EXECUTIVE SUMMARY OF DRAFT EIA /EMP FOR
ENVIRONMENTAL PUBLIC HEARING
OF THE PROPOSED
KAKATIYA KHANI OPENCAST - III PROJECT
BASWARAJUPALLI VILLAGE, GHANAPUR MANDAL,
JAYASHANKAR BHUPALPALLI DISTRICT, TELANAGANA STATE.

Project Proposal
Proposed Mine lease area is 1336.64 ha
Production Capacity 3.00 MTPA (Peak 3.75 MTPA) by OC
And 0.48 MTPA by UG

Project Proponent

THE SINGARENI COLLIERIES COMPANY LIMITED
(A Government Company)
KOTHAGUDEM COLLIERIES – 507 101 (T.S.)

Prepared by

ENVIRONMENT PROTECTION TRAINING & RESEARCH INSTITUTE
Sy. No. 91/4, Gachibowli, Hyderabad
May - 2019
## Content

<table>
<thead>
<tr>
<th>Section no.</th>
<th>TITLE</th>
<th>PAGE NO.</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Introduction</td>
<td>1</td>
</tr>
<tr>
<td>2</td>
<td>Description of the Project</td>
<td>1</td>
</tr>
<tr>
<td>2.1</td>
<td>Land Requirement of the Project</td>
<td>1</td>
</tr>
<tr>
<td>2.2</td>
<td>Description of Mining Operations</td>
<td>1</td>
</tr>
<tr>
<td>3</td>
<td>Description of the Environment</td>
<td>3</td>
</tr>
<tr>
<td>3.1</td>
<td>Physical Resource</td>
<td>3</td>
</tr>
<tr>
<td>3.2</td>
<td>Drainage</td>
<td>4</td>
</tr>
<tr>
<td>3.3</td>
<td>Meteorology (Climate)</td>
<td>4</td>
</tr>
<tr>
<td>3.4</td>
<td>Air Environment</td>
<td>4</td>
</tr>
<tr>
<td>3.5</td>
<td>Mineralogical Composition</td>
<td>5</td>
</tr>
<tr>
<td>3.6</td>
<td>Water Environment</td>
<td>5</td>
</tr>
<tr>
<td>3.7</td>
<td>Phreatic Surface Head around OC Mine</td>
<td>6</td>
</tr>
<tr>
<td>3.8</td>
<td>Impact on Groundwater Regime</td>
<td>6</td>
</tr>
<tr>
<td>3.9</td>
<td>Noise Levels</td>
<td>7</td>
</tr>
<tr>
<td>3.10</td>
<td>Land Environment</td>
<td>7</td>
</tr>
<tr>
<td>3.11</td>
<td>Soil Quality</td>
<td>7</td>
</tr>
<tr>
<td>3.12</td>
<td>Biological Environment</td>
<td>8</td>
</tr>
<tr>
<td>3.13</td>
<td>Socio-Economic Environment</td>
<td>9</td>
</tr>
<tr>
<td>4</td>
<td>Alternatives</td>
<td>9</td>
</tr>
<tr>
<td>5</td>
<td>Anticipated Environmental Impacts &amp; Mitigation Measures</td>
<td>9</td>
</tr>
<tr>
<td>5.1</td>
<td>Impact due to Air Pollution and its Management</td>
<td>11</td>
</tr>
<tr>
<td>5.2</td>
<td>Impact due to Water Pollution and its Management</td>
<td>11</td>
</tr>
<tr>
<td>5.3</td>
<td>Impact due to Noise Pollution and its Management</td>
<td>11</td>
</tr>
<tr>
<td>5.4</td>
<td>Impact due to Ground Vibrations</td>
<td>12</td>
</tr>
<tr>
<td>5.5</td>
<td>Impact on Land and its Management</td>
<td>13</td>
</tr>
<tr>
<td>5.6</td>
<td>Solid Waste and its Management</td>
<td>13</td>
</tr>
<tr>
<td>5.7</td>
<td>Impact on Socio Economic Environment</td>
<td>14</td>
</tr>
<tr>
<td>6</td>
<td>Environment Management Plan</td>
<td>16</td>
</tr>
<tr>
<td>6.1</td>
<td>Fund Provision for Environment Protection and Management</td>
<td>16</td>
</tr>
<tr>
<td>6.2</td>
<td>Mine Closure Plan</td>
<td>16</td>
</tr>
<tr>
<td>6.3</td>
<td>Monitoring</td>
<td>16</td>
</tr>
<tr>
<td>7</td>
<td>Environmental Monitoring Programme</td>
<td>17</td>
</tr>
<tr>
<td>8</td>
<td>Additional Studies</td>
<td>17</td>
</tr>
<tr>
<td>9</td>
<td>Project Benefits</td>
<td>18</td>
</tr>
<tr>
<td>10</td>
<td>Conclusion</td>
<td>18</td>
</tr>
</tbody>
</table>
EXECUTIVE SUMMARY

1 INTRODUCTION

The purpose of Environmental Impact Assessment (EIA) is to evaluate the potential environmental effects and is a planning tool for assessing the environmental concerns of a project at an early stage of project planning and design, so that it can assure the project is environmentally feasible.

The present proposal is to extract coal reserves of 75.89 MT (OC 72.16 + UG 3.73) from the depth of 47 m to 300 m by OC workings 50 to 448 by UG workings, under the name of “KTK OC-III Project for rated production capacity of 3.00 MTPA (Peak 3.75 MTPA) by OC and 0.48 MTPA by UG in Project area of 1336.64 Ha.

The present coal production from the approved projects is inadequate to meet the total demand and a substantial gap remains unfulfilled. Considering the likely addition/expansion of existing power projects and construction of new power units, the gap between the coal production and demand would further increase. In view of this, the SCCL has envisaged certain fast track opencast projects to increase production as well as profitability so as to create sufficient funds for opening deep shaft mines. Present proposal is one such opencast project.

2 DESCRIPTION OF THE PROJECT

Nature of the Project:
This project is carved out of the existing Kakatiya Longwall Project (KLP) underground mine into an opencast up to 300m depth of 5 seam floor apart from working underground mine for 9 years, with rated capacity of OC mine of 3.00 MTPA (Peak 3.75 MTPA) & UG mine of 0.48 MTPA.

Size of the Project:
The KTK OC-III Project is designed for extraction of 75.89 MT of balance coal reserves during total life of the project by removing 976.36 M.Cu.m of OB (including 10.60 M.Cu.m of top soil) at an average stripping ratio of 13.48 Cu.m/T up to the depth of 300 m. This project is planned for a rated production of 3.48 MTPA including OC and UG mine for 9 years and 3.00 MTPA beyond 9th year till end of the mine life (31 years from 2018-19). The total project area is 1336.64 Ha. The grade of coal is ‘G-8 (4920 Kcal/kg).

The proposed project falls in “Category – A” as per the EIA Notification vide S.O. 1533, dated 14.09.2006 of Ministry of Environment & Forests (MoEF) and its subsequent amendments.

