dated 13.2.2004/Validity of recognition for 10yrs)

CHAPTER-16

ANY OTHER RELEVANT INFORMATION

CERTIFICATE

This provision of Mines Act, Rules and Regulations made there under, have been observed in the preparation of the **MINING PLAN**. Wherever specific permissions are required, the applicant will approach the **DIRECTOR GENERAL OF MINES SAFETY.**

***(R.S.MANTRI)**
*Recognised person as approved u/s 22(C) of Mineral Concession Rules 1960 by Ministry of coal & Mines, Department of coal vide No.13016/18/2003-CA dated 13-02-2004 (Validity of recognition for 10 years.)

* A Copy of Recognition granted vide Lr.No.13016/18/2003-CA dated 13.02.2004 of Govt. of India is enclosed.

KOTHAGUDEM COLLIERIES,
DATED: 12.09.2005.

Plan Prepared by me

(R. S. MANTRI)
Recognised person as approved u/s 22 (C) of Mineral Concession Rules 1960 by Ministry of Coal & Mines, Department of Coal vide No 13016/18/2003-CA dated 13-2-2004(Validity of recognition for 10yrs)

एलिस कुजूर/ALICE KUJUR
अवर सचिव/Under Secretary
कोयला मंत्रालय/Ministry of Coal
भारत सरकार/Govt. of India
नई दिल्ली/New Delhi

Annexure I

THE SINGARENI COLLIERIES COMPANY LIMITED
(A Government Company)
KOTHAGUDEM

YELLANDU ADDITIONAL MINING LEASE OVER AN EXTENT OF 14.0 SQ.MILES (3626.00 HA.) GRANTED VIDE G.O. MS.NO.1175 DT 7.11.1972 -- STATUS OF COMPLIANCE OF CONDITIONS.

<table>
<tr><th>Sl. No.</th><th>Conditions</th><th>Status of Compliance</th></tr>
<tr><td>1.</td><td>The lessee shall pay rents and royalties in any Government Treasury before the 10th January of every year.</td><td>The Rents and Royalties are being paid by SCCL from time to time to Government.</td></tr>
<tr><td>2.</td><td>The lessee shall pay before the expiry of the lease or its sooner determination by either party, an amount equal to the annual dead rent or such higher amount as may be fixed by the Collector or the District in his discretion, as compensation for damage to the land covered by the lease.</td><td>As there is no damage to the land covered by the lease, no demand is issued by the Collector for payment of compensation.</td></tr>
<tr><td>3.</td><td>The lessee shall not fell trees if any in the un-reserves covered by the lease without the previous permission of Collector and if it is found that he has felled any trees without such permission he shall pay the value of the trees together a compounding fee subject to a maximum of ten times the value of the said trees.</td><td>No trees were felled in the lease area except in the following areas which were approved by Government.
<table>
<tr><th>Extent Ha.</th><th>Purpose</th><th>Date of handling over</th></tr>
<tr><td>48.00</td><td>JK OC II.</td><td>02.02.1997</td></tr>
<tr><td></td><td>Polampalli Mine</td><td>18.05.1963</td></tr>
<tr><td>5.54</td><td>Polampalli Mine</td><td>07.09.1970</td></tr>
<tr><td>13.44</td><td></td><td></td></tr>
</table></td></tr>
<tr><td>4.</td><td>The lessee shall not enter upon or commence mining operations in any reserve forest situate upon the said lands without thirty days previous notice in writing to the District Forest Officer and without obtaining the written sanction of that Officer which may be with such conditions as that officer may in his reasonable discretion prescribed.</td><td>SCCL obtained the permission of Government vide G.O.Ms. No.1175 dated 07.11.1972 for conducting mining operations in the Area wherever surface area is required; the same was acquired as at Sl.No.3.
(Copy enclosed as Annexure VII).
भारत सरकार/Govt. of India
नई दिल्ली/New Delhi</td></tr>
<tr><td></td><td>i. The lessee must bear the cost of demarcation of the area within the reserved forest limits by a declared fire line of 40 feet wide which will be cut</td><td>SCCL demarcated the boundary of Mining Lease area by constructing pillars.
Plan Prepared by me
(R. S. MANTRI)
Recognised person as approved u/s 22 (C) of Mineral Concession Rules 1960 by Ministry of Coal & Mines, Department of Coal vide No 13016/18/2003-CA dated</td></tr>
</table>

<table>
<tr><td></td><td>and kept cleared by the forest Department.</td><td></td></tr>
<tr><td></td><td>ii. The lessee must at all time permit officer of the Forest Department to enter upon the land for the purpose of maintaining or repairing existing boundary lines within the area and must pay the cost of such maintenance or repair as determined by the District Forest Officer.</td><td>SCCL is not objecting the inspection of the areas by Forest officials.
Cost of maintenance and repair of existing boundary lines with in the area will be paid as per the directions of district Forest Officer.</td></tr>
<tr><td></td><td>iii. The lessee must take suitable precaution to prevent fires from spreading into the adjoining reserve forest from the land if such fire accidentally occur he must render all possible assistance in putting them out;</td><td>No such fires occurred in the land leased to SCCL for mining.
However, suitable measures will be taken to prevent spreading of the fire in to adjoining reserve forest.</td></tr>
<tr><td></td><td>iv. The lessee shall not cut any trees or growth on the area granted in excess of 20 percent of the number of trees on the whole area under lease without the previous permission of the District Forest Officer and the value of such trees, etc., shall be paid for by the lessee at rates to be fixed by the District Forest Officer, he must not deface or interfere with any boundary stone or marks; if any boundary mark is accidentally damaged, he must bring the matter immediately to the notice of the Range Officer</td><td>The lessee has not cut any trees except in the following cases which were approved by Government.
<table>
<tr><th>Extent (Ha)</th><th>Purpose</th><th></th></tr>
<tr><td>48.00
5.54
13.44</td><td>JK OC II.
Polampalli Mine
Polampalli Mine

No damage is caused to the boundary pillars</td><td>02.02.1997
18.05.1963
07.09.1970</td></tr>
</table></td></tr>
<tr><td></td><td>v.The lessee shall not construct any new road in government Forest without the previous sanction of the Divisional Forest Officer.</td><td>The roads are laid in the forest lands with due approval of Forest Dept.

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नई दिल्ली/New Delhi</td></tr>
<tr><td></td><td>vi. The lessee using any existing forest road or cart tract for the transport of his plan or produce shall is required to do so by the Divisional Forest</td><td>Not applicable.Plan Prepared by me

(R. S. MANTRI)
Recognised person as approved u/s 22 (C) of Mineral Concession Rules 1960 by Ministry of Coal & Mines, Department of Coal vide No 13016/18/2003-CA dated 13-2-2004(Validity of recognition for 10yrs)</td></tr>
</table>

	Officer, carry out such maintenance of the road or cart track as the latter may direct. In case of failure to comply with the orders of the Divisional Forest Officer the work will be carried out by the Forest Department and the cost there of recovered from the lessee under the provisions of the Land Revenue Recovery Act or any other Law for the time being in force;	
	Vii.The lessee shall, before commencing mining operation point out to the Divisional Forest Officer or the local Ranger the precise areas wherein he proposes to conduct such operations as determined by the District Forest Officer if collection thereof is decided upon during the lease (Later portion to be struck-off is collection is ordered during grant).	Mining Operations are carried out in the forest areas as per the approval accorded by Government.
	Viii.The lessee shall pay compensation as fixed by the forest department in respect of the damage if any, caused to the forest growth or to the soil supporting the forest growth either directly or indirectly due to extraction of coal underneath.	Being carried out as per the approved EMPs.
5.	The lessee shall be free to undertake mining operations also in respect of the atomic minerals of the area held by him on the conditions that:-	No automatic minerals were found during mining operations.
	i. If in the course of mining operations he discovers any atomic mineral/minerals he shall report the fact to the Director, Atomic Mineral Division, New Delhi, within 60 days from the date of discovery of sub-mines;	Not applicable.
	ii.That the quantities of atomic minerals recovered incidental to such mining operations shall be collected and stocked separately and a report to that effect sent to the Director,	Not applicable.

