# 1.EXECUTIVE SUMMARY

### 1.1. Background of the Project and Proponent:

The Project Proponent is M/s Singareni Collieries Company Limited (SCCL). SCCL has been exploiting coal for more than 125 years. Out of 470km long Pranahita Godavari Valley Coal Field, 350km sector lies mostly in the South Indian State of Telangana. SCCL, being the only coal producing company in Southern India, has the onerous responsibility of meeting large portion of coal demand in this part of the country. The coal mining operations of SCCL are spread over 6 districts of Telangana State viz., Kumram Bheem Asifabad, Mancherial, Peddapalli, Jayashanker Bhupalpalli, Bhadradri Kothagudem and Khammam districts in Telangana State. SCCL is a Government coal mining company jointly owned by the Government of Telangana and Government of India on a 51:49 equity basis. Presently, SCCL is operating thirty underground and sixteen opencast mines.

The present proposal **(Indaram Opencast Project & Indaram Khani 1A Incline Underground mine)** is located in Srirampur area and is in tune with the company's plan to optimize the extraction of reserves and to minimize the gap between coal demand and supply by conversion of shallow depth underground mines to opencast method for the liquidation of balance coal reserves. In this proposal, two underground mines Indaram Khani 1 Incline (abandoned) and Indaram Khani 1A incline are included.

Indaram Khani 1 Incline (IK 1 incline) was started in March 1984. Due to adverse geo-mining conditions, the mine was closed in January 2006 after extraction of 2.94MT. Indaram Khani 1A incline (IK 1A incline) was started in February 1988 and still in operation. So far, 4.61MT reserves were extracted from the mine.

The Indaram Opencast Project (Indaram OCP) was proposed with conversion of two UG mines ( IK 1 Incline and IK 1 A incline) property to liquidate the balance reserves as the extraction by underground method is found unviable. FR of the Indaram OC project was got approved by SCCL board in the year 2007. Mining Plan for Indaram OC Project on the name of 'Revised Mining Plan for Part of Indaram Mining Lease (Indaram Opencast project)' has been approved with letter No. 13016/5/2007-CA-II, dated 17.09.2007. EC was also obtained for Indaram OC Project for rated capacity of 1.2 MTPA (peak capacity 1.5 MTPA) in 2008 with lease area of 846.76 Ha.

But, due to the social problems and delay in land acquisition, the grounding of the Project has been delayed till date. As on now, SCCL has been intending to ground Indaram OCP along with the working IK 1 A incline. To avoid acquisition of fertile lands and diversion of state highway, the proposal has been revised by optimizing

the land requirement by changing the quarry excavation limit line and the dump strategy (to reduce the land requirement for external dump). As part of this strategy, about 50M.Cum of OB of this Project is proposed to be dumped on SRP OC II expansion project's external dump by increasing its height from 90m to 120m. To reach to SRP OC II expansion project's external dump, State High Way is to be crossed and for the purpose a cross over bridge is also proposed. As a result, there is considerable change in land use pattern and reduction in OC project land requirement; i.e. from 846.76 Ha to 635.54 Ha. Moreover, R&R requirement has also been avoided due to the change in dump strategy.

**Present Proposal is** to obtain **Environmental Clearance** for the proposed **Indaram OC Project & IK 1A Incline Underground mine** for a rated capacity of 1.20 MTPA from OC method and 0.54 MTPA from underground method and thus, for the total rated capacity of 1.74 MTPA.

Indaram OC Project starts its operation from IK 1 Incline underground mine property and progresses towards IK 1A Incline underground mine property. Open cast operations are proposed to be confined to the property of IK 1 Incline up to the completion of $12^{th}$ year of its grounding (Including 2 years construction period), maintaining the vertical barrier between both OCP and UG mine. As such, IK 1A incline operations will be continued and produce the rated capacity coal from the identified seams of underground method for coal conservation. Further, Indaram OCP will be continued for 14 more years in the property of IK 1A Incline underground mine to liquidate the identified coal seams for OCP.

The envisaged aggregate extractable coal reserves of the Project are 41.43 MT (Indaram OCP- 28.16 MT, Indaram 1A Incline underground- 10.33 MT and IK 1 Incline- 2.94MT). As 4.61 MT reserves & 2.94MT have already been extracted from IK 1A incline & IK 1 Incline respectively, **balance extractable reserves envisaged for the Project** are **33.88MT** for the life period of **26 years** (Including 2 years construction period).

### 1.2. Brief Description of the Project

This project is an **opencast cum underground coal mining project** with combined rated capacity of 1.74 MTPA to be attained by OC &UG operations.

**Salient features of the Project**

| | |
|---|---|
| Name of the Project | Indaram Opencast Project & Indaram Khani 1A Incline Underground mine |
| Type of Project | OC-New<br>UG-Operating |
| Village | Indaram |
| Mandal | Jaipur |
| District | Mancherial dist |
| State | Telangana |
| Coal Belt | Somagudem - Indaram coal belt |
| Coal Field | Godavari Valley Coal Field. |
| Name of the organization | The Singareni Collieries Company Ltd. |
| Geological Reserves | 65.007MT |
| Extractable Reserves | 41.43MT<br>OC- 28.16 MT<br>UG- 13.27 MT (2.94 IK 1+10.33 IK 1A) |
| Extracted Reserves<br>(up to 31.03.2017) | 7.55MT<br>OC: Nil<br>UG: 7.55 MT (2.94 IK 1+4.61IK 1A) |
| Balance Extractable Reserves<br>(As on 01.04.2017) | 33.88MT<br>OC- 28.16 MT<br>UG- 05.72 MT |
| Total Overburden from Quarry | 382.01 M.cum (HOB 379.88+ Top soil 2.13) |
| Average Stripping Ratio | 13.57 Cum /T |
| Topsoil from the Ext. Dump area | 0.88 M.Cum |
| Total OB to be handled | 382.89 M.Cum |
| Surface Area of excavation (Ha) | 355.11 |
| No. of workable seams | OC- 11<br>UG- 02 |
| Seam Gradient | 1 in 3.5 to 1 in 4.5 |
| Avg. Grade & Grade range | G-11 & (G-7 to G-13) |
| Borehole density (No/Sq.km) | 23.66 No/Sq.km |
| Land requirement (Ha) | Total project area: 997.93<br>OC- 985.59<br>UG - 182.78<br>UG and OC common- 170.44 |

| | |
|---|---|
| | |
| Technology | OC: Shovel dumper combination<br>UG: SDL |
| Depth range (m) | OC: 40 - 250<br>UG: 44-350 |
| Rated capacity | OC: 1.20 MTPA<br>UG: 0.54 MTPA<br>Combined: 1.74 MTPA |
| Life of the project (Years) | OC: 26 (including 2 of const. period for OC)<br>UG: 12 |
| R&R involved | Nil |
| Capital cost | Rs 349.28Cr for Indaram OC and Rs 46.11 Cr for IK 1A incline UG mine; Total Rs 395.39 Cr. |

# 2. INTRODUCTION OF THE PROJECT / BACKGROUND INFORMATION:

**(i) Identification of the project and Project Proponent. In case of mining project, a copy of mining lease / letter of intent should be given.**

## Identification of the Project:

The present proposal (Indaram OC Project and IK 1A Incline underground mine) is in tune with the company's plan to optimize the extraction of reserves and to minimize the gap between coal demand and supply by conversion of shallow underground workings (IK 1 Incline & IK 1A Incline) to opencast method for extraction of balance coal reserves.

## Project Proponent

The Project Proponent is M/s Singareni Collieries Company Limited (SCCL).

**Address:**
Director (Planning & Projects)
The Singareni Collieries Company Limited
Po:Kothagudem Collieries, PIN. 507 101
Dist: Bhadradri Kothagudem, Telangana State.
E-Mail id**:** dpp@scclmines.com
Ph.No. 08744 - 242602; Fax No. 08744 – 242724

### Mining Leases (ML):

Out of 997.93 Ha of the total land requirement for the project**,** 340.79 Ha and 472.71 Ha of the land is covered under two mining leases i.e. Srirampur extn. mining lease (GO MS No: 279 I&C Dept. dated:24.10.2007, for 714.90Ha, valid up to 11.03.2033) and Indaram mining lease (GOMS No:15 I&C dept., dated: 23.01.2006, for 2100 Ha, valid up to 28.07.2020) respectively. Thus, mining lease is to be obtained for the balance land of 184.43 Ha.

### Environmental Clearance (EC):

Environmental Clearance (EC) was obtained for Indaram OC, vide letter No. J-11015/145/2007-IA.II(M), dated 31-07-2008 for annual capacity of 1.2 MT with a peak production of 1.5 MTPA.

**(ii) Brief description of the nature of the project**

This project is an **opencast cum underground coal mining project** with combined capacity of **1.74 MTPA** to be attained by OC cum UG operation.

**Scheme for opencast mining:**

Indaram OC project is with 11 workable/extractable seams (1AT, 1AM,1AB,1,2TOP,2BOT,IB2,3B,3A,3 and 4A **in descending order**) which includes two underground mines i.e. IK1 Incline (abandoned) & IK 1A incline (working) up to a maximum depth of 250m.

It is proposed to extract coal by using shovel-dumper combination which is considered most suitable. The method of work for OC operations with shovel-dumper combination comprises of the prime operational components such as Removal of topsoil, initial opening of box cut, removal of overburden and inter-burden to expose the coal seams for extraction of coal.

- It is proposed to use Shovel-Dumper combination for coal extraction by departmental HEMM (1,2TOP and 3 seams) and OB removal including the thin coal seams 1AT,1AM,1AB,2BOT,IB2,3B,3A,4A &4 by out-sourcing agency.

- Further, the extraction of standing pillars by opencast at IK 1A Incline underground property is proposed up to Index below 2 (IB2) seam due to safety consideration (as the width of floor is only 150 m once extraction is done even up to 3 seam which is very restricted room along floor).