Location of the Project
KTK OC-III Project is located near Baswarajupalli village, Ghanapur mandal of Jayshankar Bhupalpalli district in Telangana State. It is covered under Survey of India Top sheet No. 56N/15. The location details of the proposed Project are furnished hereunder:

<table>
<thead>
<tr>
<th>Name of the Project</th>
<th>: Kakatiya Khani Open Cast - III</th>
</tr>
</thead>
<tbody>
<tr>
<td>Village</td>
<td>: Baswarajupalli</td>
</tr>
<tr>
<td>Tehsil</td>
<td>: Ghanapur</td>
</tr>
<tr>
<td>District</td>
<td>: Jayshankar Bhupalpalli</td>
</tr>
<tr>
<td>State</td>
<td>: Telangana</td>
</tr>
<tr>
<td>Latitudes</td>
<td>: 18° 19' 40&quot; to 18° 22' 56&quot; N</td>
</tr>
</tbody>
</table>
Executive summary of Draft EIA / EMP for Kakatiya Khani Opencast - III Project

Longitudes: 79° 52' 42" to 79° 55' 30" E
Survey of India Toposheet No.: 56 N/15
Nearest town: Bhupalpalli (12 km SE direction)
Nearest City / District head quarters: Bhupalpalli(12 km)
State Capital: Hyderabad (215 km)
Nearest Airport: Rajiv Gandhi International Airport, Shamshabad (230 km)
Nearest Railway Station: Uppal railway station located on Balharshah-Kazipet of south central railway (55 km).

2.1 Land Requirement of the Project:
The project does not involve Forest Land. The land requirement for the project is 1336.64 ha which will be utilized for quarry area, external dump yard, nallah diversion, service buildings etc..

- 309.58 ha is covered in Peddapur Block-I Extn. (North) Mining Lease of 330 ha
- 540.55 ha is covered in Peddapur Mining Lease of 955 ha
- 63.82 ha is covered in Dip side of Peddapur Block-I Extn. (North) Mining Lease of 376.10 ha
- Fresh Mining Lease is to be obtained for 422.69 ha (Approval under process)

Proposed land use for various activities in the project area is given hereunder:

<table>
<thead>
<tr>
<th>S. No</th>
<th>Particulars</th>
<th>Land in ha</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Excavation Area</td>
<td>678.21</td>
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<tr>
<td>2</td>
<td>External Dump</td>
<td>382.04</td>
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<tr>
<td>3</td>
<td>Road &amp; Infrastructure area / service building</td>
<td>50.12</td>
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<tr>
<td>4</td>
<td>Safety barrier &amp; drains along the quarry and dumps / Rationalization Zone</td>
<td>190.7</td>
</tr>
<tr>
<td>5</td>
<td>Nallah diversion</td>
<td>25.89</td>
</tr>
<tr>
<td>6</td>
<td>Undisturbed/NFL (Exclusive UG Area)</td>
<td>9.68</td>
</tr>
<tr>
<td><strong>Total</strong></td>
<td></td>
<td><strong>1336.64</strong></td>
</tr>
</tbody>
</table>

2.2 Description of Mining Operations
Coal extraction in the KTK OC-III Project will be done by deploying shovels & dumpers combination in opencast method and deploying SDLs in underground method. Important inputs required for coal extraction are explosives, plant and machinery, diesel, lubricants, electricity, small quantities of cement and steel.

2.2.1 Opencast mining involves following operations:
i. Removal of topsoil form quarry area and external dump area, storing it separately in earmarked dumpsite and utilizing it for spreading on dumps after attaining the final profile in order to take up plantation.

ii. Removal of overlying earthen strata (overburden) through drilling & blasting operations and dumping it at the earmarked site (In the top most benches at areas falling with in 500 m from the village boundaries drilling and blasting operations will not be done and suitable rock breakers of will be used for breaking of both OB and coal in order to avoid danger of fly rock and damage on the structures of the nearby villages by blast induced ground vibration).
iii. Drilling and blasting of exposed coal strata, transportation of coal by dumpers to surface pit head CHP.

iv. Coal will be dispatched to the consumers by trucks from pit head coal handling plant.

v. Back filling / internal dumping of overburden within the quarry area after sufficient de-coaled area is available.

vi. Take up phase-wise plantation over the external dump area, back filled area of the quarry after stabilization and spreading of top soil and in other areas.

2.2.2 Underground involves following operations:

   a) Drilling and blasting of coal faces
   b) Coal loading by SDLs in to tubs
   c) Hauling up of the loaded tubs by haulers to the surface bunkers
   d) Coal will be dispatched to the consumers by trucks from surface bunkers.

All the mining operations will be carried out as per the statutory provisions of Mines Act 1952 for the safety, health and welfare of the employees working in the mine. The conditions stipulated by Ministry of Environment, Forests & Climate Change (MoEF&CC) and Telangana State Pollution Control Board (TSPCB) while according Environmental Clearance and Consent to Operate respectively will be implemented in the project.

3 DESCRIPTION OF THE ENVIRONMENT

Environmental baseline data was collected for one season within 10 Km radius of the project area during December 2018 to February 2019 as per CPCB guidelines for studying the pre-mining environmental status.

Detailed studies have been conducted during the winter season in respect of air, water, land and soil in core zone and buffer zone. The baseline data conforms to the requirements of EIA Notification, 2006 (as amended vide S.O. 1533, on 14.09.2006) and its amendments.

3.1 Physical Resources

3.1.1 Physiography

3.1.1.1 Core Zone:
The core zone of proposed Project area is mostly agricultural area. In general, proposed quarry area is having plain terrain with a gentle slope and sandy soil cover. The northwest and eastern parts are elevated areas to the extent of 206 m and 212 m respectively as compared to the central part of the area. The topographic elevation of this area varies from 188.83 m to 212.55 m above mean sea level. The average slope of the area is 9.9 m/km towards SW.

3.1.1.2 Buffer Zone:
The total geographical area of buffer zone (within 10Km from project area) is 50472 ha, of which 2,349 ha is barren & uncultivable land, 3,952 ha of land is used for non agricultural purposes, 2,509 ha is permanent pastures and grazing lands, 807 ha of land is cultivable waste, 5,659 ha are fallow land. The remaining 29,526 ha is net area sown. Paddy, Cotton, Jowar, Maize, Groundnut and Chillies are the major crops grown in the area.
3.2 Drainage

3.2.1 Core Zone

Proposed project area is mainly drained by Gundla vagu flowing towards South side. The drainage of the area is dendritic and the drainage density is 2.75 Km/Sq.km. There are six small seasonal tanks over the proposed project area.

Gundla Vagu passing over the proposed quarry area is planned to be diverted in Northwest and Southwest directions over Northwest property of the proposed quarry. Proposed diversion length is 7.50 km. Diversion of this nallah is proposed after the 5th year depending on the progress of the quarry operations. The diverted nallah will be re-diverted after 20th year back to its original course over the internal dump area, which will be filled up to ground level to facilitate continuation of mining operations. The re-diversion length of nallah is about 1.50 km.