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नई दिल्ली/New Delhi

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	Atomic Minerals Division, New Delhi every three months, who will have samples thereof taken and analysed to determine whether they are of acceptable grade for purchase by the Department of Atomic Energy.	
6.	The lessee shall also be free to remove any quantity of atomic minerals as are required by the Department of Atomic Energy. On payment of royalty by the lessee to the State Government.	Not applicable.
7.	Unless the quantity of Atomic Minerals found incidental to mining operations is insignificant, the lessee shall in due course apply to the State Government for inclusion of the Atomic Mineral/Minerals in the indenture of lease. Provided that the State Government may, in consultation with the Department of Atomic Energy. Exempt the lessee from obtaining a separate lease for or inclusion of Atomic minerals in the lease deed.	Not applicable. Not applicable
8.	For the purpose of clauses 4,6 and 7 of this Appendix Atomic Minerals means the minerals from which prescribed substances as defined in clause (f) of Section 3 of the Atomic Energy Act, 1948 (29 of 1948) can be obtained.	Not applicable.
9	The owner, Agent or Manager of a mine shall at least one month before the commencement of any mining operations give to the Chief Inspector of Mines, the Director, Indian Bureau of Mines and the District Magistrate of the District in which the mine is situated notices in writing in such from and containing such particulars relating to the mines and may be prescribed to as to reach them at least one month before the commencement of any mining operations.	Necessary permission of Mines Department is being obtained under Coal Mine Regulations before commencement of mining operations. Coal India New Delhi *Plan Prepared by me* **(R. S. MANTRI)** **Recognised person as approved u/s 22 (C) of Mineral Concession Rules 1960 by Ministry of Coal & Mines, Department of Coal vide No 13016/18/2003-CA dated 13-2-2004(Validity of recognition for 10yrs)**

10	The lessee shall without delay report to the State Government that discovery in the area comprise in his lease of any object of historical or archaeological interest.	No object of historical or archaeological interest was found in the leased area during coal mining operations.
11	The lessee shall abide to the conditions notified in G.O. MS.NO.1175 Ind. & Com. Dept., dated 7.11.1972.	Royalty being paid to the Government regularly.

****

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Deputy Director
Ministry of Coal
भारत सरकार/Govt. of India
नई दिल्ली/New Delhi

THE SINGARENI COLLIERIES COMPANY LIMITED
(A Government Company)

Annexure-IIA

LIST OF MINING LEASES FOR COAL HELD BY THE SINGARENI COLLIERIES COMPANY LIMITED IN THE STATE OF ANDHRA PRADESH.

Sl. No.	Name of the lease	Date of execution	Lease area	Period	From	To
I) KHAMMAM DISTRICT:-						
A) KOTHAGUDEM:-						
1.	Kothagudem Mining Lease. G.O.Ms.No.273 I&C Dept. Dated 15.09.2003.	01.11.2003	6117 Ha. (2338 Ha. RF) @	10 years	28.04.1999	27.04.2009
2.	Gouthamkhani Opencast Project (Phase-I), G.O.Ms.No. 82 I&C Department dated 21.04.1997.	19.09.1997	261.31 @@	10 years	19.09.1997	18.09.2007
3.	Sathupalli OCP-I. G.O.Ms.No. 51 I&C Dept., Dated 21.02.2005.	23.03.2005	383.05	20 years	23.03.2005	22.03.2025
B) YELLANDU AREA:-						
4.	Yellandu Additional Mining Lease. G.O.Ms.No. 1175 I&C Department dated 07.11.1972.	24.05.1974	3626.00 Ha. (14 Sq.Miles) @	30 years	15.04.1974 (Temporary working permission granted upto 14.10.2005)	14.04.2004 (Renewal under process)
5.	Yellandu Mining Lease. G.O.Ms.No. 234 & 405 I&C Dept. dated 16.05.1989 and 17.08.1989 respectively.	01.01.2005	1363.00 Ha. (Ac.3367-05) @	10 years	01.01.2005	31.12.2015
6.	Koyagudem OCP-I (Phase-I) G.O.Ms.No. 171 I&C Department dated 22.04.2002.	21.05.2002	247.00 Ha. @	30 years	14.05.2001	13.05.2031

Plan Prepared by me

Under Secretary
कोयला मंत्रालय / Ministry of Coal
भारत सरकार / Govt. of India
नई दिल्ली / New Delhi

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Sl. No.	Name of the lease	Date of execution	Lease area	Period	From	To
C) MANUGURU AREA:-						
7.	Manuguru G.O.Ms.No. 810 I&C Department dated 09.08.1974	23.07.1975	2186.00 Ha. (21.86 Sq.Kms.) &	30 years	23.07.1975	22.07.2005 (Renewal is under process)
8.	Manuguru Extension Addl. Minining Lease G.O.Ms.No. 147 I&C Department dated 11.07.1996.	10.04.1997	125.9 Ha. @	10 years	10.04.1997	09.04.2007
9.	OC-II, Manuguru (Phase-III Balance Area) G.O.Ms.No. 63 I&C Department dated 06.03.1999.	05.08.1999	198.22 Ha. @	30 years	05.08.1999	04.08.2029
10.	OCP-III, Manuguru. G.O.Ms.No. 91 I&C Dept., dated 24.03.2005.	30.05.2005	75.00 Ha.	20 years	30.05.2005	29.05.2025
II) ADILABAD DISTRICT:-						
A) BELLAMPALLI:-						
1.	Kanala Coal Area. G.O.Ms.No. 220 I&C Department dated 02.05.1969.	25.01.1991	1476.00 Ha. (5.70 Sq. Miles) @@@	20 years	01.01.1985	31.12.2004 (Renewal is under process)
2.	Tandur Coalfields Mining Lease G.O.Ms.No. 150 I&C Department dated 12.02.1990.	11.02.1991	16,286.00 Ha. (62.880 Sq.Miles)	30 years	01.01.1985	31.12.2015
B) MANDAMARRI:-						
3.	Kasipet Mining Lease. G.O.Ms.No. 460 I&C Department dated 28.12.1998.	19.03.1999	356 Ha. @@@	30 years	19.03.1999	18.03.2029
4.	Renewal of Indaram Mining Lease. G.O.Ms. No. 45 EFS&T Dept. dated 13.05.2002.	—	2100 Ha. (1054.84 Ha. RF) @	20 years	24.07.2000	23.07.2020 (Renewal is under process)