- Hence, it is planned to extract 3 and 4A seams in the property of IK 1A incline UG mine by underground within 12 years i.e. by the time of approaching of operations of OCP to IK 1A incline UG mine property.

- Indaram OCP is planned to extract 28.16 MT of coal and 382.01 M.cum of overburden with a stripping ratio of 13.57 Cum/t. In addition, it is proposed to remove 0.88 M.cum of topsoil from the proposed area of external dump for stabilization of external dump. Thus, the total OB to be handled throughout the project life will be 382.89 M.Cum.

- Indaram OCP is designed for a rated capacity of 1.2MTPA with life of 26 years (including 2 years of construction period).

- No Forest land is required.

**Scheme for underground mining:**

IK 1A Incline (working) underground mine is one of the underground mines for conversion to opencast project in this proposal. Initially, OC working will be confined to IK 1 Incline underground mine property up to 12 years and will be extended to IK 1A Incline underground property. So, the IK 1A Incline underground mine will continue the production till the proposed OCP moving benches enters in the bifurcating vertical mine boundary of IK 1 and IK 1 A Inclines. IK1 A Incline underground mine is working mine and every infrastructure is available for getting the rated sustainable production. The mine take area is having 12 seams i.e. 1AT,1AM,1AB, 1, 2Top, 2Bot, IB2, 3B, 3A, 3, 4A and 4 Seams. Out of the considered seams worked seams are 1AB,1, 2TOP and 3A (operations are stopped). Now two seams 3 & 4A are in operation. Development has been completed in 3 seam and depillaring is under progress with hydraulic (sand/bottom ash) stowing . Development is in progress in 4A seam and will be subsequently depillared with stowing. Depillaring operations consist splitting, slicing and rib reduction of the pillars.

- Envisaged extractable reserves of IK 1A are 10.33 MT. Extracted reserves are 4.61MT. Balance reserves to be extracted from the mine are envisaged as 5.72 MT.

- IK 1A Incline underground Mine is designed for a rated capacity of 0.54 MTPA with balance life of 12 years.

- No Forest land is required.

**Note: OC and UG operations areas plan is *enclosed as Plate No. V.***

**(iii) Need for the project and its importance to the country and or region**

Coal is the most important and abundant fossil fuel in India. It accounts for 56.42% (Source: Ministry of Power, GoI) of the country's energy need. Considering the limited reserve potentiality of petroleum & natural gas, eco-conservation restriction on Hydel project and geo-political perception of nuclear power, coal will continue to occupy centre-stage of India’s energy scenario. As per the working group of Ministry of Coal, Government of India, a supply gap of about 265.50 million tones is forecast by the terminal year of 12th Five Year Plan i.e. 2016-17. Even the increase in production is considered in optimistic scenario the gap of 185.50 MT will still be left by terminal year of 12th Five Year Plan.

SCCL, being the only coal producing company in Southern India, has the onerous responsibility of meeting large portion of coal demand in this part of the country. Further, there is need for enhancement in coal production to meet the requirement of Telangana State in particular and India in general. Further, Telangana State is

planning to add 10,480MW capacity by setting up new power plants within 3 years. In order to fulfill coal requirement of future thermal power projects of Telangana State in particular, SCCL is taking steps to enhance the production capacity by planning and implementation of new coal mining projects.

**(iv) Demand-Supply gap**

SCCL is the only coal mining company existing in Southern India and supplying coal to the major power utilities like NTPC, TSGENCO, APGENCO, KPCL and Maha GENCO. During financial year 2016-17, SCCL has supplied 49.72 Mt of coal to power utilities against 45.61 MTPA of FSA quantities. Apart from supply to power utilities, 9.28MT coal was supplied to cement industry, captive power plants, heavy water plant and other consumers during FY 2016-17 through Fuel Supply Agreements. Further, SCCL supplied coal to small and medium scale sector units to the extent of 1.82 MT. Total coal supplied to customers by SCCL during FY 2016-17 was 60.83 MT.

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

(Units in **Million Tonnes**)

| Sl.No | Year | 2017-18 | 2018-19 | 2019-20 |
|---|---|---|---|---|
| 1 | Demand | 81.87 | 84.87 | 81.10 |
| 2 | Production | 66.06 | 69.00 | 72.00 |
| 3 | Gap | 15.81 | 15.87 | 9.10 |

Considering the likely expansion of existing power projects and construction of new power units, the production and demand gap will further increase

**(v) Imports Vs Indigenous production**

Certain quantity of coal is being imported to mitigate demand-supply gap in the country. In order to reduce the imports, the various possibilities have been explored to enhance the production indigenously and as a part of capacity enhancement, the present proposal has been made.

**(vi) Export possibility**

There is no possibility of export of coal from the OC cum UG mine as there is sufficient demand for industries located in the region and also elsewhere in Telangana and India.

**(vii) Domestic / export markets**

The coal produced will be supplied to the major domestic customers namely power utilities, cement industries, fertilizers units, brick industries etc.

**(viii) Employment generation (Direct and Indirect) due to the Project:**

**Indaram OCP**

Due to opening of this project, direct employment will be generated in the company for various operations in the mine. The total manpower that will be deployed in this mine departmentally is 324 with envisaged requirement of daily attendance of 280 and by out sourcing 600.

Apart from the direct employment, Indirect employment may also be generated to a lot many (for about 400 persons) in the form of coal transportation, picking of shale / stone from the conveyor belts, supply of raw material like fly ash bricks, general conveyance of persons to the mine from their location by means of hired vehicles, housekeeping, out sourcing OB removal and coal extraction etc.

**IK 1A Incline underground mine**

At present 970 persons are being employed at the mine. Keeping in view of the proposed increase of rated capacity, the man power envisaged by departmental are 1350.

# 3. PROJECT DESCRIPTION:

**(i) Type of project including interlinked and interdependent projects, if any:** The project is independent and not interlinked or interdependent on any project for its production.

**(ii) Location (map showing general location, specific location, and project boundary & project site layout) with coordinates**

Location details:

**Indaram OC Project & IK 1A Incline Underground mine** is situated in the southernmost part of the Somagudem–Indaram coal belt between SRP-2 & 2A Block and the Godavari River. The block covers an area of 6.00 sq km and the **project** lies between the latitude N$18^0$ 46’ 39” and $18^0$ 50’ 06” and longitude E$79^0$ 29’ 05” and $79^0$

33’ 25”. The Project falls in the Survey of India Topo sheet No's. 56 N/5, 6, 9 &10. The block lies in the Jaipur Mandal of Mancherial district in Telangana State. The proposed **project** is in Srirampur area of Bellampalli Region of SCCL.

The block is situated beside State highway leading from Godavarikhani to Mancherial. Srirampur Township and Mancherial town are at a distance of 2.5 Km and 12 Km respectively. The nearest railhead is Mancherial Railway Station, which is at a distance of about 12 Km. This railway station is situated on Kazipet-Balharshah section of South Central Railway. The block is well connected with state capital Hyderabad (250 Km) and the district head quarters Mancherial (12 Km) by road.

Note: The Location plan and Key plans are enclosed as plate no: I & II

**(iii) Details of alternate sites considered and the basis of selecting the proposed site, particularly the environmental considerations should be highlighted.**

Mining is site specific in nature. As such alternative sites are not considered.

**(iv) Size or magnitude of operation**

**The OC Project** is proposed to operate at normative capacity of 1.2 MTPA. The physical parameters of the project are furnished below:

| | | |
|---|---|---|
| a | Maximum strike length along surface | 4230 m |
| b | Maximum strike length along quarry floor | 3930 m |
| c | Maximum width of the quarry along surface | 1010 m |
| f | Minimum width of the quarry along surface | 590m |
| g | Maximum width of the quarry along floor | 640m |
| h | Minimum width of the quarry along floor | 320m |
| i | Minimum depth of the quarry | 40m |
| j | Maximum depth of the quarry | 250m |
| k | Floor area of quarry | 194.85 Ha |
| l | Area of excavation on surface | 355.11 Ha |
| m | Total area of project (including external dump area & Safe barrier around the quarry& dump, roads etc.) | 997.93 Ha |
| N | Gradient of the seam | 1 in 3.5 to 1 in 4.5 |
| O | External dump A area (Ha) | 147.17 |
| P | External dump B area (Ha) | 337.64 |
| Q | Internal dump area (Ha) | 244.84 |

**The UG mine** is proposed to operate at the rated capacity of 0.54 MTPA. Its mine take area is 182.78Ha. It is planned to continue the present working seams i.e. 3 & 4A seams to extract balance reserves of 5.72 MT.

**(v) Project description with process details (a schematic diagram/ flow chart showing the project layout, components of the project etc. should be given)**

The project is a coal producing unit referred to as coal mine. The coal produced is brought to surface and dispatched to identified-customers viz. power plants, cement industries, fertilizer industries etc.