3.2.2 Buffer Zone

The drainage of this area is affected by ephemeral streams of Maner and Laknavaram rivers, which are in turn tributaries to River Godavari. A structural hill range is trending SE to NW is located in the Eastern part of the buffer zone acts as a drainage divide between R. Maner and R. Laknavaram. Major part of the buffer zone is drained by North westerly flowing Moranchavagu, Are vagu and Boggula vagu are tributaries to Maner River. Within the buffer area about 41.06 sq.km in the eastern periphery is drained by easterly flowing Laknavaram River. The drainage system is well developed over the basement rocks and Kamthi hill ranges due to steeper gradient and low infiltration, while the plains and valleys underlain by Barakar and Barren measure Formations, it is poorly developed in view of higher infiltration and gentle slope. The drainage in this area is mainly sub - dendritic to sub parallel. The drainage density is 3.49 km/sq. km. There are number of ephemeral tanks, with a cumulative area of 32.67 sq.km strewn over the buffer zone. The Ghanapuram Cheruvu (9.39 sq.km), Ramappa cheruvu (5.67 sq.km), Patwaripalli cheruvu (1.59 sq.km), Yellareddypeta cheruvu (1.44 sq.km), Vangapalli Cheruvu (0.90 sq.km), Dharama Rao peta cheruvu (0.86 sq.km), Kamlapuram cheruvu (0.62 sq.km), Mallayyapalli cheruvu (0.56 sq.km), Chelpuru cheruvu (0.55 sq.km) and Kashimpalli cheruvu (0.39 sq.km) etc., are located within the buffer zone and are the chief irrigation source in this area.

3.3 Meteorology (Climate)

The area experiences typical tropical climate of a distinct hot summer from March to June with occasional dust storms, a good monsoon between July and October and a pleasant winter from November to February.

The micro-meteorological study was carried out during winter season. The maximum wind speed recorded was 10.3 m/s. Calm conditions prevailed is for 18.95 % of the time during this period. The predominant wind direction was blowing from North East (NE) direction followed by East North East (ENE) direction. The maximum temperature and humidity recorded during this period were 38.4°C and 99.9%, while the minimum recorded were found to be 11.9 °C and 17.0% and the average temperature and humidity values were 22.6°C and 66.3 %. The total rainfall observed during study period is found to be 15.3 mm.

3.4 Air Environment

Different air pollution parameters like particulate matter of less than 10μm size (PM$_{10}$), particulate matter of less than 2.5μm (PM$_{2.5}$), Sulphur Dioxide (SO$_2$) and Nitrogen Oxides (NOx) have been identified as critical parameters relating to project activities for representing baseline status of ambient air quality within the study area in accordance with the Terms of Reference (ToR) issued by MoEF&CC. To assess the base line ambient air
Executive summary of Draft EIA / EMP for Kakatiya Khani Opencast - III Project

quality, ten ambient air quality monitoring locations were identified in core zone and buffer zone (10 Km. radius of study area) of the project.

3.4.1 Core Zone:
Ambient air quality data monitored in the core zone shows that PM$_{10}$ concentrations varied from 50 to 70 $\mu$g/m$^3$ with a mean of 61.4 $\mu$g/m$^3$. PM$_{2.5}$ concentrations were in the range of 29.1 to 45.8 $\mu$g/m$^3$. The SO$_2$ and NO$_x$ concentration varies from 8.3 $\mu$g/m$^3$ to 14.1 $\mu$g/m$^3$ and 12.9 $\mu$g/m$^3$ to 18.3 $\mu$g/m$^3$ respectively.

All the parameters are found to be within prescribed limits as per National Ambient Air Quality Standards.

3.4.2 Buffer Zone:
The concentration of PM$_{10}$ varied from 48 $\mu$g/m$^3$ (Nagarmapalli Village) to 79 $\mu$g/m$^3$ (Laxmireddypalli Village). The PM$_{2.5}$ concentration varied from 27.9 $\mu$g/m$^3$ (Darmaraopet & Nagarampalli) to 49.2 $\mu$g/m$^3$ (Pulluriramiahpalli Village). The SO$_2$ and NO$_x$ concentration varies from 8.1 $\mu$g/m$^3$ to 19.6 $\mu$g/m$^3$ and 11.1 $\mu$g/m$^3$ to 25.1 $\mu$g/m$^3$ respectively.

All the values are found to be within prescribed limits as per National Ambient Air Quality Standards prescribed by MoEF&CC.

3.5 Mineralogical Composition
The mineralogical composition for the Particulate Matter of size less than 10μ was analyzed at all air quality monitoring locations within the 10 Km radius of the study area. The samples were analyzed for Chromium, Nickel, Arsenic, Cadmium, Mercury, Lead, etc and their concentrations are found to be below the detectable limits.

3.6 Water Environment
The impact of the proposed project on the water environment is assessed by studying the ground and surface water quality within the study area. A total of 14 water samples i.e., 7 samples from surface water and 7 samples from groundwater were analyzed for various physio-chemical and bacteriological parameters. The ground water quality results were compared with IS:10500, 2012 standards, surface water quality with CPCB water quality criteria standards.

Comparison with CPCB water quality criteria
In accordance with CPCB water quality criteria, parameters studied were pH, DO, BOD and total coliforms. It may be observed that all the surface water samples have DO values ranging from 5.9 mg/L to 6.5 mg/L and values are satisfactory and meeting CPCB criteria. pH values were found to be in the range 6.5 to 7.7. BOD was found to be within the limit.

Total coliforms and fecal coliforms were present in all the surface water samples collected in the study area. E.Coli was present in all the surface water samples collected within the study area, except sample collected at Tank near Gurrampeta (SW-4), Yeellaredippet cheruvu (SW-5), Tank near Chelpur (SW-6) E.Coli was absent. Presence of Total coliforms, fecal coliforms and E.coli shows contamination from fecal matter or sewage entry and not suitable for direct drinking purpose and needs chlorination before treatment.

From the analytical results it can be observed that the surface water samples collected from all the locations require suitable treatment to make them potable.

3.6.1 Ground Water:
The analysis results of groundwater samples were compared with IS:10500 of Acceptable and Permissible limits, which are stipulated for water to be fit for drinking purpose with groundwater as source. pH values were in the range between 6.5 to 7.6 in the groundwater samples collected within the study area. Parameters like TDS, Calcium, Chlorides, Fluoride
Executive summary of Draft EIA / EMP for Kakatiya Khani Opencast - III Project

The concentration of iron (as Fe), is above the acceptable limit of 0.3 mg/L at all locations except at GW-3, GW-4 and GW-5. The Hardness is above the permissible limit of 600 mg/L at GW-2 (905 mg/L), GW-6 (675 mg/L) and Magnesium concentration is above the permissible limit of 30 mg/L at GW-2 (132 mg/L), GW-6(101 mg/L).

The concentrations of heavy metals Cadmium (Cd), Manganese (as Mn), Copper (Cu), Lead (Pb), Zinc (as Zn), Selenium (as Se), Arsenic (as As), Chromium (Cr), and Nickel (Ni) were either below the detection limits or below the permissible limits.

3.7 Phreatic Surface Head around Mine

In this area, the attitude of phreatic surface is being monitored seasonally on long term basis in 36 observation wells which are located at 500 m to 6 km from the existing coal mines. The phreatic surface varies from 1.14m to 15.00m during pre-monsoon season and 0.10m to 13.20m during post-monsoon season, the depth of these shallow wells is from 4.15 m to 15.50m with a diameter from 0.45m to 6.85m. The average water level fluctuation is 3.63m.