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Sl. No.	Name of the lease	Date of execution	Lease area	Period	From	To
C) SRIRAMPUR:-						
5.	Chennur Mining Lease. G.O.Ms. No.415 I&C Department dated 25.08.1989.	25.01.1991	3603.00 Ha. (36.03 Sq.KMs.) @@@	20 years	25.01.1991	24.01.2011
6.	North Godavari Mining Lease. Renewal G.O.Ms.No. 158 I&C (M.III) Dept. dated 28.05.2003.	13.08.2003	5389 Ha. @	10 years	22.05.2000	21.05.2010
7.	Srirampur Mining Lease.	—	938.85 Ha. (140 Ha. RF)	GOI issued formal approval under F© vide letter No.8-56/91-FC dated 12.02.2005 (APPLICATION UNDER MM (D & R) Act is Under Process)		
III) KARIMNAGAR DISTRICT						
RAMAGUNDAM:-						
1.	South Godavari Additional Area. G.O.Ms.No. 900 I&C Dept. dated 17.09.1975.	11.06.1976	1554.00 Ha. (6 Sq.Miles) @@@	30 years	11.09.1975	10.09.2005 (Renewal is under process)
2.	South Godavari Coal fields renewal G.O.Ms.No. 291 I&C (M-IV) Dept. dated 11.06.1986.	20.06.1987	6848.00 Ha. (26.410 Sq.Miles) @@@	30 years	01.01.1985	31.12.2014
3.	Pandulapalli etc., (vgs). (Extension of South Godavari Mining Lease). G.O.Ms.No. 25 I&C (M.III) Dept., dated 21.01.1991.	19.07.1991	4877 Ha. @@@	30 years	19.07.1991	18.07.2021
4.	Medipalli Mining Lease G.O.Ms.No. 210 I&C (M-III) Dept. dated 21.01.1991.	10.12.1991	1643.00 Ha. (Ac.4060-30) @@@	30 years	10.12.1991	09.12.2021

Plan Prepared by me

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नई दिल्ली/New Delhi

Sl. No.	Name of the lease	Date of executio	Lease area	Period	From	To
IV. WARANGAL DISTRICT:-						
1.	Bhoopalapalli Mining Lease G.O.Ms.No. 230 I&C Dept, dated 31.05.1988.	04.08.1989	2792.00 Ha. (27.920 Sq.Kms.) @@@	20 years	04.08.1989	03.08.2009
2.	Peddapur Block-I Extension (North) G.O.Ms.No. 455 I&C Dept. dated 26.12.1998.	26.05.1999	330 Ha. @@@	30 years	26.05.1999	25.05.2029
3.	Peddapur Mining Lease G.O.Ms.No.114 I&C Dept., Dated 19.04.1999.	22.09.1999	955 Ha. @@@	30 years	22.09.1999	21.09.2029
4.	KTK 5 & 5A Inclines. G.O.Ms.No. 155 I&C (M-III) Dept. Dated 26.05.2003	02.09.2003	144.00 HA. @@	30 years	02.09.2003	01.09.2033
5.	KTK 1 &1A Inclines. G.O.Ms.No. 194 I&C (Mil) Dept. dated	02.09.2003	235 Ha. @@	30 years	02.09.2003	01.09.2033

@ Partly forest.
@@ Fully forest.
@@@ Non-forest.

SUMMARY

District	No. of mining lease	Area Ha.
Khammam	10	14,582.48
Adilabad	7	30,148.85
Karimnagar	4	14,922.00
Warangal	5	4,456.00
TOTAL	**26**	**64,109.33**

.....

Plan Prepared by me

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Coal
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नई दिल्ली/New Delhi

Annexure-IIB

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	Remarks
ADILABAD DISTRICT, BELLAMPALLIAREA:-						
1.	Shanthikhan Extension Mining Lease. ADMG Ref: 1471/M/2001.	Fresh	29.08.2001	30 years	401.70 Ha. (285.89 Ha. RF)	• GOI (MOEF) issued 1st Stage approval on 22.08.2004. **Under MM(R&D) Act 1957** • ADMG, Mancherial inspected the area and forwarded the application with his report to DMG on 14.09.2001. • SCCL requested DMG on 16.09.2004 to forward the proposal to GOAP (I&C Department) as the GOI (MOEF) issued 1st stage approval. • **Pending with DMG.**
2.	Goleti 1 & 1A Inclines. ADMG Ref: 882/M/03. GOAP I&C Ref: 12739/M.III(I)/2003-I.	Fresh	01.04.2003	30 years	250 Ha.	• Proposal is to be forwarded by State Government to MOEF. **Under MM(D&R) Act 1957** • ADMG Mancherial forwarded the proposal along with his report to DMG on 19.06.2003 and the same was forwarded by DMG to GOAP in I&C Department. • GOAP in I&C Department recommended the proposal to GOI (MOM) on 13.08.2003 to accord prior approval. • GOI(MOC) requested SCCL on 14.11.2003 to furnish approved Mining Plan. • SCCL submitted Mining Plan to GOI (MOC&M) on 10.11.2004 for approval. » GOI (MOC&M) advised SCCL to submit all information for approval of Mining Plan. • SCCL submitted Mining Plan to GOI (MOC&M) with all required information for approval on 28.06.2005. **Pending with GOI (MOC&M).**

Plan Prepared by me

(R. S. MANTRI)
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Sl. No.	Name of the Mining Lease	Fresh Or Renewal	Date of application	Lease period	Area	Remarks
3.	Dorli OCP-I. ADMG, Mancherial Ref.No. 2993/M/2004.	Fresh	15.12.2004	30 years	510.10 Ha.	• Application submitted to ADMG. Mancherial on 15.12.04. • ADMG, Mancherial conducted site inspection on 19.01.2005. • Pending with ADMG. Mancherial to forward the
ADILABAD DISTRICT, SRIRAMPUR AREA:-						
4.	Indaram Extension. (UGML). GOAP (I&C Dept.) Ref. No. 12740/M.III(11)/2003-1. GOI (MOC&M) Ref.No. 13016/28/2003-CA	Fresh	26.10.2002	30 years	456 Ha.	• Under F(C) Act application is under process. **Under MM(D&R) Act 1957** • GOAP (I&C Department) recommended the proposal to GOI (MOC&M) on 13.08.2003. • GOI (MOC&M) requested SCCL on 14.11.2003 to furnish approved Mining Plan, which is under submission. • **Pending with SCCL.**
MANDAMARRI AREA						
	Kasipeta North Extn.Block (UGML)	Fresh	30.05.2005	30 Years	206.00 Ha.	ADMG, MNCL to conduct site inspection and to forward the application to DMG. Pending with ADMG,

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Sl. No.	Name of the Mining Lease	Fresh Or Renewal	Date of application	Lease period	Area	Remarks
WARANGAL DISTRICT, BHOOPALAPALLI AREA:-						
6	KTK 9 & 9A Inclines. DMGRef.No. 36487/R7-1/97. //	Fresh	25.10.1997	30 years §	616.38 Ha. (431.85 Ha.RF)	• GOI (MOEF) issued formal approval on 17.05.2005. • Govt. of AP EFS&T Department to be issue G.O. **Under MM(D&R) Act, 1957** • ADMG inspected the area on 18.12.1997 and forwarded the report to DMG. The report from Collector is yet to be sent. • SCCL requested DMG on 17.09.2004 to forward the proposal to GOAP (I&C Department) as the GOI (MOEF) issued 1st stage approval. • **Pending with DMG.**
7	Addl. Mining Lease for KTK 6 Incline. ADMG, Warangal Ref. No. 3549/M/2004.	Fresh	23.07.2004	50 years	250 Ha.	• GOI (MOEF) issued 1st Stage approval on 14.09.2004. **Under MM (D&R) Act 1957** • ADMG, Warangal informed that the sitednspection will be made on 20.08.2004. • ADMG, Warangal conducted site inspection on 24.09.2004. • ADMG forwarded the proposal to DMG on 1/27.01.2005. • **Pending with DMG.**
	Yellandu Additional Mining Lease (Present Proposal)	Renewal	_____	20 years	1741 Ha	• Temporary working permission granted for a period of six months from 15-04-2005 or till renewal of the Mining Lease, Whichever is earlier, vide GOI, MOEF (F.C. Divison) F.No.8-54/1991-FC(pt),dated.10-05-2005.