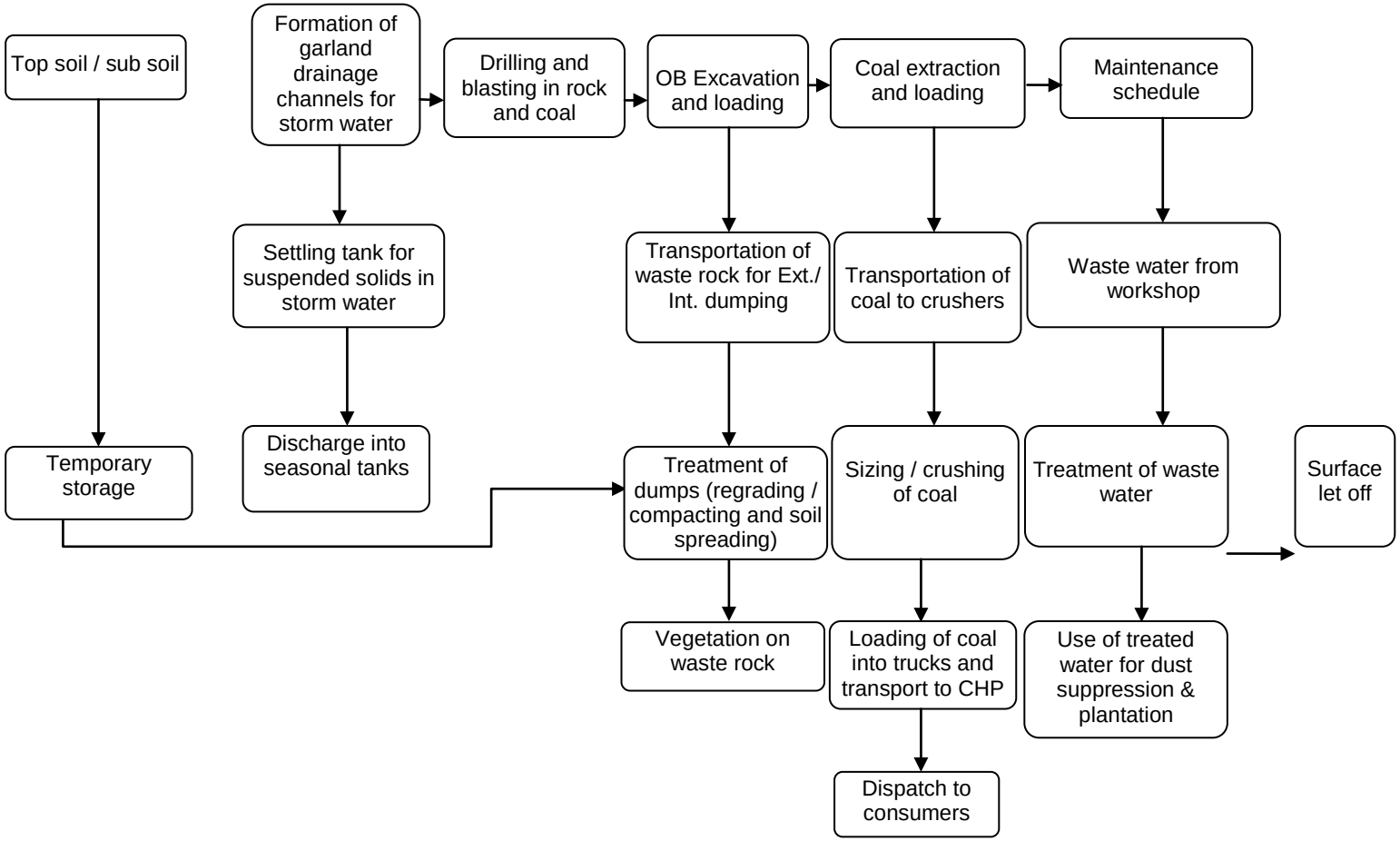
**The components of the project for OC operations:** Under the prevailing geo-mining conditions such as multiple thin seams with steep gradient, multiple faults and presence of underground workings, it is proposed to mine the property using shovel-dumper combination which is considered most suitable. The method of work for OC operations with Shovel-Dumper Combination comprises of the following prime operational components.

- Removal of topsoil.
- Initial opening of Box Cut.
- Removal of overburden and interburden to expose the coal seams.
- Extraction of coal.

The activities involved in the process are:

- Drilling and blasting
- Haul roads formation
- OB excavation, transportation and dumping in ear marked dumpyards.
- Transportation of coal from face to surface by means of rear dumpers
- Dispatch of coal from pit head CHP to consumers.
- Pumping operations

## MINE DEVELOPMENT AND COAL EXTRACTION PROCESS CHART - BY OC OPERATIONS



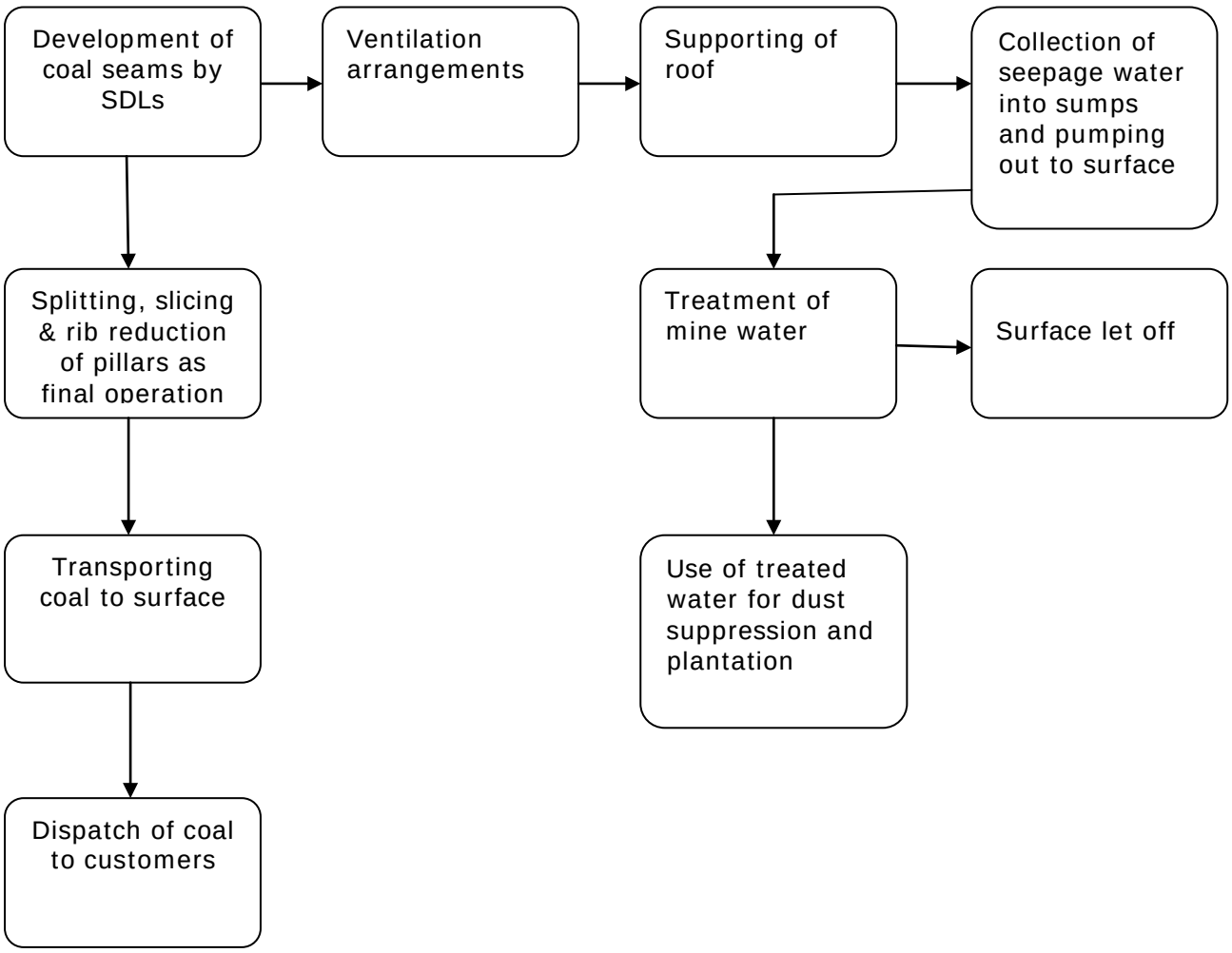
**The components of the project for UG operations:** The method of work for UG operations with board and pillar method by semi-mechanization using Side Discharge Loaders (SDLs) comprises of the following prime operational components.

- Mine development & Depillaring:

  Drilling and Blasting of the faces
  Coal evacuation from faces by SDLs
  Splitting, slicing and rib reduction of pillars

- ventilation arrangements
- Face supporting
- Transportation of coal by haulage network.
- Dispatch of coal from pit head CHP to consumers
- Pumping of seepage water by installing pumps in stages

**MINE DEVELOPMENT AND COAL EXTRACTION PROCESS CHART - BY UG OPERATIONS**



All the mining operations will be done under the Supervision of Mining/ Mechanical/Electrical staff as per the Mines Act 1952.

**(vi) Raw material required along with estimated quantity, likely source, marketing area of final product, mode of transport of raw material and finished product.**

Raw material required for the project with estimated quantity:

| Material | Quantity/annum | Source |
|---|---|---|
| Explosives (T) | 6,845 | Purchasing from explosive companies |
| Diesel Oil (KL) | 16,737 | Purchasing from oil companies |

**Mode of transportation of raw material:** Raw material will be handled by the following mode of transport

- Explosives will be transported in explosive vans approved by the Chief controller of Explosives.
- Diesel oil will be transported to company established oil bunks at site through approved oil company tankers.

**Marketing area of final product:** The coal will be supplied to the major customers like power plants, cement, textiles, paper industries and other utilities.

**Mode of transportation of finished product (coal):**

**Indaram OCP**

A pit head coal handling plant is proposed at the surface, to receive ROM coal transported by 35 T Rear Dumpers. 2 Nos. of 500 TPH feeder breakers receive the ROM coal and reduces it to (-) 200mm size. 2 No's secondary crushers are planned to further crush the coal to bring to -100mm size. The coal is then transported to PWB feeding belt of 125KW through 2No's of 30 KW FB belts. 150Cum/40T Pre-weigh bin with gantry for truck loading is planned. A belt is planned for shale separation.

**IK 1A Incline underground mine**

Coal from the face is transported by SDLs to the respective loading points at which, the coal is loaded in to the tubs for transportation to surface by haulage. Through surface bunkers, the coal will be dispatched to the customers.

**(vii) Resource optimization/recycling and reuse envisaged in the project, if any, should be briefly outlined**.

Resources like explosives, diesel oil, machinery, land, power and water will be fully optimized to minimize unnecessary loss during the process of extraction and supply of coal to the customers.