The attitude of piezometric surface is being monitored in 6 piezometric wells around KTK OCP Sector-I (Opencast mine in the buffer zone) since 2011. These piezometers are located at 150 to 500m distance from the edge of the quarry in all directions. The cumulative piezometric head in these wells vary from 1.91m to 20.26m during pre-monsoon season and 1.22m to 25.82m bgl during post monsoon.

From the analysis of long-term monitoring data of phreatic and piezometric in the buffer zone reveals that, there is no considerable impact of mining on groundwater regime in this area.

3.8 Impact on Groundwater Regime

The impact of mining on local ground water regime depends on the mine parameters like depth and rate of expansion, ground water recharge and hydraulic parameters of the aquifers intercepted in the quarry.

The opencast mining operations will be carried out up to a depth line of 300 m and hence there will be seepage of ground water in to the quarry area. The water accumulated in the quarry will be pumped out of quarry in order to facilitate mining process.

The probable maximum inflow of groundwater into the KTK OC-III project will be 6505 m3/day. About 2801 m3/day is needed for various mine requirements like dust suppression (2520 m3/day), work shop (113 m3/day), for plantation (18 m3/day) and for domestic consumption (150 m3/day) at the Project. After meeting the mine requirements, the excess water 3704 m3/day will be let out into nearby stream/tanks.

Detailed hydro-geological studies have been carried out in the study area of the project to study the utilization pattern of ground water in the region. As per the Groundwater Resource Estimation, the present stage of groundwater development is 55.57% and the area is categorised as “safe”. Presently, the surplus water from the existing mines in the buffer area is being discharged into nearby streams / tanks, which is being utilized by the local people to meet their agricultural needs and this will in turn augment the recharge of ground water regime.

The stage-wise the radius of influence from centre of the project and quarry surface boundary on the water regime is assessed and given below.
From the available hydrogeological information, it is assumed that the mining influence of proposed project on the ground water regime may extend up to 1281m from the mine surface edge during final stage of the project, which is mostly covered by SCCL acquired lands. From the analysis of long term monitoring of phreatic and piezometric surface data in the buffer zone of the project, it is observed that, there is no considerable impact of mining on groundwater regime in this area.

Due to stratification, the permeable beds act as individual units and develop multi-aquifer system. As such, the propagation of drawdown cone is limited to a small distance from the edge of the mine. Due to prominent boundaries/faults, the propagation of this cone of influence is further restricted. The mine water discharged into the local drainage network/tanks act as constant source of recharge and improves the water levels. After cessation of mining, due to increased permeability in the backfilled area, the infiltration of rain water increases and the water levels recoup in a short time. At the final stage of the mine, the void left in the dip-side area will be gradually filled with rain water and surface run off and become a good reservoir and acts as constant source of recharge to the groundwater regime and improves the water levels.

### 3.9 Noise Levels

A detailed noise survey was carried in and around the mine site to study the hourly equivalent noise levels. Equivalent noise levels were measured on hourly basis during 24 hours by using a High Precision Sound Level Meter at seven locations within the study area of the project. It is observed that the noise levels measured during day time and night time in the core as well as in the buffer zone of the proposed project are within the stipulated standards.

### 3.10 Land Environment

Land use and Land cover pattern of the study area was carried out by visual interpretation of Resource Sat (RA2) acquired during 22nd February, 2018 and 20th October 2018. Based on interpretation of latest temporal satellite data it is observed that 56.53% area is used for taking crop during kharif season. Eucalyptus plantations which have commercial value are developed in 18.37% area and about 8.49% per core area is left as agricultural fallow land. On the northeastern part of Madhavaraoopalli village about 5.74% of core area is observed as open scrub. Double crop area occupies about 4.56 %, built up area is 3.22% and waterbodies occupy 2.11 % of core area.

### 3.11 Soil Quality

The physico-chemical properties of soil, which are important for plant growth and agricultural productivity, pH, Electrical Conductivity, Cation Exchange Capacity (CEC), Sodium Adsorption Ratio (SAR), Organic carbon, Ex.Ca, Ex.Mg, Ex.Na, and Ex.K and other trace metals are analyzed for four soil samples in the study area.
pH is an important parameter which indicates the alkaline or acidic nature of soil. Soils collected from the villages in the study area are slightly acidic to slightly alkaline in nature having pH in the range of 6.9 to 7.8.

The EC for the soil samples are in the range of 0.132 - 0.456 mmhos/cm. Cation exchange capacity which was found to be in the range of 21 to 29 meq%.

The texture of the soil varies from sandy clay, Sandy loam, clay loam and sandy clay loam. Soil of all the villages of the study area are moderately alkaline in nature having pH in the range of 6.9 to 7.8.

The Nitrogen value range from 158 to 180 kg ha\(^{-1}\) reflecting that the values are observed to be in better category. The minimum value was observed at Madhavaopalli, Ganapuram and the maximum value was observed at Gurrampeta. The Phosphorus value ranged from 16 to 22 kg ha\(^{-1}\) indicating that the values are in less category. The maximum value of 22 kg ha\(^{-1}\) was found at Ganapuram and the minimum value of 16 kg ha\(^{-1}\) at Madhavaopalli . The Potassium value ranged from 425 to 514 kg ha\(^{-1}\) indicating that values are observed to be more than sufficient category, the maximum value was found at Ganapuram and the minimum value was observed at Sitaramapuram.

The trace metals Cd, Cr, Pb, Zn, Mn were analysed. Cd levels were below the detection limit of the ICPOES instrument sensitivity levels. The other metals were well within the soil permissible limits.

### 3.12 Biological Environment

The Baseline Environmental studies were carried out within 10 km radius of the project site during winter. A flora & fauna study was carried out for the proposed site of KTK OC-III Project and its surroundings in 10 km radius during February 2019. This was followed by detailed analysis conducted on distribution of flora & fauna and forest types of the area, and then studies on vegetation cover of both terrestrial and aquatic ecosystems. All the species encountered were identified and recorded.

#### 3.12.1 Flora

The forest areas in buffer area of KTK OC-III mining project basically come under dry deciduous and shrub jungle forest. Five Reserve forests (RF) areas falling around the proposed KTK OC-III mining project they are Mulug RF (M) (Fairly dense mixed jungle), Bhagiratapeta RF (dense scrub), Jakaram RF (open mixed jungle), Ramappa RF (open mixed forest) and Lakshmidevepeta RF (Degraded forest).

A total of 344 plant species belonging to 268 genera and 73 families were recorded in the study area (Core & Buffer zone). The study area has 154 species which were found to be common in both core and buffer zone followed by 114 species in Buffer zone and 76 species in Core zone.

Among 344 species collected from the study area, there are 105 species of trees, shrubs 72, lianas 4, climbers 31, herbs 125, epiphyte 1 and Aquatic 6 species. As the vegetation analysis suggests there are more of herbaceous species (125 species) in comparison to tree species (105).