*****

(R. S. MANTRI)

Recognised person as approved u/s 22 (C) of Mineral Concession Rules 1960 by Ministry of Coal & Mines, Department of Coal vide No 13016/18/2003-CA dated 13-2-2004(Validity of recognition for 10yrs)

Annexure – III

No. 13016/18/2003-CA
Government of India
Ministry of Coal and Mines
Department of Coal
.....

New Delhi, dated 13.2.2004

To

Chairman-cum-Managing Director,
Singreni Collieries Company Limited,
Kothagudem, Khammam,
Andhra Pradesh,

Subject :- Grant of recognition to Shri M.S. Reddy and Shri R.S. Mantri as qualified person to prepare mining plan for SCCL.

Sir,

I am directed to refer to your letter No. CRP/PP/F/602/818 dated 19.8.2003 on the subject mentioned above and to convey approval of the Central Government under Section 22(C) of Mineral Concession Rules 1960 to grant recognition to Shri M.S. Reddy, General Manager (Project Planning) SCCL and Shri R.S. Mantri Addl. General Manager (Project Planning) SCCL as qualified person to prepare mining plan for SCCL. This recognition shall be valid for a period of 10 years from the date of issue of this letter.

Yours faithfully,

(S.K.Kakkar)
Under Secretary

OFFICE OF THE CHAIRMAN & M.D. SINGARENI COLLIERIES CO. LTD.
116
21 FEB 2004
KOTHAGUDEM

DGM(S)

Director (P&P) S.C.C.O. LTD.
KGM

Plan Prepared by me

(R. S. MANTRI)
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DETAILS OF LAND

Annexure IV

Village: Sudimalla Mandal: Yellandu District: Khammam

S.No.	Sy.No.	Patta (Ha)	Govt. (Ha)	Forest (Ha)	Total (Ha)
1	549	—		32.38	32.38
2	603	—	133.95	—	133.95
3	604	0.37		—	0.37
4	605	0.18	—	—	0.18
5	606	0.11	—	—	0.11
6	607	0.15	....	....	0.15
7	608	0.2	—	—	0.20
3	609	—	290.76	—	290.78
9	610	—	6.53		6.53
10	611	—	2.78	—	2.78
11	612	—	1.22	—	1.22
12	613	3.05		—	3.05
13	614	0.79	—	—	0.79
14	615	0.73	—	—	0.73
15	616	1.06	—	—.	1.06
13	617		39.92	—	39.92
17	618	0.99	—	—	0.99
18	619	7.74	—	—	7.74
	TOTAL:	15.37	475.16	32.38	522.91

Village:Rompade Mandal: Yellandu

S.No.	Sy.No.	Patta . (Ha	Govt. (Ha)	Forest (Ha)	Total (Ha)
1	547	3.34	---	....	3.34
2	601	---	3.64	---	3.64
	TOTAL:	3.34	3.64	—	6.98

Village: Usirikayalapalli Mandal: Singareni

S.No.	Sy.No.	Patta (Ha)	Govt. (Ha)	Forest (Ha)	Total (Ha)
1	244	61.46	—	—	61.46
2	245	13.11	—		13.11
3	246	—	55.62		55.62
4	247	—	49.60		49 60
5	248	1.33	—	—	1.33
6	249	0.25	—	—	0.25
7	250	0.46	—	—	0.46
8	251	0.52	—	—	0,52

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S.No.	Sy.No.	Patta (Ha)	Govt. (Ha)	Forest (Ha)	Total (Ha)
9	496	3.66		—	3.66
10	497	38.76	—	—	38.76
11	498	0.53	—	—	0.53
12	499	0.46	—	—	0.46
13	500	0.23	—	....	0.23
14	501	0.36	—	....	0.36
15	502	0.52	—		0.52
16	503	0.22	—	—	0.22
17	504	0.77	—	....	0.77
18	505	1.15	—	—	1.15
19	506	0.66	—	—	0.66
20	507	0.59	—		0.59
21	508	1.01	—		1.01
22	509	0.73			0.73
23	510	0.51	—		0.51
24	511	0.55	—	—	0.55
25	.512	0.51	—	—	0.51
26	513	0.34	—	—	0.34
27	514	0.94	—	—	0.04
28	515	0.84	—	—	0.84
29	516	0.51	—		0.51
30	517	0.47	....	——	0.47
31	518	0.03	—	—	0.03
32	519	0.89	—		0.89
33	520	0.57	—	—	0.57
34	521	0.58	—		0.58
35	522	0.80	—	—	0.80
36	523	0.81	---	---	0.81
37	524	0.72	—	---	0.72
38	525	0.11	....	—	0.11
39	526	0.62	—	—	0.62
40	527	0.84	---	....	0.84
41	528	0.92	---	—	0.92
42	529	0.59	----	---	0.59
43	530	0.78	----	---	0.78
44	531	0.58	---	—.	0.58
45	532	0.60	----	---	0.60
46	533	0.69	....	—'—	0.69
47	534	1.14	----	—	1.14
48	535	0.81	—	—	0.81
49	536	1.12	---	....	1.12
50	537	1.11	—	—	1.11
51	538	1.32	—	—	1.32
52	539	1.07	—	—	1.07

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S.No.	Sy.No.	Patta (Ha)	Govt. (Ha)	Forest (Ha)	Total (Ha)
53	540	0.77	—	---	0.77
54	541	1.35	—	—	1.35
55	542	1.59	—	—	1.59
56	543	1.65	---	---	1.65
57	544	0.55	—	—	0.55
58	545	1.34	—		1.34
59	546	1.24	---	—	I.24
60	547	2.14	—	---	2.14
61	548	907.97	—	39.12	947.09
	TOTAL:	1066.77	105.22	39.12	1211.11

SUMMARY

Sl. No	Mandal	Village	Patta (Ha)	Govt. (Ha)	Forest (Ha)	Total (Ha)
1	Yellandu	Sudimaiia	15.37	475.16	32.38	522.91
2		Rompade	3.34	3.64	----	6.98
3	Singareni	Usirikayalapalii	1066.77	105.22	39.12	1211.11
		Total:	1085.48	584.02	71.50	1741.00