As the coal mining process does not involve any chemical process, the pumped out water will be useful for supply for domestic purpose, drinking, watering plantations, parks, lawns, and gardens and spraying arrangement for dust control. The effluents from workshop will be treated in ETPs. Excess water that will be let out from the mine will be treated in settling tanks and used for agriculture purpose.

**(viii) Availability of water, its source, energy/power requirement and source should be given.**

**OC project**: The source of water for the OC Project activities is the water pumped out from the proposed opencast itself. After meeting the mine requirements, the excess water will be let out into nearby nallah after necessary treatment and sedimentation of solids and waste. About 1000$m^3$/day is required for various purposes of the mine requirements like dust suppression (600$m^3$/day), washing of HEMM (300$m^3$/day), domestic requirement (30$m^3$/day) and for plantation is (70$m^3$/day).

**UG mine:** The water produced in the mine during mining activity due to natural seepage and stowing operations is collected at identified sumps and is pumped to surface by means of suitable capacity of pumps. As the mine discharge will have contamination of dust, dirt, it will be treated through filter beds constructed at pit head. After filtration through sand beds the water is being used for drinking, plantation, washing etc.

Filter bed constructed on surface is to meet the water requirements of the mine and nearby colonies. Water purification system (reverse osmosis plant) provided in the mine premises is supplying pure drinking water to the employees of the mine. The makeup water from the underground which is around 760 GPM, is pumped out and delivered in to filter bed. After sedimentation and filtration the clear water is supplied to underground for drinking purpose through pipeline after chlorination. The

employees carry the pure drinking water to underground with 1 l bottles. Part of the water is being used for dust suppression on surface & underground.

**Power requirement & Source:** The source of power for the project will be from 132KV sub-station, Mandamarri of SCCL. It is proposed to draw power from the Ramagundam-Mandamarri, 33 KV feeder which is passing just by side of the quarry. The power requirement for this project will be about 1.22 MW (as OB removal is by hiring HEMM, which are mainly with diesel operated equipment).

**(ix) Quantity of wastes to be generated (liquid/solid) and scheme for their disposal.**

The opencast coal mine involves the extraction of coal from the earth's crust. During the process of extraction, the superincumbent strata are required to be excavated and dumped in the earmarked sites as a solid waste. The wastes in the form of solid and liquid are generated during mining activity.

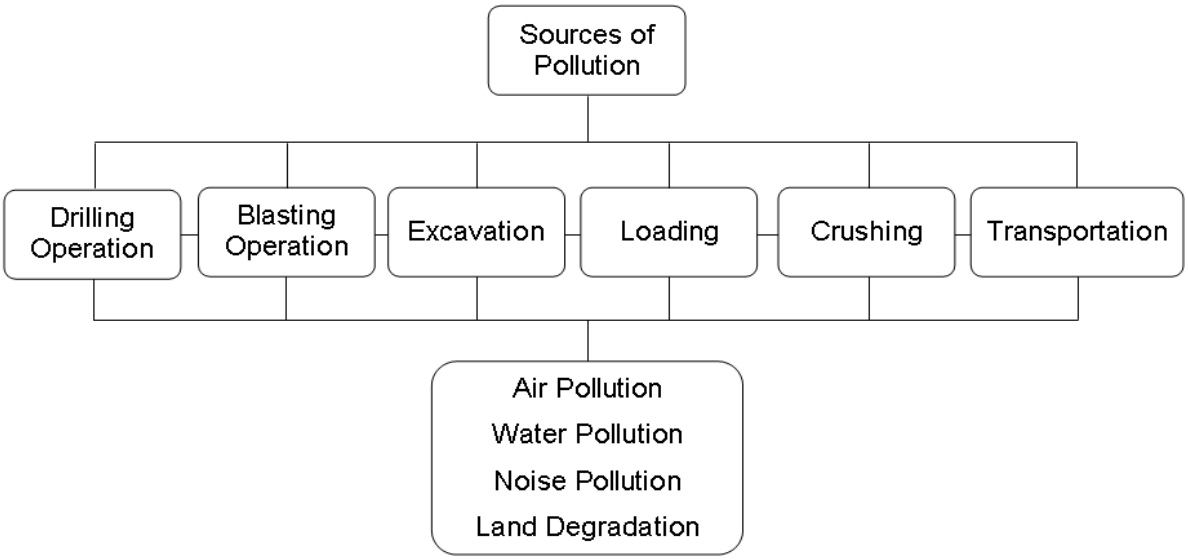
**Solid waste from OC:** The quarrying of Indaram will produce **28.16** MT of Coal and **379.88** M.Cum of OB (including topsoil quantity of 2.13 M.Cum). In addition, it is proposed remove 0.88 M.Cum of topsoil from the proposed external dump area for stabilization of external dump. Thus, the total OB to be handled throughout the project life is **382.89** M.Cum.

**Solid waste from UG mining operations:** In underground mine, waste generated during the mining operations is very less compared to that of opencast mining. The solid waste generated will be generally the stone bands / dirt bands / shale produced during mining activity. The debris, so produced will be used in underground itself for track ballasting, leveling of the uneven floors and strengthening of surface bank head. The other wastes will include decayed timber in small proportions.

**Liquid waste from OC and UG mining operations:** The liquid waste to be generated in the mine like used engine oil, gear oil, brake oils and other lubricants will be stored in separate tins/drums/cans and sent to main stores for disposal to TSPCB authorized recyclers.

**(x) Schematic representations of the feasibility drawing which gives information of EIA purpose.**

Schematic diagram showing the activities that will be involved in the proposed project which will be potential source for air pollution, water pollution, noise, land degradation and impact on other environmental attributes are given under:




# 4. SITE ANALYSIS:

### (i) Connectivity

The block is situated beside State highway leading from Godavarikhani to Mancherial. Srirampur Township and Mancherial town are at a distance of 2.5 Km and 12 Km respectively. The nearest railhead is Mancherial Railway Station, which is at a distance of about 12 Km. This railway station is situated on Kazipet-Balharshah section of South Central Railway. The block is well connected with state capital Hyderabad (250 Km) and the district head quarters Mancherial (12 Km) by road.

### (ii) Land form, Land use and Land ownership

The opencast cum underground project does not involve Forest Land. The land requirement for the mine take area of the project comprising of quarry area, external dump yard, nallah diversion, service buildings, CHP etc. is 997.93 Ha.

Pre-mining land use details:

| Land Type | Description | IOC& IK1A | Ext. dump B (SRP OC-II) | Total |
|---|---|---|---|---|
| Non-Forest/Tenancy /Private | Agriculture | 592.22 | 215.05 | 807.27 |
| | Village | - | 20.32 | 20.32 |
| | Barren | 18.17 | - | 18.17 |
| | Roads | 14.68 | 2.66 | 17.34 |
| Govt. Non-Forest | Agriculture | 15.32 | 99.74 | 115.06 |
| | Grazing/other | - | 5.72 | 5.72 |
| | Roads | 2.08 | 0.16 | 2.24 |
| | Water bodies | 5.41 | 6.40 | 11.81 |
| Total | | 647.88 | 350.05 | 997.93 |

The land requirement for the proposed project is given below

| Sl. No | Particulars | Requierement |
|---|---|---|
| 1 | Quarry Area | 355.11 |
| 2 | External Dump area | 147.17 |
| 3 | Embankment | 21.24 |
| 4 | Safety clearances along quarry and external dump & drains | 94.06 |
| 5 | Haul Road to Dump B | 17.96 |
| 6 | Exclusive requirement for IK 1A incline mine take area | *12.34 |
| | **Total** | ***647.88** |
| 7 | **External dump B | 337.64 |
| 8 | Approach ramp to Ext. dump-B | 12.41 |
| | **Grand total** | **997.93** |

Note: *The Land requirement Plan of the area is shown in* Plate No: IV

*12.34 Ha of land is falling outside mine take area of OC project but included in mine take area UG mine making total **project area** of the combined project as **647.88 Ha** which includes UG mine take area of 182.78 Ha.

** OB of Indaram OC Project is proposed to be dumped over the external dump of SRP OC-II expansion Project by increasing its height from 90m to 120m.

**(iii) Topography**

**Physiography:** Topography of the area varies from 825m to 848m. The area within 10km radius of the block is of gently sloping plains with local undulations. The local relief varies from 120 m above mean sea level in the south central part to 270 m above mean sea level in the northern part with an average slope of 5.7 m / km. towards Godavari River in the south central part. The block area is a plain terrain, gently sloping towards south. The topographic elevation varies from 130 m to 165 m above Mean Sea Level (MSL).

**Drainage:** Drainage net work of the block area is showing dendritic pattern. The area is traversed by several southerly flowing seasonal nallahs which ultimately join the river Godavari which is the main drainage channel. The HFL of Godavari River recorded in October 1995 at Ramagundam is 138.4 m above MSL. The drainage is of dendritic to sub-parallel type indicating the plain terrain and structural influence in

its development. The drainage density is 2.46 km/sq.km. The drainage is scantily developed within the block area.

Note: *The* Topographical *plan of the study area is shown in Plate No: III*

**Diversions or shifting involved:**

(a) **Power lines**: The diversion of power lines as given below are required

| Description | Length of diversion |
|---|---|
| 400KV HT. Power lines (Gajwel) | 1Km |
| 400KV HT. Power lines (Nirmal) | 3Km |
| 400KV HT. Power lines (Chandrapur) | 3Km |
| 33KV HT.Power lines (SCCL) | 4Km |
| 11KV HT. Power lines (NPDCL) | 4Km |

b**) Diversion of road to CHP (IK 1A**): Existing road connected to highway through the proposed quarry area is to be diverted along land limit line in eastern side from north to south having length of 1.75Km

c) **Diversion of Nallah**: One nallah flowing through the proposed quarry area from N-W is to be diverted towards South side for a length of 0.65 Km.