The family Leguminosae is represented by 50 species followed by Apocynaceae, Malvaceae and Poaceae each 21 species, Compositae and Rubiaceae each 16 species, Acanthaceae (13), Lamiaceae (11), Amaranthaceae, Euphorbiaceae, and Phyllanthacea each 9 species, Combretaceae, Convulvulaceae and Cyperaceae each 8 species, Bignoniaceae and Moraceae each 6 species, Boraginaceae and Solanaceae each 5 species, etc.
Among 6 species, the aquatic plants collected and recorded from different aquatic bodies of the study area include *Ceratophyllum demersum*, *Ipomoea aquatic*, *Monochoria hastata*, *Nymphoides hydrophylla*, *Ochna obtusata* and *Typha angustifolia*, under 6 genera and 6 families.

### 3.12.2 Fauna

In the study area a total of 12 species of mammals belonging to 6 orders and 9 families were recorded.

A total of 52 species of avifauna belonging to 11 orders & 29 families were recorded in the study area of which common bird species include *Ashy prinia* (*Prinia socialis*), *Redvented bulbul* (*Pycnonotus cafer*), *Black drongo* (*Dicrurus macrocercus*), *Indian Roller* (*Coracias benghalensis*) and *Small green bee-eater* (*Merops orientalis*). A total of 40 species are under Schedule-IV and *Pavo cristatus* is under schedule-I and *Corvus splendens* is under schedule-V of IWPA, 1972.

The butterflies represented with 16 species belonging to 1 order & 5 families. Among 16 species none of the species are listed under IUCN or IWPA, 1972.

Although the species mentioned under Schedule I, II, III, IV & V in the study area are common in occurrence and was noted through secondary information and also when interacted with the locals, and no direct evidence could be recorded from the field during the present study. There are no wildlife protected areas such as National Park, Sanctuary, Biosphere Reserve, Tiger Reserves and Elephant Reserve in the study area of the project.

### 3.13 Socio-Economic Environment

The project site is surrounded by 22 villages within 10 km radius of study area. The socio-economic aspects, demographic structure, economic and livelihood pattern of the 12 villages were analyzed based on the primary data.

Primary data is generated by adopting a simple random sampling method. Out of 22 census villages in the study area, 12 villages were identified which have maximum number of households. Within these villages, nearly 5% of households was taken randomly and attained the sample size of 200 households.

As the area is well developed and mining is being carried in this area from quite long time, infrastructure, quality of life, other social factors are found good.

### 4 ALTERNATIVES

Coal mines are site specific in nature and location of the proposed area is restricted to the geology and coal deposition of the area. Safety, economic and technical constraints determine the mining method to be employed in a particular project. Considering the gradient of seams, depth of seams and after evaluating different options, Shovel Dumper combination for coal and overburden, SDL method for underground have been finalized as suitable mining methodology for the proposed KTK OC-III Project.

### 5 ANTICIPATED ENVIRONMENTAL IMPACTS AND MITIGATION MEASURES

The section summarizes the pollution potential of the proposed project, possible impacts on the surrounding environment during pre-operational and operational phases and the environment management plan proposed for prevention and control of pollution.

#### Impact due to Air Pollution and its Management

Considerable amount of air pollution will be caused at various stages of mining operations such as excavation, drilling, blasting, loading and transportation of material. Suspended
Particulate Matter (PM$_{10}$ and PM$_{2.5}$) are the main pollutants which will emanate during mining operations. Most of the dust will be generated from drilling, blasting, excavation, crushing and transportation operations. This dust becomes air borne and gets carried away to surrounding areas. The impact on air is mainly localized in nature as the dust particles are not carried to longer distances and the effect is felt within the core zone of the project involving active mining operations.

While complete elimination of dust due to mining operations may not be possible, the following measures will be taken to mitigate the fugitive dust from different operations:

- To avoid the dust generation from the drilling operations, wet-drilling will be adopted.
- Use of appropriate explosives for blasting and avoiding overcharging of blast holes in coal and OB will be followed while blasting.
- The volume of dust rising from dumps by the action of wind will be controlled significantly by planting grasses on slopes and native plants on dumps soon after their formation / attaining final profile.
- Haul roads will be the major source of dust in the opencast mines. To overcome the problems of dust generation from mine haul roads, the following steps will be taken.
  - OB & Coal transport vehicles shall pass through sensor operated water sprinkling network.
  - Continuous water spray arrangements on haul roads and permanent transport routes at required frequencies. It is proposed to procure 2 no’s of 28 KL and 2 no’s of 12KL water sprinklers for spraying water on OB and coal transport haul roads and for reclamation works.
  - Avenue plantation along roads.
- Taking up plantation around the quarry and OB dumps in three rows, and plantation on the OB dumps and other vacant places which will serve as a barrier to prevent the dispersion of dust
- Black topping of permanent roads like routes to coal handling plant, permanent internal roads, etc.,
- Effective dust suppression measures will be taken up at pit head coal handling plant (CHP). The crusher house will be enclosed to the extent possible and dust suppression arrangement will be provided at suitable locations in the CHP. All conveyors, screens, crusher etc. will be provided with covers to avoid fugitive dust during operation. Mobile mist generating machines will be deployed for dust suppression at CHP. Some of the measures proposed to be adopted at CHP in order to control dust emission include:
  i) Height of fall to be minimized at all coal transfer points,
  ii) Internal lining of chutes and bins will be done to take care of abrasion & dust and
  iii) Continuous water spraying arrangements will be made for dust suppression.
- The exhaust emissions from HEMM containing CO, SO$_2$ & NO$_x$ will be controlled by strictly adhering to the scheduled maintenance that includes periodical tuning of engines.
- The additional control measures on dump like thick plantation, stabilization and additional green belt along the boundary is recommended to control the dust concentrations.

5.1 Impact due to Water Pollution and its Management

The main source of water pollution is mine discharge and surface run-off containing suspended solids. The mine discharge water will be passed through settling ponds for removal of suspended solids.

The source of water for the project is the water pumped out from the proposed opencast mine. The probable inflow of groundwater into the KTK OC-III Project is 6505 KLD. About 2801 m$^3$/day is needed for various mine requirements like dust suppression (2520 m$^3$/day), work shop (113 m$^3$/day), for plantation (18 m$^3$/day) and for domestic consumption (150 m$^3$/day) at the Project. The probable maximum inflow of groundwater into the KTK OC-III
Executive summary of Draft EIA / EMP for Kakatiya Khani Open cast - III Project

Project will be 6505 m\(^3\)/day. After meeting the mine requirements, the excess water will be let out into nearby stream/tanks.