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Annexure VA

MINEWISE ALLOCATION-WISE MANPOWER DEPLOYMENT

SL. NO	DESIGNTION	MINES	
		21	JK 5
1	COLLIERY MANAGER/SUPDT OF MINES	1	1
2	SAFETY OFFICER (1ST CLASS)	0	3
3	VENTIALTION OFFICER (2ND CLASS)	1	0
4	ASST. MGR (1ST CLASS)	3	1
5	UNDER MANAGER (2ND CLASS)	12	14
6	SURVEYOR	3	2
7	ENGINEER	10	11
8	WELFARE OFFICER	1	1
9	OVERMEN	26	22
10	MINING SIRDAR	44	57
11	SHOT FIRER	28	8
12	PIT OFFICE ASST.	1	1
13	CLERKS	20	23
14	FOREMEN/CHARGE HAND (MECH)	4	3
15	FITTERS	30	43
16	FOREMEN/CHARGE HAND (ELEC)	4	3
17	ELECTRICIANS	31	36
18	WELDER	3	4
19	COAL FILLER	444	551
20	BADLI FILLER	18	0
21	COAL CUTTERS	135	74
22	MUNSHI	2	5
23	TRAMMER (UG)	102	104
24	TRAMMER (SURFACE)	6	0
25	HAULAGE OPERATOR (UG)	31	45
26	CONEYOR OPERATOR (UG)	32	32
27	LINEMEN	30	36
28	TIMBER MEN	171	120
29	PUMP OPERATOR	22	42
30	SURVEY STAFF	9	10
31	TYNDALS	26	9
32	TUB REPAIRING STAFF	6	11
33	ROPE SPLICERS/HAMMERMAN	6	7
34	LAMP ROOM STAFF	8	14
35	MASON	3	3
36	CARPENTER	1	2
37	FAN OPERATOR	5	3
38	BLACK SMITH	0	1
39	HELPER	0	16
40	ELECTRICIAN HELPER	7	4
41	FITTER HELPERS	8	3
42	M.V.DRIVER	0	1
43	ROAD HEADER OPERATOR	2	13
44	MULTI JOB WORKMEN (RH)	5	74
45	CANTEEN STAFF	6	7
46	PEON	0	2
47	SWEEPER	1	2
48	GENERAL MAZDOORS (UG)	409	471
49	GENERAL MAZDOORS (SUR)	15	45
50	RIGMAN	1	0
51	TURNER /MACHINIST	0	1
52	BADLI WORKER	2	1
53	TELEPHONE OPERATOR	3	3
	TOTAL	1756	1945

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Annexure VB

MANPOWER DEPLOYMENT JK OPENCAST

SL. NO.	DESIGNATION	M I N E JK OC
1	COLLIERY MANAGER/SUPDT OF MINES	1
2	ASST. MGR (1ST CLASS)	1
3	UNDER MANAGER (SMMC)	8
4	SURVEYOR	4
5	ENGINEER	12
6	WELFARE OFFICER	1
7	OVERMEN	23
8	MINING SIRDAR	3
9	CLERKS	17
10	FOREMEN/CHARGE HAND (MECH)	12
11	EP FITTER	100
12	FOREMEN/CHARGE HAND (ELEC)	5
13	EP ELECTRICIAN	42
14	EP WELDER	11
15	EPTURNER	3
16	EP OPERATOR	158
17	DRILL OPERATOR	16
18	PUMP OPERATOR	6
19	SURVEY STAFF	11
20	LAMP ROOM STAFF	1
21	CARPENTER	1
22	PAINTER	1
23	HELPER	4
24	EP HELPER/ GREASER	36
25	M.V.DRIVER	21
26	DUMP MAN / TRIP MAN	10
27	CABLE MAN	42
28	CANTEEN STAFF	3
29	CRUSHER OPERATOR	7
30	EXPLOSIVE CARRIER	11
31	BUNKER CHAIN MAZDOOR	6
32	GENERAL MAZDOORS (SUR)	323
33	BADLI WORKER	2d
	TOTAL	903

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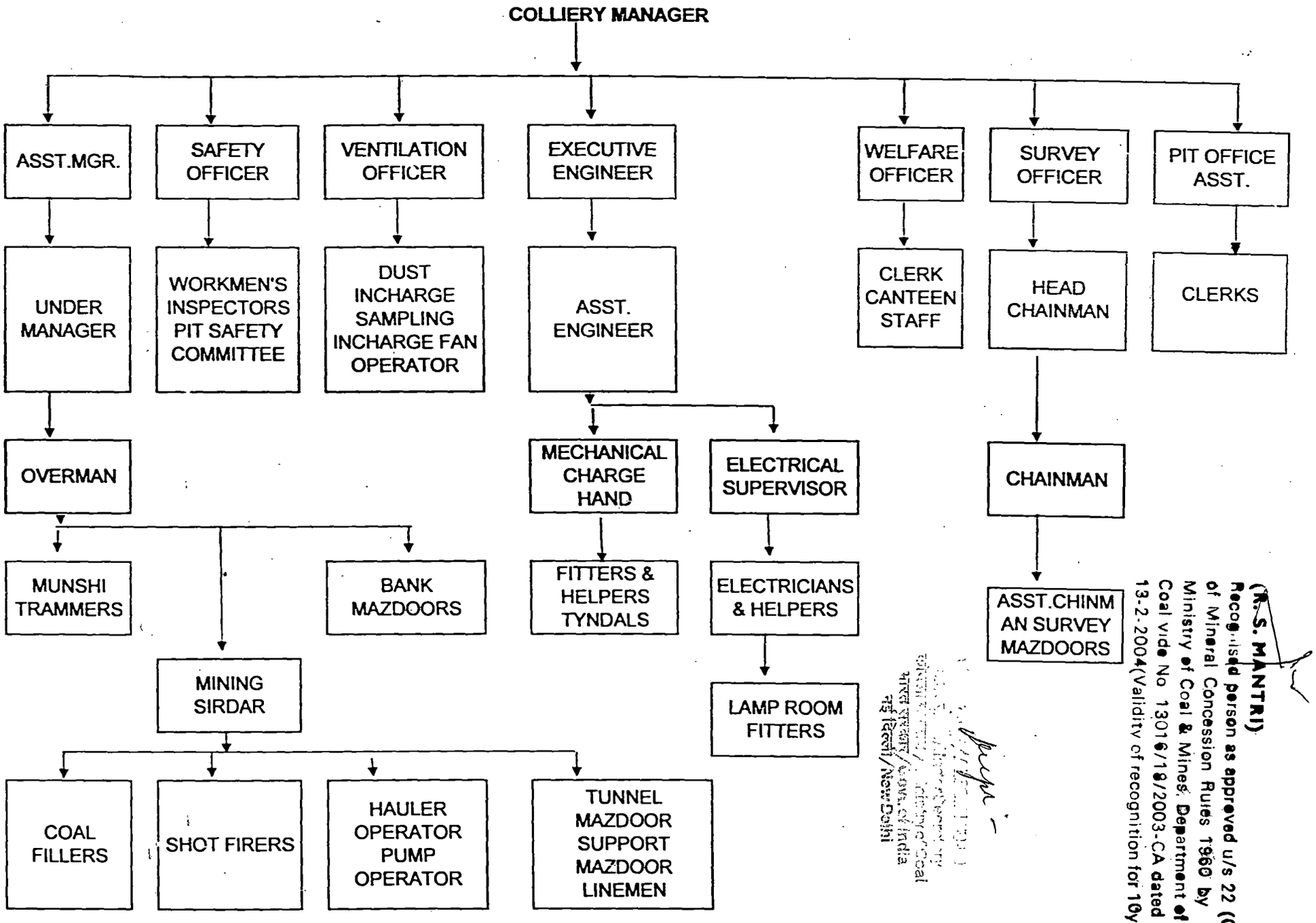
ANNEXURE-VIA