**(iv) Existing land use pattern (agriculture, non-agriculture, forest, water bodies(including area under CRZ)),shortest distances from the periphery of the project to periphery of the forests, national park, wild life sanctuary, eco sensitive areas, water bodies(distance from the HFL of the river).In case of industrial area, a copy of the Gazette notification should be given.**

The proposed project area does not fall under CRZ area. The project does not fall within 10 Km radius of any Wild Life Sanctuary and no forest land is involved in the project area. The project is not near to industrial area. Indaram, Kundaram and Raidandi Reserve forests are within 10 Km radius of the project limit line. River Godavari is flowing from N-W to S-E.

**(v) Existing Infrastructure**

The infrastructure facilities existing are:

- Well-established township
- Source of power and existing substation
- Connecting road and communication systems

- ❖ guest houses, schools and hospitals

### (vi) Soil classification

**Summary of soil analysis collected in the proposed Indaram OCP mine**

| *Sl. No* | Characteristics | | Unit | Shettipalli | Pegadapalli | Malkapur | IK-I A | Jangaon | Narshimapalli |
|---|---|---|---|---|---|---|---|---|---|
| 1 | Soil depth | | Cm | 30 | 30 | 30 | 30 | 30 | 30 |
| 2 | Particle size | Sand | % | 27 | 14 | 17 | 17 | 28 | 17 |
| | | Silt | % | 34 | 36 | 36 | 33 | 36 | 35 |
| | | Clay | % | 46 | 51 | 47 | 53 | 39 | 49 |
| 3 | Texture | -- | | Clayey silt | Clayey silt | Clayey silt | Clayey silt | Clayey silt | Clayey silt |
| 4 | Organic matter | % | | 0.78 | 0.9 | 0.6 | 0.6 | 0.9 | 0.6 |
| 5 | pH | -- | | 7.76 | 7.19 | 7.85 | 7.29 | 7.43 | 7.26 |
| 6 | Electrical Conductivity | | micro ohms /cm | 610 | 748 | 698 | 520 | 788 | 697 |
| 7 | Cation Exchange Capacity | Na | Meq/100g | 3.10 | 4.30 | 2.98 | 3.10 | 4.30 | 2.98 |
| | | K | Meq/100g | 0.68 | 0.60 | 0.40 | 0.50 | 0.70 | 0.40 |
| | | Ca | Meq/100g | 3.88 | 4.08 | 2.70 | 3.40 | 4.10 | 2.10 |
| | | Mg | Meq/100g | 1.20 | 1.10 | 1.30 | 1.12 | 1.10 | 1.30 |
| 8 | Heavy metals | Cd | Meq/100g | 0.03 | 0.02 | 0.02 | 0.02 | 0.03 | 0.01 |
| | | Cr | Meq/100g | 0.02 | 0.01 | 0.01 | 0.02 | 0.01 | 0.01 |
| | | Pb | Meq/100g | 0.03 | 0.02 | 0.02 | 0.02 | 0.03 | 0.01 |
| | | Ni | Meq/100g | 0.01 | 0.01 | 0.01 | 0.02 | 0.01 | 0.01 |
| | | Cu | Meq/100g | 0.50 | 0.40 | 0.39 | 0.42 | 0.56 | 0.31 |
| | | Zn | Meq/100g | 9.30 | 8.80 | 8.10 | 8.90 | 7.60 | 6.20 |
| | | Mn | Meq/100g | 0.03 | 0.02 | 0.02 | 0.01 | 0.02 | 0.01 |
| 9 | Infiltration Rate | | mm/hr | 94.0 | 99.0 | 88.6 | 49.0 | 35.0 | 29.0 |
| 10 | Water Holding Capacity | | % | 30 | 31 | 30 | 33 | 26 | 27 |

### (vii) Climatic data from secondary sources

### Micro Meteorological data and climate

The micro-meteorological data for the proposed Indaram Opencast Project was recorded in the year 2005-2006. Wind speed, wind direction, humidity, temperature and rainfall are recorded on hourly basis.

The predominant wind directions during summer season were observed to be East with a speed in the range of 0 to 20.6 kmph. The calm conditions during this period

were found to be around 29.3%. Temperature and relative humidity during this period were found in the range of 31.8$^0$C to 32.8$^0$C and 43.9% to 52.9% respectively.

**Meteorology**

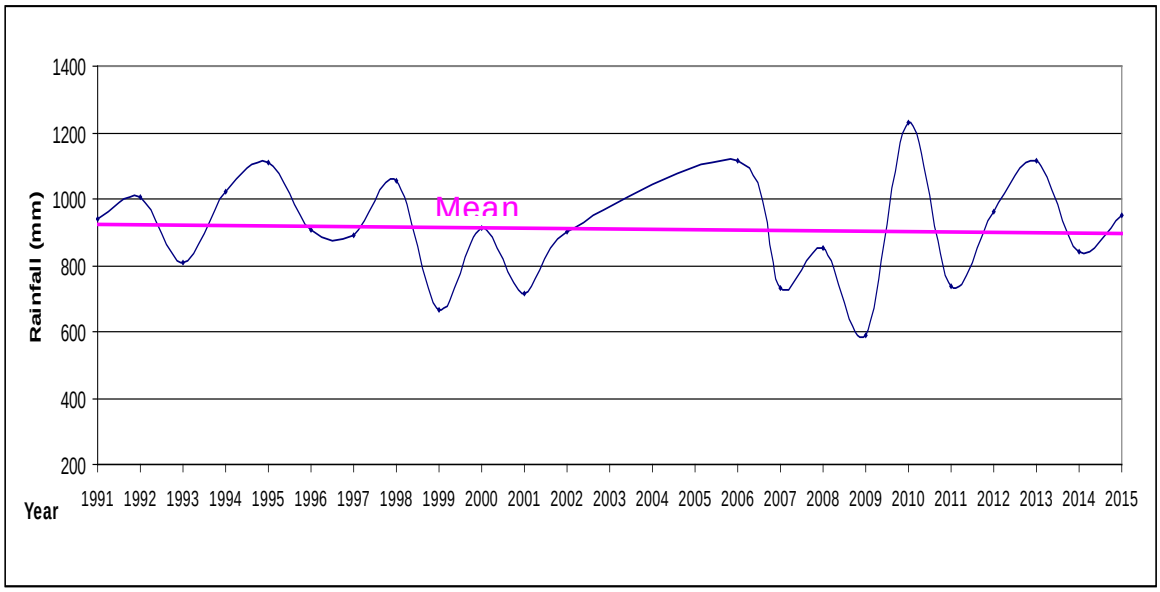
The area experiences tropical climate of a distinct hot summer from March to June with occasional dust storms, a good monsoon between middle of June to October and a pleasant winter from December to February.

**Rainfall:** The Jaipur rain gauge station data is used for the study area. The variations in the annual rainfall are conspicuous. During 1991-2015, rainfall varies widely from 588.2 mm (2009) to 1230.2 mm (2010) with a mean of 911.2 mm, the maximum monthly rainfall 429.6 mm (August, 2002), The monsoon rainfall contributes 89.4% while non-monsoon rainfall contributes 10.6% of rainfall.

**Annual Rainfall and Percent of Deviation**

| Year | Total RF | Deviation % from avg.RF | Status |
|---|---|---|---|
| 1991 | 937.0 | 2.8 | Normal |
| 1992 | 1007.1 | 10.5 | Normal |
| 1993 | 808.1 | -11.3 | Normal |
| 1994 | 1021 | 12.1 | Normal |
| 1995 | 1110 | 21.8 | Normal |
| 1996 | 905.7 | -0.6 | Normal |
| 1997 | 887.7 | -2.6 | Normal |
| 1998 | 1053.2 | 15.6 | Normal |
| 1999 | 665.6 | -27.0 | Moderate Drought |
| 2000 | 911.1 | 0.0 | Normal |
| 2001 | 715.7 | -21.5 | Normal |
| 2002 | 899.2 | -1.3 | Normal |
| 2006 | 1117.5 | 22.6 | Normal |
| 2007 | 734.2 | -19.4 | Normal |
| 2008 | 854.4 | -6.2 | Normal |
| 2009 | 588.2 | -35.4 | Moderate Drought |
| 2010 | 1230.2 | 35.0 | Excess |
| 2011 | 735 | -19.3 | Normal |
| 2012 | 959 | 5.2 | Normal |
| 2013 | 1112.8 | 22.1 | Normal |
| 2014 | 843.4 | -7.4 | Normal |
| 2015 | 949.9 | 4.2 | Normal |

**Annual rainfall data plot**




## (viii) Social Infrastructure available

The proposed project site is situated in Srirampur area of SCCL, where mining activities are being carried out since Britisher's time. The social infrastructure in terms of connectivity by road, communication, health, sanitation, community centers, education, financial institutions, income source etc. is well established. SCCL has constructed quarters for residential accommodation of the employees employed in the existing mine & deepartments. Other facilities provided are:

- Connectivity to District and State head quarters.
- Power supply network and communication network.
- Hospital for necessary medical aid with specialist doctors.
- Referral of Acute Medical cases to super specialty hospitals.
- Clubs for social interactions and recreation.
- Bank facility and ATM counters.
- Schools for providing necessary education.
- Parks for recreation.
- Necessary market facilities and shops.
- Provision of Super bazaar.
- Supply of free LPG.
- Provision of petrol through Company petrol bunk.
- Sports & Cultural activities.
- Encouraging Horticulture.
- Promoting skills of women of the colonies through Singareni Seva Samithi.
- Development of surrounding habitat through SHAPE funds.

# 5. PLANNING BRIEF:

## i. Planning concept (type of industries, facilities, transportation etc) Town and country planning / Development authority classification

### Coal Reserves

All the assessed reserves are categorized as “Proved” since the geological continuity of the seams has been established beyond reasonable doubt allowing 10% deduction from the gross reserves to account for the unforeseen geological factors, to arrive at net reserves.