The following control measures will be adopted for controlling water pollution:

- Garland drains of proper size and length will be made and maintained along the quarry and external dump to prevent the surface run-off water from entering into quarry and to dispose properly to the natural drains / tanks after channelizing through settling ponds. One diesel backhoe shovel is provided for preparation of garland drains, settling ponds, etc.
- The excess water which will be let out will be utilized for irrigation by nearby villagers.
- Check dams / rock fill dams and toe walls will be constructed wherever necessary to reduce siltation.
- Water accumulated due to rain as well as seepage will be led to the main sump of the pit and will be subsequently pumped to the surface.
- The mine water will be utilized for dust suppression, washing, drinking, fire fighting, plantation etc.
- Workshop effluents will be treated suitably in sedimentation tanks followed by Oil & Grease traps.
- The Sewage generated from mine office and other surface buildings will be small quantities and treated in septic tanks followed by soak pits.
- In this area, the attitude of piezometric surface is being monitored during four seasons in a year (i.e., winter, pre-monsoon, monsoon and post-monsoon).
- From the available hydrogeological information, it is assumed that the mining influence of project on the ground water regime is about 1281 m from the surface boundary of the mine during the final stage.
- However, the mine water discharged into the local drainage network / tanks act as constant source of recharge, which improves the ground water in the region.
- In view of the above, it can be inferred that there will not be any significant impact on ground water regime in this area. In the event of any adverse impact due to mining on the surrounding area, SCCL will take necessary measures to address the issue.

5.2 **Impact due to Noise Pollution and its Management**

The main sources of noise in the mines will be HEMM, drilling, blasting, dumpers and movement of coal transport trucks. Sound levels near HEMM would be above 90 dB (A). However, the HEMM cabins are sound proof and the employees working in the vicinity of HEMM will be provided with earplugs / muffs.

The following control measures are proposed to be taken for noise reduction which includes:

- Controlled blasting techniques using milli-second delay detonators & relays will be adopted in this project for minimizing noise and blast vibrations.
- Secondary blasting is one of the major sources. Avoiding the secondary blasting with proper blast design, spacing and burden. Using of rock breakers proposed for sizing if required.
- Carrying out blasting during favourable atmospheric conditions and less human activity timings.
- Creation of green belts of dense foliage in three rows between mine areas and around the land limit line and residential colonies, if any, which will act as noise attenuator in phased manner.
- Proper maintenance of machinery (including transport vehicles) including fine tuning of engines to reduce noise.
- Avenue plantation along the coal transportation roads.
- Practice of keeping some coal in the bunkers so that, the coal directly does not hit on the sides of the bunkers and also minimizing the height of fall.
• Providing adequate silencers to the dumpers and other vehicles.

5.3 Impact due to Ground Vibrations

Blasting in mining areas may give rise to ground vibrations which may cause damage to nearby structures. Fly rock is another problem that deserves attention. In order to control noise and blast vibrations, suitable control measures will be adopted in the project and ground vibrations will be continuously recorded by using seismograph instruments (Minimate / NOMIS) and the same is being done in the nearby opencast mine (KTK OKC-2 mine) and recorded ppv and noise level are within stipulated limits.

The following precautions will be taken up at the project site for controlling noise and blast vibrations.

- In the top most benches at areas falling within 500 m from the village boundaries drilling and blasting operations will not be done and suitable rock breakers of will be used for breaking of both OB and coal in order to avoid danger of fly rock and damage on the structures of the nearby villages by blast induced ground vibration.
- Controlled blasting technique will be adopted for reducing blast vibrations substantially.
- Further, charge per delay will be regulated to minimize blast vibrations. Charge per delay will be restricted to less than 2 Tonnes. However, the charge per delay is controlled by:
  - Reducing the blast hole depth
  - Using small diameter holes
  - Delay initiation of deck charges in the blast holes
  - Using more numbers of delay detonators in series
  - Using sequential blasting machine.
- Optimum delay sequence and stem to column ratio will be maintained to minimize the fly rock distance and ground vibration intensity.
- Basing on the distance of the nearest sensitive areas from the epicenter of the blast, charge weight will be altered to meet the stipulated standards.
- Design of optimum blast hole geometry considering bench height, diameter of hole, type of explosive, nature of rock, level of fragmentation required etc.
- Divide total charge / blast in several parts so as to keep minimum explosive per delay i.e. use of milli - second delay detonators & relays.
- Avoid concentration of explosive by using deck charging.
  - Reducing excessive burden and spacing.
  - Removing buffers in front of the holes.
  - Reducing stemming but not to the degree of increasing air-blast and fly rock.
  - Limiting sub-drilling just to tear-off the bench bottom.
  - Reducing sub-grade drilling.
  - Allowing at least one free face.
  - Using decoupled charges.
  - Drilling holes parallel to the bench face.
  - Accuracy in drilling.
- The explosives of following quality will be used
  - High Velocity of Detonation
  - Density suited to its particular application (Based on nature of over burden, inter parting, coal, shale, etc.)
  - Good fume characteristics
  - Good water resistance
  - Good storage qualities and resistance to atmospheric parameters.

5.4 Impact on Land and its Management

Any mining activity may alter the land use pattern in the lease area. In order to minimize the adverse effects, land reclamation will be carried in concurrent with mining operations. At
the end of the mining operations, quarry area and dumps left will be acceptable to the society and surrounding environment.

A detailed programme on Solid Waste Management and Land Reclamation has been given in the EMP for addressing land degradation. The following measures are proposed to be undertaken in the project.

- Plantation on the over burden dumps with native, regenerative and self-sustaining species.
- Plantation along the boundary of the project area will carried out to improve the aesthetic value.
- Top soil excavated from the site will be dumped separately at predetermined place for spreading subsequently on external dumps and backfilled areas for plantation.
- Back filling of the mine pits concurrently with the mining operations (land reclamation).

5.5 Solid Waste & Its Management

The opencast mining operations involve change in landscape and topography. Also a large amount of overburden has to be excavated during coal mining operations, external overburden dumps are formed and void will be created in the de-coaled area of the quarry. Hence, a suitable dumping strategy has been formulated for proper handling of overburden and ensuring better land management.

Dumping Strategy

All the options have been studied for optimizing utilization of land for OB dumping. The following precautions will be taken in the proposed project for proper dump management.

i) Separate spoil dumps for topsoil and hard overburden
ii) Maximum height of top soil dump is 10 meters.
iii) Hard overburden will be dumped in 30 m high decks up to a maximum height of 120 m and for internal dump it is planned with a maximum height of 60 m above ground level.
iv) 30 m berm width for safe transport.
v) Dump slope for each deck to be at natural repose of 37. 5° and overall slope at 25.64°. 
vii) Track dozers will be deployed for shaping the dumps and dozing of overburden.
vii) Top soil will be spread over dump slopes and non-active dump area for reclamation.
viii) Garland drains and rock fill dams will be constructed around the dump to regulate surface run-off and control siltation of surface water bodies.

Overburden Dump Management

The placement of OB excavated during the total life of the project is as furnished below.