ORGANISATION CHART OF HANDSECTION MINE



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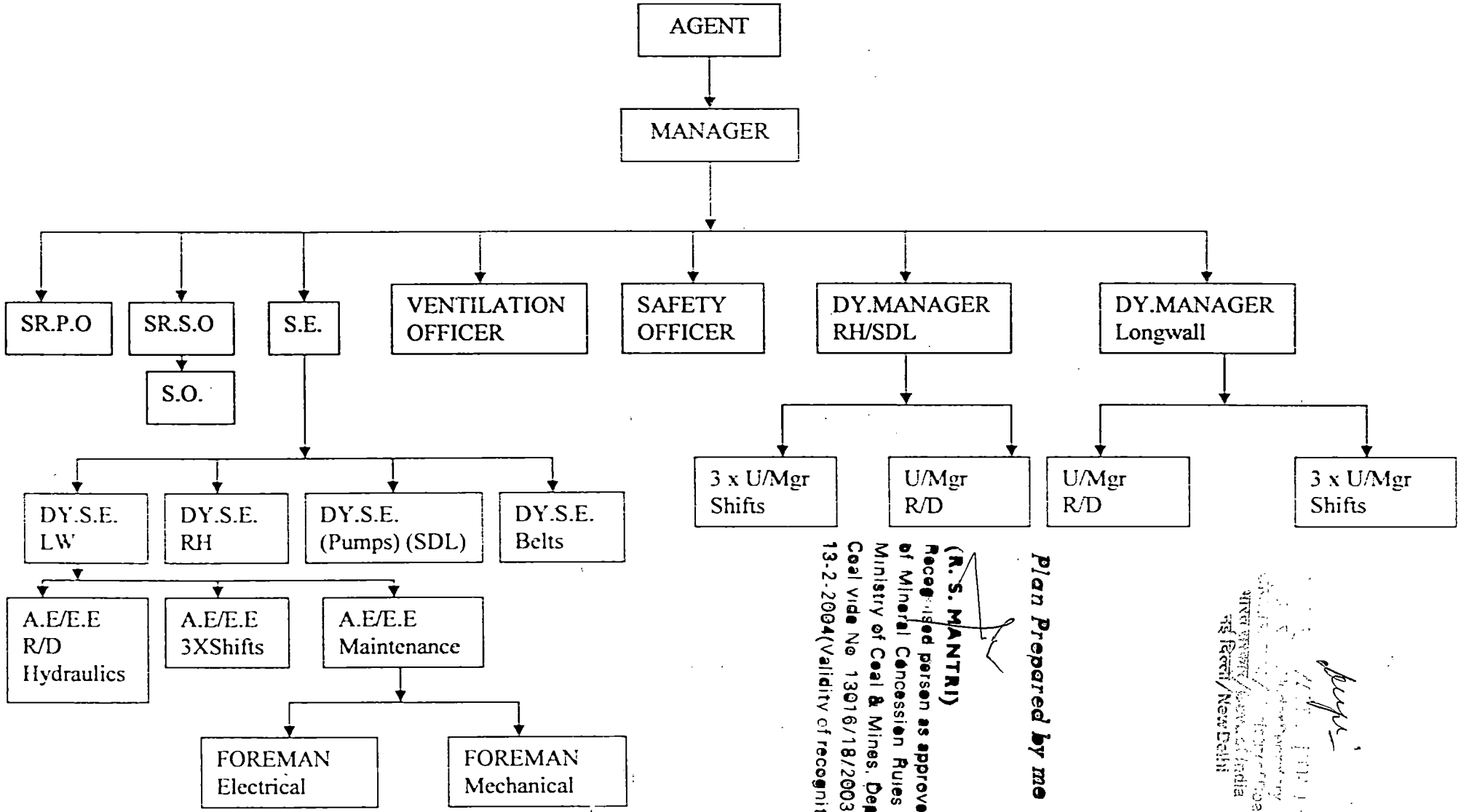
ORGANISATION CHART OF LONGWALL MINE

ANNEXURE VIB



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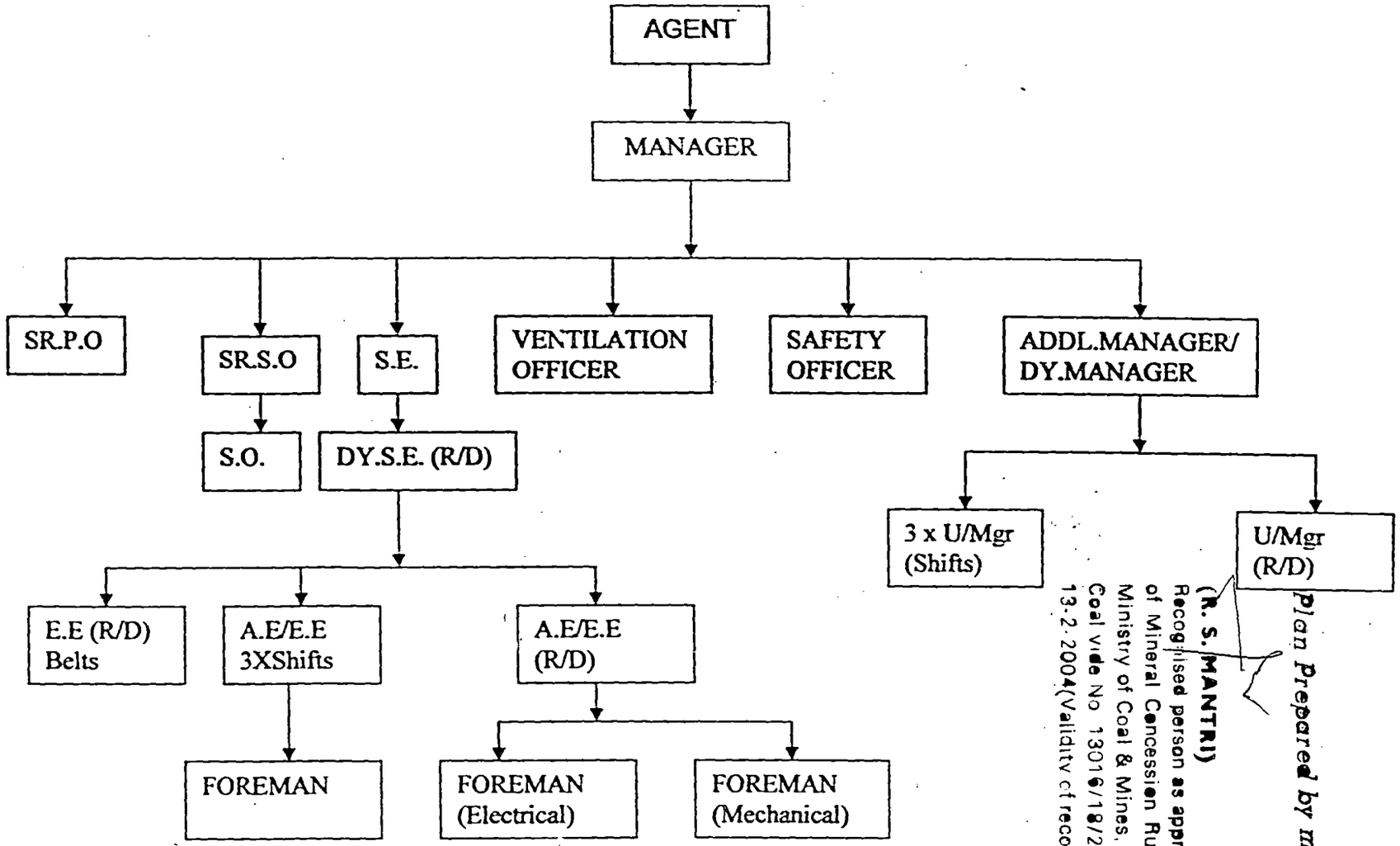
ORGANISATION CHART OF BLASTING GALLERY MINE