The details of reserves are as given below:

| | |
|---|---|
| Net geological reserves | 65.007 MT |
| Mineable reserves | 44.250 MT |
| Extractable reserves | 41.430 MT |
| Extracted reserves | 07.550 MT |
| Balance reserves | 33.880 MT |

Out of the balance reserves of 33.88 MT, balance reserves pertaining to 3 & 4A seams to be extracted from the IK 1A UG mine are 5.72 MT and 28.16MT are to be excavated from Indaram OC project.

The seam wise reserves are estimated by using Geo-model data with CARLSON SOFTWARE.

### DETAILS OF COAL SEAMS

### Indaram OCP

The revised GR of Indaram OC block was re-submitted by considering the reserves of the seams having thickness of about 0.5 m and more as it is proposed to be extracted by opencast. Thus, the number of seams increased from 6 to 11 in the present proposal. Further, due to safety consideration (as the width of floor is only 150 m once extraction is done even up to No 3 seam which is very restricted room along floor), it is proposed to extract 3 seam and 4A seam (below No.3 Seam) pertaining to IK 1A property by underground within 12 years and the extraction by opencast in IK 1A property is limited to Index below 2 (IB2) seam.

The 11 seams are 1AT,1AM,1AB,1,2TOP,2BOT,IB2,3B,3A,3 and 4A in descending order. The details of coal seams are given below:

**IK 1A Incline**

There is presence of 12 seams i.e. 1AT,1AM,1AB, 1, 2Top, 2Bot, IB2, 3B, 3A, 3, 4A and 4 Seams (in descending order) in IK 1A incline property as per revised GR.

Considered seams in UG mine are as given below

**1AB**: Seam was partially developed from 3L to 10L along dip direction and 8 Dip south to 9 Dip North along strike direction and stopped due to poor quality of coal. The parting with 1 seam is **33** Mtrs.

**1 Seam**: It was fully developed up to the south side mine boundary. North side also developed up to dip most boundary i.e. 24L. Operations are stopped.

**2Top**: Fully developed up to south side mine boundary and development stopped towards north side after7 Dip/ 10 Level due to poor quality of coal.

**3A Seam**: Partially developed from -2L to 4L in dip direction and 7Dip south to 4 Dip north in strike direction. Further development has been stopped during year 2004, due to thinning down of the seam.

**3 Seam**: Total development completed up to south side and North side boundaries. The parting with 3A seam is 18 Mtrs.

**4A Seam**: Partially developed. Present 2 SDLs are working in 13D dist. Parting between 3 seam and 4A seam is 15 Mtrs.

At present two seams are being worked i.e. 3 & 4A seams. Development has been completed in 3 seam and depillaring with stowing is under progress. Development is in progress in 4A seam.

Geological reserves of IK 1A are 51.49 MT. So far 4.61MT reserves have been extracted. As the seams up to IB2 are planned for excavation from OC project, 3&4A seams are planned for excavation by UG workings. These seams produce 5.72MT of balance reserves (3 seam-4.81 MT& 4A seam-0.91 MT) of G7-G9 grade.

**RATED CAPACITY AND LIFE OF THE PROJECT:**

**Indaram OC**

The proposed Indaram **OC** project is planned for rated capacity of 1.20 MTPA . The total mineable Coal reserves are **28.16** MT and OB to be removed is **382.01** M.Cum

with an average stripping ratio of **13.57** Cum/T. The life of the project estimated is 26 years includes 2 years of construction period.

**Production Schedule**

**Indaram OC**

| | Coal (Dept) | Coal (Out Source) | Total coal | HOB | Top soil | Total OB | SR |
|---|---|---|---|---|---|---|---|
| 1 | Construction period | | | | | | |
| 2 | | | | | | | |
| 3 | 0.54 | 0.36 | 0.90 | 14.04 | 0.36 | 14.400 | 16.00 |
| 4 | 0.75 | 0.45 | 1.20 | 17.87 | 0.29 | 18.160 | 15.13 |
| 5 | 0.61 | 0.59 | 1.20 | 17.18 | 0.17 | 17.350 | 14.46 |
| 6 | 0.79 | 0.41 | 1.20 | 13.97 | 0.09 | 14.060 | 11.72 |
| 7 | 0.90 | 0.30 | 1.20 | 18.74 | | 18.740 | 15.62 |
| 8 | 0.80 | 0.41 | 1.20 | 18.21 | 0.05 | 18.260 | 15.17 |
| 9 | 0.80 | 0.41 | 1.20 | 18.21 | 0.05 | 18.260 | 15.22 |
| 10 | 0.80 | 0.41 | 1.20 | 18.21 | 0.05 | 18.260 | 15.22 |
| 11 | 0.80 | 0.41 | 1.20 | 18.21 | 0.05 | 18.260 | 15.22 |
| 12 | 0.80 | 0.41 | 1.20 | 18.20 | 0.05 | 18.250 | 15.21 |
| 13 | 0.79 | 0.41 | 1.20 | 17.09 | 0.078 | 17.168 | 14.31 |
| 14 | 0.79 | 0.41 | 1.20 | 17.09 | 0.078 | 17.168 | 14.31 |
| 15 | 0.79 | 0.41 | 1.20 | 17.09 | 0.078 | 17.168 | 14.31 |
| 16 | 0.79 | 0.41 | 1.20 | 17.09 | 0.078 | 17.168 | 14.31 |
| 17 | 0.79 | 0.41 | 1.20 | 17.09 | 0.078 | 17.168 | 14.31 |
| 18 | 0.77 | 0.43 | 1.20 | 21.11 | 0.116 | 21.226 | 17.69 |
| 19 | 0.77 | 0.43 | 1.20 | 21.11 | 0.116 | 21.226 | 17.69 |
| 20 | 0.77 | 0.43 | 1.20 | 21.11 | 0.116 | 21.226 | 17.69 |
| 21 | 0.77 | 0.43 | 1.20 | 21.10 | 0.116 | 21.216 | 17.68 |
| 22 | 0.77 | 0.43 | 1.20 | 21.10 | 0.116 | 21.216 | 17.68 |
| 23 | 1.13 | 0.08 | 1.20 | 4.33 | | 4.33 | 3.61 |
| 24 | 1.13 | 0.08 | 1.20 | 4.33 | | 4.33 | 3.61 |
| 25 | 1.13 | 0.08 | 1.20 | 4.32 | | 4.32 | 3.60 |
| 26 | 0.81 | 0.05 | 0.86 | 3.08 | | 3.08 | 3.58 |
| | **19.56** | **8.60** | **28.16** | **379.88** | ***2.13** | ***382.01** | **13.57** |

***** With Top soil of 0.88M.Cum, which is planned to excavate from the earmarked external dump area-A total top soil will be 3.01M.cum and total OB to be handled will be 382.89 M.Cum.

**IK 1A Incline:**

So far, 4.61MT reserves have been extracted from IK 1A incline and it is to produce 5.72MT of coal in its balance life of 12 years. Rated capacity is envisaged at 0.54 MTPA.

**Integrated Schedule planned**

| Year | I OC | IK 1A (Ug) | Total |
|---|---|---|---|
| 1 | | 0.36 | 0.36 |
| 2 | | 0.44 | 0.44 |
| 3 | 0.90 | 0.54 | 1.44 |
| 4 | 1.20 | 0.54 | 1.74 |
| 5 | 1.20 | 0.54 | 1.74 |
| 6 | 1.20 | 0.54 | 1.74 |
| 7 | 1.20 | 0.54 | 1.74 |
| 8 | 1.20 | 0.54 | 1.74 |
| 9 | 1.20 | 0.54 | 1.74 |
| 10 | 1.20 | 0.44 | 1.64 |
| 11 | 1.20 | 0.44 | 1.64 |
| 12 | 1.20 | 0.36 | 1.50 |
| 13 | 1.20 | | 1.20 |
| 14 | 1.20 | - | 1.20 |
| 15 | 1.20 | - | 1.20 |
| 16 | 1.20 | - | 1.20 |
| 17 | 1.20 | - | 1.20 |
| 18 | 1.20 | - | 1.20 |
| 19 | 1.20 | - | 1.20 |
| 20 | 1.20 | - | 1.20 |
| 21 | 1.20 | - | 1.20 |
| 22 | 1.20 | - | 1.20 |
| 23 | 1.20 | - | 1.20 |
| 24 | 1.20 | - | 1.20 |
| 25 | 1.20 | -- | 1.20 |
| 26 | 1.20 | - | 1.20 |
| Total | 28.16 | 5.72 | 33.88 |

**Method of work**:

**Indaram OC**

The mining sequence has been planned in such a way as to permit mining the coal reserves in a more effective manner and at the same time allows backfilling of considerable quantity of overburden. This aspect considerably mitigates the adverse environmental impact generally associated with opencast mining. The methods of excavation of OB and extraction of coal in virgin & underground developed areas are briefly explained below.

**Excavation of OB:** the equipment will be deployed on a horizontal plane and their movement will be along a particular horizon as the equipment is not able to stand/work along the inclined plane where inclination is more than 1 in 3. The mining area will be divided into no of horizons with a height of 10M each. The OB will be removed by deploying hired HEMM (shovels and other HEMM) in each horizon.

**Extraction of coal in virgin area:** For the extraction of coal where gradient is more, the equipment will be deployed in the immediate upper horizon of the seam roof. The drilling machine will drill blast holes in OB immediately above coal roof. Then blasting, leveling and lifting of OB done. Where the blasted OB is excavated, drilling, blasting and leveling of blasted coal will be done. This leveled coal will be lifted by diesel operated hydraulic back-hoe shovels.