<table>
<thead>
<tr>
<th>Sl. No</th>
<th>Location of Dump yard</th>
<th>Hard OB (M.Cum)</th>
<th>Top Soil (M.Cum)</th>
<th>Total (M.Cum)</th>
<th>Percentag e of total OB</th>
<th>Area (ha.)</th>
<th>Height (m agl)</th>
</tr>
</thead>
<tbody>
<tr>
<td>1.</td>
<td>External dump yard</td>
<td>248.7</td>
<td>3.82</td>
<td>252.52</td>
<td>25.75</td>
<td>382.04</td>
<td>120</td>
</tr>
<tr>
<td>2.</td>
<td>Internal dump yard</td>
<td>717.06</td>
<td>6.78</td>
<td>723.84</td>
<td>74.25</td>
<td>466.59</td>
<td>60</td>
</tr>
<tr>
<td>Total</td>
<td></td>
<td>965.76</td>
<td>10.60</td>
<td>976.36</td>
<td>100.00</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

External Dump Yards

The area at Kondarajireddipalli village in SE side of the proposed quarry area is planned to be earmarked for external dump yard. Before start of dumping, the top soil of 1m thickness, at the area will be removed (Quantity 3.82 M.Cum). It is proposed to dump about 248.70 M Cum i.e. 25.75 % of total hard OB in this external dump yard. Maximum height of external dump yard will be 120m from ground level. The area of the dump yard will be 382.04 Ha.
About 3.82 M.Cum of top soil is planned to be spread over the finished decks of external dump yard from 1st to 10th years of coal production.

**Internal Dumps**

Back filling operations will start from 8th year onwards and all the OB excavated from quarry will be accommodated in the de-coaled area. About 717.06 M.Cum i.e. 74.25% of total hard OB is envisaged to be back-filled in the voids of the proposed quarry area. Maximum height of internal dump yard will be 60m from ground level. The extent of the backfilled area will be 466.59 Ha (measured at ground level). About 6.78 M.Cum of top soil is planned to be spread over the finished decks of internal dump yard from 15th year till end of operations.

At the end of mining operations, the end land use status of the proposed project is

<table>
<thead>
<tr>
<th>Sl. No</th>
<th>Description</th>
<th>Land Use Details (ha)</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td>Plantation</td>
</tr>
<tr>
<td>1.(a)</td>
<td>Excavation (Backfill)</td>
<td>281.13</td>
</tr>
<tr>
<td>(b)</td>
<td>Excavation (Voids)</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Sub-total excavation:</td>
<td><strong>281.13</strong></td>
</tr>
<tr>
<td>2.</td>
<td>External Dump Yard</td>
<td>382.04</td>
</tr>
<tr>
<td>3.</td>
<td>Safe barrier, Roads, Drainage around quarry &amp; Dump yard.</td>
<td>129.15</td>
</tr>
<tr>
<td>4.</td>
<td>Built up area / Infrastructure</td>
<td>38.71</td>
</tr>
<tr>
<td>5.</td>
<td>Nallah Diversion</td>
<td>19.31</td>
</tr>
<tr>
<td>6.</td>
<td>Undisturbed/NFL (Exclusive UG Area)</td>
<td></td>
</tr>
<tr>
<td></td>
<td><strong>Grand Total</strong></td>
<td><strong>850.34</strong></td>
</tr>
</tbody>
</table>

**NOTE:** The actual area of plantation is 1033.05 Ha out which 182.71 Ha of land will be reclaimed for agricultural use and balance area to an extent of 850.34 ha will be left as plantation area.

### 5.6 Impact on Socio Economic Environment

SCCL has been carrying out mining operations in Godavari Valley Coal Fields (GVCF) for last 129 years. There is a positive impact on the quality of life, employment avenues and socio-economic development of the region. The local people get direct, indirect employment opportunities because of coal mining activities and infrastructure facilities being developed in these areas.

The project involves rehabilitation and resettlement of people living in the villages falling within project area. SCCL will implement the R&R package formulated by District Administration as per the State Government Guidelines.

No significant changes have been observed in the traditional way of life and occupation of the local people in coal mining areas. The local people are rather benefited due to the
provision of more infrastructure facilities provided by the management. There are avenues for indirect employment facilities in the mine as well as other ancillary activities for the local people.

SCCL is organizing Corporate Social Responsible (CSR) activities through well structured mechanism through:
1. Singareni Seva Samithi (SSS),
2. Singareni Employees Wives Association (SEWA)
3. Local Communities.
4. Environmental safeguards beyond mandate.

Activities of Singareni Sewa Samithi (SSS):
Singareni Seva Samithi has conducted skill development trainings programs at Bhupalpalli and surrounding villages and the details of the same is as given below.

Training Classes conducted in various vocational courses through SSS at BHP Area during the year 2017-18

<table>
<thead>
<tr>
<th>Sl. No.</th>
<th>Name of the course</th>
<th>No.of batches sanctioned</th>
<th>No.of Batches conducted</th>
<th>Total No.of Candidates trained</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Tailoring Course (Six months Course)</td>
<td>4 Batches</td>
<td>4 Batches</td>
<td>99</td>
</tr>
<tr>
<td>2</td>
<td>Beautician Course (Three months Course)</td>
<td>2 Batches</td>
<td>2 Batches</td>
<td>40</td>
</tr>
<tr>
<td>3</td>
<td>Fashion Designing Course (Three Months Course)</td>
<td>2 Batches</td>
<td>2 Batches</td>
<td>50</td>
</tr>
<tr>
<td>4</td>
<td>Maggam Work Course (Three Months Course)</td>
<td>1 Batch</td>
<td>1 Batch</td>
<td>20</td>
</tr>
<tr>
<td>5</td>
<td>Computer DTP Course (Two Months Course)</td>
<td>3 Batches</td>
<td>3 Batches</td>
<td>60</td>
</tr>
<tr>
<td>6</td>
<td>Photosop Course (One Month Course)</td>
<td>2 Batches</td>
<td>2 Batches</td>
<td>40</td>
</tr>
<tr>
<td>7</td>
<td>Motor Driving Course (One Month Course)</td>
<td>2 Batches</td>
<td>2 Batches</td>
<td>40</td>
</tr>
<tr>
<td></td>
<td><strong>Total</strong></td>
<td></td>
<td></td>
<td><strong>349</strong></td>
</tr>
</tbody>
</table>

Training Classes conducted in various vocational courses through SSS at BHP Area during the year 2018-19

<table>
<thead>
<tr>
<th>Sl. No.</th>
<th>Name of the course</th>
<th>No.of batches sanctioned</th>
<th>No.of Batches started</th>
<th>Total No.of Candidates under training</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Tailoring</td>
<td>04</td>
<td>03</td>
<td>75</td>
</tr>
<tr>
<td>2</td>
<td>Rexine/leather bag making</td>
<td>01</td>
<td>--</td>
<td>--</td>
</tr>
<tr>
<td>3</td>
<td>Beautician</td>
<td>02</td>
<td>02</td>
<td>42</td>
</tr>
<tr>
<td>4</td>
<td>Computer dtp</td>
<td>02</td>
<td>1</td>
<td>20</td>
</tr>
<tr>
<td>5</td>
<td>Fashion designing</td>
<td>02</td>
<td>02</td>
<td>45</td>
</tr>
<tr>
<td>6</td>
<td>Maggam work</td>
<td>03</td>
<td>03</td>
<td>75</td>
</tr>
<tr>
<td>7</td>
<td>Spoken english</td>
<td>02</td>
<td>02</td>
<td>40</td>
</tr>
<tr>
<td>8</td>
<td>Motor driving (lmv) for paps including ladies batch</td>
<td>04</td>
<td>2</td>
<td>40--</td>
</tr>
<tr>
<td>9</td>
<td>Computer hardware</td>
<td>02</td>
<td>1</td>
<td>20</td>
</tr>
<tr>
<td>10</td>
<td>Photosop</td>
<td>02</td>
<td>2</td>
<td>40</td>
</tr>
<tr>
<td>11</td>
<td>Multi media</td>
<td>02</td>
<td>02</td>
<td>40</td>
</tr>
<tr>
<td>12</td>
<td>Yoga training classes</td>
<td>3 centres</td>
<td>02</td>
<td>--</td>
</tr>
<tr>
<td>13</td>
<td>Police constable training</td>
<td>Started from 16.07.2018</td>
<td>105 candidates are imparting trg.</td>
<td>105 candidates are imparting trg.</td>
</tr>
</tbody>
</table>