ANNEXURE VIC



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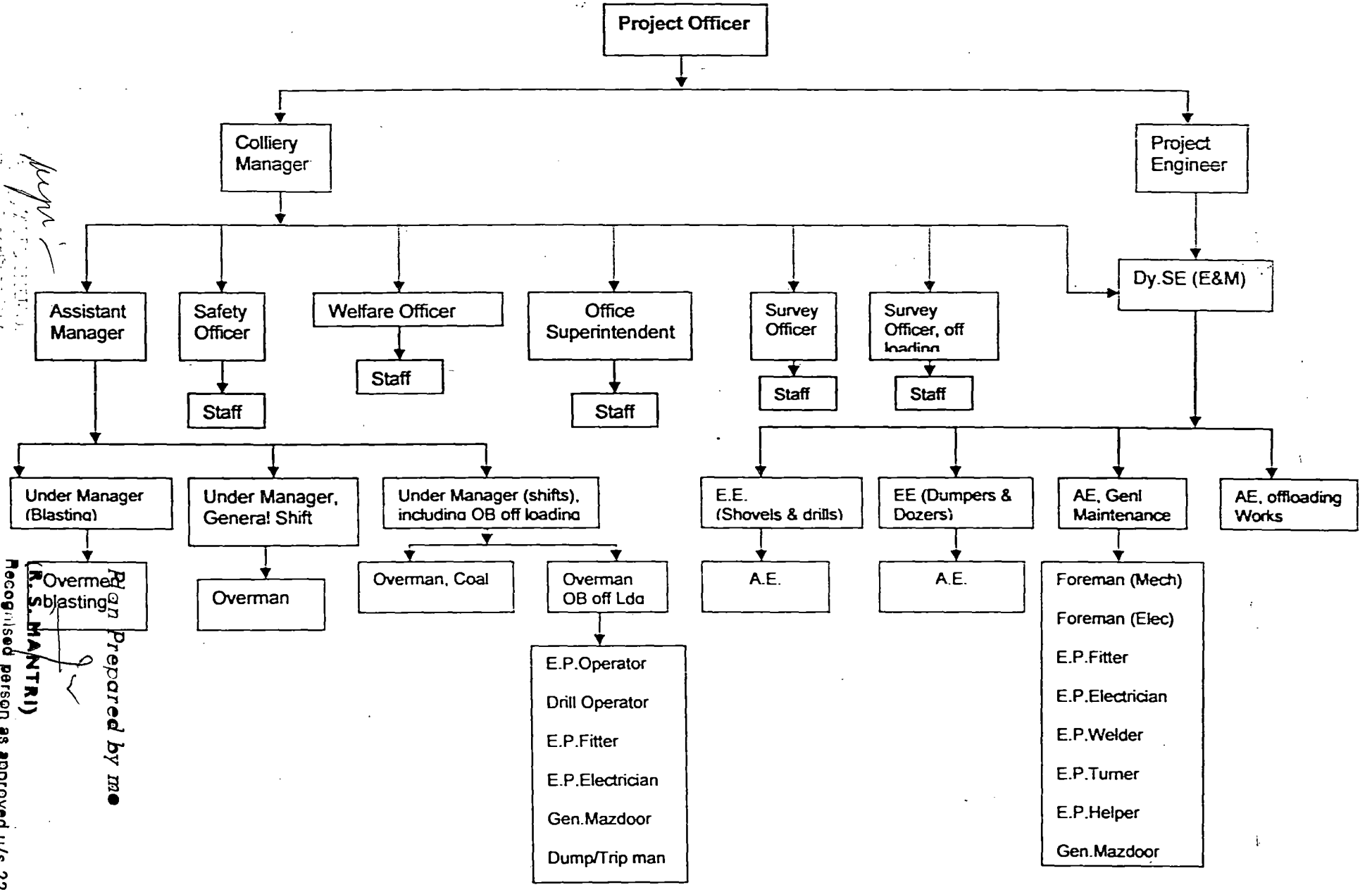
ORGANISATION CHART OF OPENCAST MINE

ANNEXURE VID



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Annexure - VII

F.No. 8-54/1991-FC (Pt)
Government of India
Ministry of Environment and Forests
(F.C. Division)

Paryavaran Bhawan,
CGO Complex, Lodhi Road,
New Delhi – 110003
Dated : 10th May 2005.

To

The Principal Secretary (Forests),
Government of Andhra Pradesh,
Hyderabad.

Sub: Diversion of 42.5 ha of forestlan l in respe ct of Yellandu Mining Lease in Kammam district of Andhra Pradesh, Temporary Working Permissi on in favour of Singareni Collieries Company Ltd (SCCL) – Reg

Sir,

I am directed to refer to the letter No. CRP/EST/F/154/308 dated 21.03.2005 of M/s. Singareni Collieries Company Limited, Government of And ra Pradesh, on the subject mentioned above seeking extension of Temporary Working Permission for the Yellandu Mining Lease in Kammam district of Andhra Pradesh for a period of one year. Earlier, pending submission of the renewal proposal by the State Government, Temporary Working Permission (TWP) was granted for a period of one year vide this Ministry's letter of even number dated 23.04.2004 for working in already broken up area. While submitting the lacking information required for consideration of the proposal under the Forest (Conservation) Act, 1980, extension of TWP has also been requested.

2. After careful consideration of the request of the User Agency and taking a practical view of the circumstances, extension of Temporary Working Permission is hereby granted in favour of M/s. SCCL, Government of Andhra Pradesh, to continue working in already broken up area of Yellandu Mining Lease in Kammam district of Andhra Pradesh for a period of six months w.e.f. 15.04.2005 or till renewal of the mining lease, whichever is earlier, subject to the condition that no fresh area shall be broken up and all environmental safeguards shall be adhered to.

Yours faithfully,

(Sandeep Kumar)
Assistant Inspector General of Forests

CRP PP
I.W.No. 12444
Date 10/5/05

ALICE KUJUR
Secretary
Ministry of Coal
Govt. of India
New Delhi

1. The Principal Chief Conservator of Forests, Andhra Pradesh, Hyderabad, for necessary action.
2. The Nodal Officer, O/o the PCCF, Andhra Pradesh, Hyderabad, for necessary action.
3. The Chief Conservator of Forests (Central), Regional Office, Bangalore.
4. RO(HQ)/Monitoring Cell, MoEF, New Delhi.
5. M/s. Singareni Collieries Company Ltd, Kothagudem, Khammam district, Andhra Pradesh-507101.
6. Guard File

(Sandeep Kumar)
Assistant Inspector General of Forests

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CRP-EST
F. 2125
10/5/05

(R. S. MANTRI)
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Annexure - VIII

GOVERNMENT OF ANDHRA PRADESH
A B S T R A C T.

Mines - Mining lease for Coal for 30 years over an extent of 14 Sq.Miles in Yellandupadu, Uragutta, Singaperiguda R.F. Banjara Guts, Ommakaipalli, Pollampalli and Kommepalle village, Yellandu Taluk, Khammam District - Application of M/s.Singareni Collieries Company Limited, Kothagudem - Sanctioned.

INDUSTRIES & COMMERCE(MINES.III)DEPARTMENT.

G.O.Ms.No.1175. Dated 7-11-1972.

Read the following:-

1) From the Collector, Khammam Lr.No.D.Dis.18/63(A7), dt.7-5-1964.
2) From the Director of Mines & Geology Lr.No.R.Dis.6103/M2/64, dated 15-6-1964.
3) Govt. of India Ministry of Steel and Mines Lr.No.C4/9(83)/64, dated 6-8-1964.
4) From the Singareni Collieries Company Lr.No.20/S/10142, dated 26-5-1965.
5) From the Chief Conservator of Forests Lr.No.20267/66-G2, dated 12-1-1970.
6) From Food & Agriculture Department U.O.Note No.171/For.I/72, dated July, 1972.