**Extraction of coal In UG developed area:** In this case, the method of mining will slightly differ. A layer of parting of minimum 6m thick will be left over the developed seams and the equipment will be deployed above that parting so as to prevent them from falling into the u/g galleries. Where the coal seam is developed in the upper horizon, the drilling will be done in solid parting on either side of the developed gallery and where coal seam is developed in the lower horizon, the drilling will be done both in solid parting of 6m thick and in coal seam together on either side of the developed gallery. Drilling will be done over the solid coal pillars upto the roof of seam. Then blasting will be carried out both in OB and coal where the seam is developed in the lower horizon and in OB in other areas. This will help in packing the galleries with blasted materials, which will prevent the heavy machinery from falling into the galleries. After blasting, the OB material above blasted coal will be excavated. After removal of OB, the coal will be lifted by diesel operated hydraulic back-hoe shovels.

**Method of work for UG operations**:

After the coal seams are encountered, level galleries were driven in seams up to the boundary of the mine to establish the transport circuit. Dip galleries are driven at regular intervals from level galleries and inter-connection are made to form pillars as per Coal Mines Regulations 1957.Panels are formed of pillars and size of panels are decided on incubation period, as well as rate of extraction.

In all the coal faces, 43mm dia, and 1.8m deep shot holes will be drilled. The level and dip galleries are being advanced by conducting solid blasting with P-5 explosives. To conduct blasting Electric coal drill machines (1.25 HP) are being used for drilling holes of 43mm dia and 1.8 to 2 mts in length in wedge cut pattern. Conventional drilling with electric hand held drilling machine working at 110V 3-phase, diamond section drill rods, eccentric type of drill bits with tungsten carbide tips is being followed at this mine. Permitted explosives of P5 type, milli-second delay detonators, and multi-shot exploders approved for use in underground by DGMS are being used for solid blasting method.

After the completion of development, depillaring operations by splitting, slicing and rib reduction will be done in seams one after the other in ascending order and the depillaring operations are planned in conjunction with hydraulic ash/sand stowing. The panels in all the seams will be formed of such size that the entire panel would be extracted well within the incubation period of the Seams.

The size of the panels is mainly governed by the incubation period and experience in the existing operating mines.

**Mechanization:**

**Indaram OC**

| **Description** | **Equipment** | **No.** |
|---|---|---|
| **Coal** | 3Cum Hyd. excavator (Back hoe) | 2 |
| | 35T Rear dumper (coal body) | 8 |
| | 150-160mm drill | 1 |
| | 410 HP Dozer (with ripper attachment) | 1 |
| | 320Hp Dozers | 1 |
| **Common** | 280 HP Motor Graders | 1 |
| | 1 Cum Diesel Hyd. excavator | 1 |
| | 28KL Water Sprinkler | 1 |
| | 4.6 Cum Front End Loader | 1 |
| | 10T truck | 1 |
| | 40T truck | 1 |
| | Fire Tender Truck | 1 |
| | 5T Fork Lift | 1 |
| **Reclamation** | 280 HP Motor Graders | 1 |
| | 320 HP Dozers | 1 |
| | 28 KL Water Sprinkler | 1 |
| | Farm Truck | 1 |

**IK 1A Incline**

15 Elect. SDLs and 16No.s of bolters are envisaged for the rated capacity.

**WASTE MANAGEMENT**

The quarrying of pit produces 382.01 M.Cum. of OB including 2.13 M.Cum of top soil. In addition this, it is planned to excavate 0.88 M.Cum of top soil from the area earmarked for external dump yard A, which makes the total top soil as 3.01M.Cum and total OB as 382.89 M.Cum from the project.

The following design criteria have been considered for waste dumps.

i) Separate spoil dumps for Topsoil and other OB
ii) Maximum height of topsoil dump is 10 metres.
iii) Main OB to be dumped in 30 m high decks.
iv) 30 m berm width for allowing safe transport.
v) Dump slope for each deck to be at natural repose of $37.5^0$ and overall slope at $26.5^0$
vi) Track Dozers will be deployed for shaping the dumps
vii) Maximum height of internal dumps and external dump A is 90m. The height of External dump B will be 120m as the dumping of OB of this project is over the dumps of SRP OC-II (of height 90m).

**Location of Dump Yards**

It is proposed to accommodate the OB in the following four dump yards.

(1) External dump- A, beyond the in-crop of seam-IV on the rise side (to the west of pit)
(2) External dump-B, over the final dumps of SRP OC-II.
(3) Temporary storage of top soil in the S-E side of quarry (internal)
(4) North Internal dump yard.
(5) South Internal dumpyard.

**Hard OB:**

Hard OB of 379.88 M.Cum will be excavated from the quarry. In $1^{st}$ year the HOB will be dumped in External Dump Yards A & B.

For 5 years, the dumping will be only in both the external dump yards (by 4th year itself dumping in external dumping in dump B will be completed). Internal dumping in North Internal dump starts only after 5th year, along with the external dumping in External dump A. After 15th year dumping will be done internally only. By 20th year internal dumping of hard OB in North internal dump will be completed, and dumping in South internal dump yard starts and will be continued till the final year (24th year).

72.10M.Cum and 49.91M.Cum of HOB will go to external dumps A and B respectively. 198.38 M.Cum and 59.49 M.Cum of HoB will be dumped internally in North and South external dump yards respectively.

**Top soil:**

2.13M.Cum of top soil is excavated from the quarry. Further, top soil of 0.88 MBCM will be stripped off from the area earmarked for external dump yard A before dumping the over burden (top soil excavated from the area earmarked for external dump yard -B i.e. external dump of SRP OC-II expansion project is proposed to be utilised for spreading over the dumps of the SRP OC-II expansion project itself). Thus the project produces 3.01 M.Cum of top soil. The same is proposed to be spread over the external dumps, internal dumps and embankment.

**Details of dump yards**

The parameters of External and Internal dumps are detailed below:

| | **Ext. Dump A** | ***Ext. Dump B** | **North Int. Dump** | **South Int. Dump** | **Total** |
|---|---|---|---|---|---|
| Max. Height (m) | 90 | 120 | 90 | 60 | |
| Area (Ha) | 147.17 | 337.64 | 145.65 | 99.62 | |
| Hard OB (MCum) | 72.10 | 49.91 | 198.38 | 59.49 | 379.88 |

* The dump (+90m) is of SRP OC-II expansion project, over which the OB dumping of proposed project is planned, increasing its height to 120m.

At the end of the mining operations sloping of internal dumps will be made towards the final void such that any soil erosion from the dumps will be settled in voids.

**Final Void**

The Maximum depth of the Final void at the end of mining operations is 250m. the area of final void at GL is 160.13 Ha. The volume of the void is 219.14 M.Cum. It will be used as water body.

**ii. Population projection**

The average daily attendance required to achieve the rated production of 1.2 MTPA is estimated to be 280 excluding area level. After considering absenteeism towards authorized leave, sick etc., the men on roll for the project will be 324 excluding Area level. Contractor manpower is estimated at 600.

For UG mine manpower is envisaged as1350 for the rated capacity.

**iii. Land use planning (breakup along with green belt etc)**

The land required for the project is being used for quarry, OB dumping, pit head infrastructure, approach roads, etc. but the same will be reclaimed to economic/ social use. The details of land in post mining scenario will be as follows:

Post Mining Land Use:

| Sl. No. | Description | Total Land | Plantation | Void | Agriculture | Public/other use |
|---|---|---|---|---|---|---|
| 1 | Quarry area | 355.11 | 155.82 | 160.13 | 0.00 | 39.16 |
| 2 | External Dump Area | 147.17 | 126.01 | 0.00 | 0.00 | 21.16 |
| 3 | Embankment | 21.24 | 14.25 | 0.00 | 0.00 | 6.99 |
| 4 | Safety clearance along quarry and external dump & drains | 94.06 | 49.91 | 0.00 | 0.00 | 44.15 |
| 5 | Haul road to dump B | 17.96 | 0.00 | 0.00 | 0.00 | 17.96 |
| 6 | Exclusively for UG mine take area | 12.34 | - | - | 12.34 | 0.00 |
| | **Total** | **647.88** | **345.99** | **160.13** | **12.34** | **129.42** |
| 7 | External Dump-B | 337.64 | 337.64 | 0.00 | 0.00 | 0.00 |
| 8 | Approach ramp to Ext. dump-B | 12.41 | 0.00 | 0.00 | 0.00 | 12.41 |
| | **Grand total** | **997.93** | **683.63** | **160.13** | **12.34** | **141.83** |

Post closure land use:

| Sl. No. | Description | Total Land | Plantation | Water body | Agriculture | Public/ other use |
|---|---|---|---|---|---|---|
| 1 | Quarry area | 355.11 | 155.82 | 160.13 | 0.00 | 39.16 |
| 2 | External Dump Area | 147.17 | 126.01 | 0.00 | 0.00 | 21.16 |
| 3 | Embankment | 21.24 | 14.25 | 0.00 | 0.00 | 6.99 |
| 4 | Safety clearance along quarry and external dump & drains | 94.06 | 49.91 | 0.00 | 10.70 | 33.45 |

| | | | | | | |
|---|---|---|---|---|---|---|
| 5 | Haul road to dump B | 17.96 | 0.00 | 0.00 | 17.96 | 0.00 |
| 6 | Exclusively for UG mine take area | 12.34 | - | - | 12.34 | 0.00 |
| | **Total** | **647.88** | **345.99** | **160.13** | **41.00** | **100.76** |
| 7 | External Dump-B | 337.64 | 337.64 | 0.00 | 0.00 | 0.00 |
| 8 | Approach ramp to Ext. dump-B | 12.41 | 0.00 | 0.00 | 0.00 | 12.41 |
| | **Grand total** | **997.93** | **683.63** | **160.13** | **41.00** | **113.17** |

Note: The Final stage, Ultimate pit and Mine closure plans are enclosed as Plates No's VI , VII and VIII respectively.

**iv. Assessment of infrastructure demand (Physical & Social)**

The proposed project is planned to develop in the existing coal belt of the company where well established infrastructure such as road, CHP, township, communication, power supply arrangements, etc. are available.