Surrounding Habitat Assistance Programme (SHAPE):
Surrounding Habitat Assistance Programme is designed to develop infrastructure facilities to the surround people of 8 km from the SCCL townships and / or 10 Km from the mine entry. About 2% of average net profits of the company made during last three years were allocated for CSR at company level. The details of the works carried out under CSR in and around the Kakatiya longwall mine is as follows:

- CSR (SHAPE) expenditure during 2004-05 to 2011-12 is Rs.180.55 lakhs
- CSR expenditure of KLP during 2014-18 is Rs.947.38 lakhs

6 ENVIRONMENT MANAGEMENT PLAN

Environment Management Plan (EMP) aims at the preservation of ecological system by considering in-built pollution abatement facilities at the proposed site. Mitigation measures at the source level and an overall environment management plan at the project area are designed so as to improve the supportive capacity of the surrounding environment. The EMP involves identification of pollutants, sources of pollution, utilization of suitable technology for mitigation of pollution, preparation of suitable management plan and provision of necessary resources including financial provision for its effective implementation.

6.1 Fund Provision for Environment Protection and Management

In order to implement the environmental protection measures, an amount of Rs. 1054 lakhs excluding rehabilitation and resettlement is provided towards capital cost. In addition to this, an amount of Rs. 776.30 Lakhs has been provided in the project as indirect capital towards environment related works. A recurring cost of Rs.232.07 Lakhs per annum (18.99 per tonne) will also be spent on environmental management, which is in-built in the cost of production.

6.2 Mine Closure Plan

Mining being a time bound activity and must be closed after extraction of the mineral deposit. Closing of mining operations involves numerous issues like reclamation and environmental protection, community issues, socio-economic consideration, planning for alternate use of available facilities, cost estimation and asset disposal. The total Mine closure cost estimated based on the typical mine closure cost for the project is ₹ 115.37 Crores. However, by considering 5% incremental cost to be deposited additionally every year towards the mine closure, the total estimated closure cost will Rs. 260.17 Crores.

6.3 Monitoring

The monitoring of the mine closure plan is an essential requirement for review of the efficacy of the mine closure plan and to take corrective actions. The monitoring consists of measuring the Air quality, Water Quality, preservation of water body, external dump plantation, reclamation of land for improving aesthetic and other land use values as prescribed in the mine closure plan. Area level environment management committee will monitor the implementation of mine closure plan.

7 ENVIRONMENTAL MONITORING PROGRAMME

Environmental monitoring programme has been prepared for the proposed project for assessing the efficacy of implementation of Environment Management Plan and to take corrective measures in case of any degradation in the surrounding environment. An environment management committee will be formulated at the project level to monitor the implementation of environmental protection measures in the project.

Air quality, water quality, noise levels, ground water levels will be periodically monitored in compliance to the conditions stipulated by TSPCB and MoEF&CC and necessary mitigation measures will be taken as and when necessary.
8 ADDITIONAL STUDIES

i) Rehabilitation and Resettlement Study:

Three villages Madhavaraopalli, Ravinagar & Kondarajireddipalli (full) and two villages Jangupalli & Venkateshwarlapalli (Part) are falling in the Project area of KTK OC-III. Hence, Rehabilitation and Resettlement for these villages will be provided as per the existing R&R policy envisaged by the Government.

A total of 511 families are affected by the project of which 444 Nos. of families are Project Displaced Families (PDFs) and 67 families are Project Affected Families (PAFs) and about 472 structures will be compensated as per initial survey.

SCCL will formulate suitable Rehabilitation Package to the above PAFs & PDFs which will be finalized based on the socio-economic survey conducted by the Administrator appointed by State Govt in consultation with the District Administration.

SCCL has no separate Rehabilitation Policy and SCCL will implement the R&R policy envisaged by the Government.

ii) Risk assessment and Disaster Management Plan

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 both opencast and underground mines.

Risk Assessment is to be performed on a regular basis. The goal for each risk assessment is to identify hazards, determine risk rating and controls and to review the implementation of risk controls from previous risk assessment sessions.

KTK OC-III is mixed /integrated project (Opencast with Shovel Dumper combination & underground with Bord & Pillar Semi Mechanization (SDLs)), the Hazards were identified basing on the previous experience of the Project with the following criteria.

- Design parameters of the proposed mine
- Work process evaluation
- Accidents or occurrences
- Consultation with employees.
- Safety statistics
- Significant incident, near miss or accident reports
- Inspection in the mine

Accordingly, a detailed risk assessment and disaster management plan has been prepared for the proposed project basing the Technical Circulars issued by Directorate General of Mines Safety for implementing safety management systems in coal mines.

9 PROJECT BENEFITS

The KTK OC-III project is essential for maintaining coal supplies from the area and fulfills the committed supply to various users. The proposed project will also have other tangible benefits as given below:

- Indirect employment opportunities to local people in contractual works like housing construction, transportation, sanitation, for supply of goods and services to the project and other community services.
- Additional housing demand for rental accommodation will increase.
- Market and business establishment facilities will also increase.
- Cultural, recreation and aesthetic facilities will also improve.
• Improvement in communication, transport, education, community development and medical facilities.
• Overall change in employment and income opportunity.
• Shall provide closer interaction and understanding between people from different regions, culture, social traits etc.
• The project will help State and Central Government by way of paying royalty, sales, tax, duties etc. This in turn will help in development activities by Government in the area.

10 CONCLUSION

The industrial and economic growth of India depends to a large extent on coal, which is the prime source of energy. Our requirement of coal has significantly increased and the major requirement will come from the power sector. The other major requirement of coal comes from other industries like Cement, Sponge iron etc.

As a strategy of SCCL for maintaining / increasing the coal production, the present proposal is made for extraction coal reserves by conversion of existing Kakatiya Longwall Project (KLP) underground mine into an opencast cum underground coal mining project with rated capacity of OC mine of 3.00 MTPA (Peak 3.75 MTPA) & UG mine of 0.48 MTPA. The technology used for mining is Shovel Dumper combination for open cast and Bord & Pillar Semi mechanized (SLDs) for underground.

From the detailed analysis of the environmental impacts and the mitigation measures proposed in the EMP, it is anticipated that no significant deterioration in the eco-system is likely to occur due to the proposed mixed/integrated project. On the other hand, the project is likely to have several benefits like improvement in indirect employment generation and economic growth of the area, by way of improvements in the infrastructure facilities and better socio-economic conditions.