...

O R D E R:

With the prior concurrence of Central Government, the Government sanction to M/s.Singareni Collieries Company Limited grant of a Mining lease for Coal for a period of 30 years over an extent of 14 Sq.Miles in Survey Nos. as in annexure in Khammam District, subject to the provisions of Mines and Minerals(Regulation and Development) Act 67/1957 and the rules made thereunder in general, subject also to the conditions in Form K prescribed under the Mineral Concession Rules, 1960, and to the additional conditions specified in the Appendix to this order.

2. The rates of royalty, dead rent and surface rent shall be collectable as follows:

Royalty:- Five percent of F.O.R. price subject to a minimum of fifty Naya paise per tonne.

Dead rent:-	1st year.	Nil.
	2nd to 5th year.	Rs.12.50 per hectare P.A.
	6th to 10th year.	Rs.25/- per hectare P.A.
	11th year onwards.	Rs.37.50 per hectare P.A.

Surface rent and Water charges:- At such rates as the land revenue and cess is assessable on the land are paid.

3. The grantee should pay a deposit of Rs.1,000/- prescribed in Rule 32 of the Mineral Concession Rules, 1960 before the lease is actually executed.

4. The grantee should execute the lease deed within the time limit specified in Rule 31 of Mineral Concession Rules, 1960.

5. The terms and conditions referred to in para 1 of this order are subject to such further modifications, additions and alterations as may be ordered before the lease deed is executed.

6. The Collector of Khammam is requested to take necessary further action for the execution of the lease deed. As soon as the deed is executed the date of such execution should be reported to the Government and the Director of Mines & Geology, Hyderabad.

contd..2.

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(6)

Note.- The grant is liable to cancellation, should it be found it was grossly inequitable or was made under a mistake of fact or owing to mis-representationor fraud or excess of authority.

(BY ORDER AND IN THE NAME OF THE GOVERNOR OF ANDHRA PRADESH)

T.B.LAKRISHNAN,
Deputy Secretary to Government.

To

The Collector of Khammam.(w.c.in original by R.P.).

Copy to:-

1) The Director of Mines & Geology, Hyderabad-2.
2) M/s.Singareni Collieries Company Limited, Moher Manzil Red Hills, Hyderabad.
3) The Chief Conservator of Forests, Hyderabad.
4) The Assistant Director of Mines & Geology, xx Warangal.
5) The Controller, Indian Bureau of Mines, New Secretariat Buildings, Nagpur.
6) The Director General of Mines safety, Dhanbad.
7) The Secretary to the Government of India, Ministry of Steel,and Mines xxx (Department of Mines), New Delhi.
8) The Food & Agriculture(Forest.I)Department.
9) SF/SCs.

// forwarded:by order //

SECTION OFFICER.

MS/16.11.

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DGM—16—7-4-67—6,000.

APPENDIX.

MINING LEASE

1. The lessee shall pay rents and royalties in any Government Treasury before the 10th January of every year.

2. The lessee shall pay before the expiry of the lease, or its sooner determination by either party, an amount equal to the annual dead rent or such higher amount as may be fixed by the Collector of the district in his discretion, as compensation for damage to the land covered by the lease.

3. The lessee shall not fell trees if any in the unreserves covered by the lease without the previous permission of the Collector and if it is found that he has felled any trees without suchpermission he shall pay the value of the trees together with a compounding fee subject to a maximum of ten times the value of the said trees.

4. The lessee shall not enter upon or commence mining operations in any reserve forest situate upon the said lands without thirty days previous notice in writing to the District Forest Officer, and without obtaining the written sanction of that officer which may be with such conditions as that officer may in his reasonable discretion prescribe :—

(*i*) The lessee must bear the cost of demarcation of the area within the reserved forest limits by a declared fire line of 40 feet wide which will be cut and kept cleared by the Forest Department.

(*ii*) The lessee must at all times permit Officers of the Forest Department to enter upon the land for the purpose of maintaining or repairing existing boundary lines within the area and must pay the cost of such maintenance or repair as determined by the District Forest Officer.

(*iii*) The lessee must take suitable precautions to prevent fires from spreading into the adjoining reserve forest from the land and if such fires accidentally occur he must render all possible assistance in putting them out.

(*iv*) The lessee shall not cut any trees or growth on the area granted in excess of 20 per cent of the number of trees on the whole area under lease without the previous permission of the District Forest Officer and the value of such trees, etc., shall be paid for by the lessee at rates to be fixed by the District Forest Officer ; he must not deface or interfere with any boundary stone or marks ; if any boundary mark is accidentally damaged, he must bring the matter immediately to the notice of the Range Officer.

(*v*) The lessee shall not construct any new road in Government Forest without the previous sanction of the Divisional Forest Officer.

(*vi*) The lessee using any existing forest road or cart tract for the transport of his plan or produce shall, if required to do so by the Divisional Forest Officer, carry out such maintenance of the road or cart tract as the latter may direct. In case of failure to comply with the orders of the Divisional Forest Officer the work will be carried out by the Forest Department and the cost thereof recovered from the lessee under the provisions of the Land Revenue Recovery Act or any other law for the time being in force.

(*vii*) The lessee shall, before commencing mining operations, point out to the Divisional Forest Officer or the local Ranger the precise areas wherein he proposes to conduct such operations as determined by the District Forest Officer if collection thereof is decided upon during the lease. (Latter portion to be struck off if collection is ordered during grant).

5. The lessee shall be free to undertake mining operations also in respect of the atomic minerals, in the area held by him on the conditions that :—

(*i*) if in the course of mining operations he discovers any atomic mineral/minerals, he shall report the fact to the Director, Atomic Minerals Division, New Delhi within 60 days from the date of discovery of such mines ;

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(*ii*) that the quantities of atomic minerals recovered incidental to such mining operations shall be collected and stocked separately and a report to that effect sent to the Director, Atomic Minerals Division, New Delhi every three months, who will have samples thereof taken and analysed to determine whether they are of acceptable grade for purchase by the Department of Atomic Energy.

(K.S. MANTRI)
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4.30

6. The lessee shall also be free to remove any quantity of atomic minerals as are required by the Department of Atomic Energy, on payment of royalty by the lessee to the State Government.

7. Unless the quantity of atomic minerals found incidental to mining operations is insignificant, the lessee shall in due course apply to the State Government for inclusion of the Atomic mineral/minerals in the indenture of lease:

Provided that the State Government may, in consultation with the Department of Atomic Energy, exempt the lessee from obtaining a separate lease for/or inclusion of atomic minerals in the lease deed.

8. For the purpose of clauses 4, 6 and 7 of this appendix 'atomic minerals' means the minerals from which prescribed substances as defined in clause (*d*) of section 3 of the Atomic Energy Act, 1948 (29 of 1948) can be obtained.

9. The owner, agent or Manager of a Mine shall at least one month before the commencement of any mining operations give to the Chief Inspector of Mines, the Director, Indian Bureau of Mines and the District Magistrate of the District in which the mine is situated, notices in writing in such form and containing such particulars relating to the Mine as may be prescribed so as to reach them at least one month before the commencement of any mining operations.

10. The lessee shall without delay report to the State Government the discovery in the area comprised in his lease, of any object of historical or archaeological interest.

4-31

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$12\frac{01}{03}$