**v. Amenities/Facilities**

The following facilities will be provided to the persons connected to mining operation whether direct or indirect are:

Residential quarters, rest shelters for taking rest, canteen facilities at subsidized rates, washing/bathing facilities, provision of motor cycle/cycle sheds, provision of drinking water points, sanitation facilities ,first aid and medical facilities etc.

# 6. PROPOSED INFRASTRUCTURE

### i. Industrial area (Processing area)

It is proposed to construct new service buildings, pit stores etc., at suitable location.

### Residential area (Non processing area)

No additional township is required for the envisaged proposal.

### ii. Green belt (Plantation details)

In the Project area, plantation is proposed year wise, gradually to attain green belt of area of 683.63 Ha. Plantation is planned on external dumps, internal dumps, embankment and safety zone. in Post closure stage 41.00Ha of the land is planned to be reclaimed for agriculture pupose.

### iii.Social Infrastructure

Social Infrastructure available in the area will cater to the needs of the employees working in the mine. No additional social infrastructure is proposed in the project.

### iv.Connectivity (Traffic and transportation road/ Rail/Metro/ Water ways etc)

The block is situated beside State highway leading from Godavarikhani to Mancherial. Srirampur Township and Mancherial town are at a distance of 2.5 Km and 12 Km respectively. The nearest railhead is Mancherial Railway Station, which is at a distance of about 12 Km. This railway station is situated on Kazipet-Balharshah section of South Central Railway. The block is well connected with state capital Hyderabad (250 Km) and the district head quarters Mancherial (12 Km) by road.

### v. Drinking water management (Source and Supply of water)

The water collected at identified sumps and will be pumped to surface by means of suitable capacity of pumps. The water will be pumped to filter bed on surface and after suitable treatment; it will be used for drinking purpose.

### vi.Sewerage system

The sewerage water will be treated in septic tank followed by soak pit.

### vii. Industrial waste management

Mine water pumped out of the mine is the major effluent source which will be let out into natural streams after removal of suspended solids. The other source of concern would be the domestic and service building effluents. The domestic effluent will be treated in septic tank followed by soak pits.

coal-containing impurities such as shale etc. which may be excavated in the coal extraction process, will be separated in belt transportation to CHP/bunkers . This shale will be handled separately and will be dumped in the OB dump yards.

There is no problem for collection, handling and transport of solid wastes and there will not be any subsequent pollution of air, water and soil due to disposal or reuse of solid wastes.

**viii. Power requirement & supply/source**

The source of power for the project will be from 132KV sub-station, Mandamarri of SCCL. It is proposed to draw power from the Ramagundam-Mandamarri, 33 KV feeder which is passing just by side of the quarry. The power requirement for this project will be about 1. 22 MW (as OB removal is by hiring HEMM, which are mainly with diesel operated equipment).

# 7. REHABILITATION AND RESETTLEMENT (R&R) PLAN:

No R&R is envisaged due to the proposal of adoption of 'controlled blasting techniques' to avoid any problem to the habitat lying beyond 300 mts and within 500 mt of the proposed excavation limit line of the quarry.

# 8. PROJECT SCHEDULE AND COST ESTIMATES:

**i. Likely date of start of construction and likely date of completion**

**(Time schedule for the project to be given)**

The OC project is planned to commence from 2019-20 and UG mine is in operation. OC is likely to be completed by 2042-43 with life of the project 24 years Life (excluding 2 years of construction period) and the UG mine operations will be completed by 2028-29 with its balance life of 12 years.

**ii. Estimated project cost along with analysis in terms of economic viability of the project**

Head wise capital required for sanction is given here.

Rs Cr.

| Sl. No. | Capital head | Capital required |
|---|---|---|
| 1 | Land | 196.53 |

| | | |
|---|---|---|
| 2 | Rehabilitation & Resettlement | |
| 3 | Cost of Building | 8.27 |
| 4 | Prospecting & Drilling | 1.19 |
| 5 | Plant & Machinery | 55.50 |
| 6 | Furniture & Fixtures | 1.27 |
| 7 | Vehicles | |
| 8 | EMP Related Cost | 6.99 |
| 9 | Development | 88.68 |
| | Total Capital Outlay | 358.43 |
| 10 | Revenue Expenditure Capitalized | -10.16 |
| 11 | Interest During Construction | 1.01 |
| | **Net Capital Requirement** | **349.28** |

**Cost of Production:**

Details of Cost of Production estimated at 100% and 85% performance levels is given below.

| Sl. No. | Particulars | **Estimated cost (Rs/T)** | |
|---|---|---|---|
| | Performance Level | At 100% | At 85% |
| 1 | Wages | 265.83 | 303.36 |
| 2 | Stores | 161.11 | 168.09 |
| 3 | Power | 25.88 | 27.25 |
| 4 | a) OB Removal Offloading Cost | 1391.64 | 1391.64 |
| 5 | b) Cenvat Credit | -70.92 | -70.92 |
| 6 | Post- Project EMP | 1.25 | 1.47 |
| 7 | Reclamation | | |
| 8 | Mine Closure Cost | 35.45 | 41.71 |
| 9 | CSR Cost | 5.00 | 5.88 |
| 10 | General Administration | 19.20 | 22.59 |
| 11 | Interest on Working Capital | 53.89 | 55.55 |
| 12 | Interest on Loan | 1.68 | 1.97 |
| 13 | Depreciation | 187.52 | 220.61 |
| | Total Cost of Production | **2077.53** | **2169.21** |

**IK 1A Incline**

Cost of production at present rated capacity is given below.

**Rs /T**

| | **Performance Level** | **At 100%** |
|---|---|---|
| | **Cost of Production** | **Rs/Tonne** |
| 1 | Salaries & Wages | 3324 |
| 2 | Pay Revision Provision | 286 |
| 3 | Explosives | 18 |
| 4 | Stores | 203 |
| 5 | Power | 189 |
| 6 | Other Expenses | 86 |
| 7 | Sand Transport | 55 |
| 8 | Interest | |
| 9 | Depreciation | 112 |
| | Total Cost of Production | 4273 |
| | Sales realisation | 1970 |
| | Profit/loss | -2303 |

Mine is being operated in losses.

**Net Capital requirement: Rs. 46.11Cr.**
**Total Net capital requirement is Rs.395.39 (Rs. 349.28 Cr + Rs. 46.11 Cr.)**

**Viability of the Project:**

The project requires an additional price of **Rs. 597.29 per tonne** in order to achieve 12.00% IRR at 85% performance level.

| **Sl. No.** | **Particulars** | | |
|---|---|---|---|
| 1 | Performance level | 100% | 85% |
| 2 | Production (Mt) | 1.20 | 1.02 |
| 3 | Cost of production (Rs/T) | 2077.53 | 2169.21 |
| 4 | Average Sales Price (Rs/T) | 1957.64 | 1957.64 |
| 5 | **Additional Price** | 597.29 | **597.29** |
| 6 | Total Sales | 2554.93 | 2554.93 |
| 7 | Profit /Loss (Rs/T) | 477.40 | 385.72 |
| 8 | **Financial IRR** | 16.25% | **12.00%** |
| 9 | Economic IRR | 17.11% | 12.87% |

# 9. ANALYSIS OF PROPOSAL (FINAL RECOMMENDATION):

Financial and social benefits to the local people including tribal population of the area are as given below:

**IMPROVEMENT IN PHYSICAL INFRASTRUCTURE**

This project is located in Mancherial district of Telangana State, where communications and other facilities are well established. The following physical infrastructure facilities will be further improved due to the proposed project.

- Road Transport facilities
- Communications
- Housing facilities
- Water supply and sanitation
- Power
- Medical, Educational and social benefits will be made available to the nearby civilian population in addition to the workmen employed in the project.

**IMPROVEMENT IN SOCIAL INFRASTRUCTURE**

Coal mining and agriculture are the basic sectors of employment for the local people in this area. This project will provide indirect employment opportunity to local community. Employment is expected in civil constructions, in trade, garbage lifting, sanitation and other ancillary services. Employment in these sectors is primarily temporary or contractual and involvement of unskilled labour is more. A major part of this labour force is mainly from local villagers who are expected to engage themselves both in agriculture and project activities. This will enhance their income and lead to overall economic growth of the area.

The following changes in socio-economic status are expected to take place with this project.

i) The project will have a strong positive employment and income effect, both direct and indirect. Migrant - non-migrant ratio will shift towards migrant side because a number of people will migrate towards the central region of study circle in the years to come. This will happen because of better indirect employment opportunities due to this project.

ii) The project is going to have positive impact on consumption behavior by way of raising average consumption and income through multiplier effect.

iii) The project is going to bring about changes in the pattern of demand from food to non-food items and sufficient income will be generated.

iv) People perceive that the project will help in the development of social infrastructures / such as:
- Education facilities
- Banking facilities
- Post offices and Communication facilities
- Medical facilities
- Recreation facilities
- Business establishments & Community facilities
- Plantation and parks

**OTHER TANGIBLE BENEFITS**

The proposed project is likely to have other tangible benefits as given below.

i) 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.

ii) Additional housing demand for rental accommodation will increase.

iii) Market and business establishment facilities will also increase.

iv) Cultural, recreation and aesthetic facilities will also improve.

v) Improvement in communication, transport, education, community development and medical facilities.

vi) Overall change in employment and income opportunity.

vii) The State Government will also benefit directly from the proposed project, through increased revenue from royalties, excise duty and etc.

**Justification**

- In order to meet the ever increasing coal demand, it is essential to propose this project, which contributes 1.74 MT (Peak) for coal per annum.
- The proposal is justified keeping the conservation of coal in view, as the reserves proposed in this project includes the reserves which are not amenable to UG method for economic and safety reasons.
- Opencast method is a safe method of mining compared to underground method.
- The development of coalfield will provide better social and economic life to the area. It will also give a boost to the industrial activity in the area and help in creating national wealth and employment opportunities.
- Opencast method yields better recovery of coal at 90% of geological reserves with short gestation period.

****