PRE-FEASIBILITY REPORT OF SRIRAMPUR OPENCAST- II EXPANSION PROJECT

1. EXECUTIVE SUMMARY:

1.	Name of the Project	: Srirampur Opencast-II Expansion Project
2.	Type of the project	: Expansion Project
3.	Location	
	Village	: Srirampur
	Mandal	: Mancherial
	District	: Mancherial
	State	: Telangana
	Coal Belt	: Somagudem–Indaram Coal Belt
	Coal Field	: Godavari Valley Coal Field
4.	Name of the organization	: The Singareni Collieries Company Limited
5.	Reserves	:
	5.1. Geological Reserves	: 136.59 Mt
	5.2. Mineable Reserves	: 109.27 Mt
	5.3. Extractable Reserves	: 86.41 Mt
	5.4. Percentage of Extraction	: 63.26%
	5.5. Reserves Extracted up to 31-03-2016	: 12.26 Mt
	5.6. Balance Extractable reserves	: 74.15
	5.7. Total Overburden	: 815.68 M.Cum
	5.8. OB removed up to 31-03-2016	: 75.97 M.Cum (HOB: 73.93 M.Cum, Topsoil: 2.04 M.Cum)
	5.9. Balance OB to be removed	: 739.71 M.cum
	5.10. Average Stripping Ratio for balance Reserves	: 9.98 tones/Cum
6.	Area of excavation(Ha)	: Total: 647.42 (Expansion only: 448.35 Ha.)
7.	Number of workable coal seams	: 6
8.	Gradient of Coal seams	: 1 in 5.8
9.	Average GCV (K.Cal/Kg) & Grade	: 4740 K.Cal/Kg, G-9
10.	Borehole density (No/Sq.km)	: 28 No/Sq.km
11.	Total Land requirement	: 1604.11 Ha.
	Land already acquired	: 848.49 Ha

	Land to be acquired	: 755.62 Ha
11.1.	Forest land	: 276.38 Ha
	Forest land already diverted	: 113.93 Ha
	Forest land to be diverted	: 162.45 Ha
11.2.	Non-Forest land	: 1327.73 Ha
	Non-Forest Land already acquired	: 734.56 Ha
	Non-Forest Land to be acquired	: 593.17 Ha
12.	Technology	: Shovel Dumper combination
13.	Minimum depth of the quarry (m)	: 120
14.	Maximum depth of the quarry (m)	: 350
15.	Rated capacity	: 3.5 MTPA
16.	Life of the project	: 22 Years from 2016-17
17.	R&R involved	: 1209 PDFs & 653 PAFs Four villages namely Thallapalli, Singapur, Guttedarpalli and Dubbapalli
18.	Net capital required for the project	: Rs.272.73 Crores
19.	Capital for EMP	: Rs.4.80 Crores

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

SRP OC-II Expansion Project is carved out of Srirampur OCP Geological Block. The Project is located in the southern part of the Somagudem–Indaram coal-belt in the Godavari Valley Coal Field and forms part of Bellampalli Region of SCCL. The project is covered in Survey of India Toposheet No.56 N/5, 56 N/6, 56 N/9 and 56 N/10 and is bounded between the North latitude $18^0$48'02" and $18^0$51'18" and East longitude $79^0$28'46" and $79^0$31'44". The block is falling in the Mancherial Mandal of Mancherial district of Telangana State.

Based on Technical Feasibility Report prepared by CMPDIL, SRP 2&2A Underground Mine was converted into opencast in 2 phases. In 1st phase, part of SRP 2&2A property (without forest land, villages and tank) up to 150 m depth of III seam was converted in to opencast mine under the name of SRP OCP - I. The mining plan for this project was approved vide Memo No 13016/6/2006-CA-II, dated 3/7/2006. EC was obtained vide Letter No J-11015/208/2005-1A.II(M), dated 11/9/2006. The Project was planned to extract 7.52 Mt of reserves from five workable seams (I, II, IIIB, IIIA and III seams) in 17 years with a rated capacity of 0.6

MTPA by removing about 49.31 M.Cum. of OB at an average stripping ratio of 6.56 Cu.m/T. It was proposed to extract the coal with departmental HEMM and OB by outsourcing agency. The total land requirement for the project is 306.79 Ha. ***The extraction of coal was completed in this project.***

In 2nd phase, SRP OCP-I was expanded for the balance area including forest land, villages and village tanks under the name of SRP OCP-II to extract further dip side property of SRP 2&2A U/G mine up to 230m depth of III seam. The Project was planned to extract 56.24 Mt of reserves from five workable seams (I, II, IIIB, IIIA and III seams) in 23 years with a rated capacity of 2.50 MTPA by removing about 475.82 M.Cum of OB at an average stripping ratio of 8.46 Cu.m/T. It was proposed to extract the coal with departmental HEMM and OB by outsourcing agency. The total land requirement for the project is 707.63 Ha. The mining plan for this project was approved vide Memo No 13016/3/2007-CA-II, dated 29/6/2007 for an area of 921.56 Ha. However EC was granted for an area of 707.63 Ha, vide Letter No J-11015/212/2007-1A.II (M), dated 11/7/2008 and the project is being continued as per the EC conditions. It was envisaged in the EMP of SRP OC-II Project to use the external dump yard of SRP OC-I Project covering an area of 85.36 Ha (in addition to the 707.63 Ha of land mentioned in the EC of SRP OC-II project) for dumping of OB from SRP OC-II project by rising this dump to 120m from 75m height.

In the present proposal, it is proposed to annex dip side property to the existing SRP OCP-II and increase the rated capacity from 2.5 MTPA to 3.50 MTPA under the name of ***Srirampur Opencast-II Expansion Project***. In this proposal, the balance extractable reserves of SRP OC-II project and the extractable reserves of the annexed property are considered. The extractable reserves as on 1/4/2016 are estimated at 74.15 MT and the OB to be extracted is 739.71 MBCM with balance stripping ratio of 9.98 Cu.M/T. Since this proposal envisages to utilize the entire land of SRP OC-I and SRP OC-II including the annexed dip side area, it is proposed to obtain a comprehensive EC for the entire land of 1604.11 Ha for a balance life of 22 years from 2016-17.

Hence, in this proposal the details of 1604.11 Ha of land are furnished along with the balance reserves extractable as on 1/4/2016.

The Srirampur Opencast-II Expansion Project falls under four Mining leases namely,

1) 1st renewal of Indaram Mining Lease (2100 Ha), sanctioned Vide GO.NO. 15 I&C dated 23/01/2006, which is valid up to 23/07/2020 (20 years).
2) Srirampur Mining Lease (938.85 Ha), sanctioned Vide GO.NO. 42 I&C dated 11/02/2008, which is valid up to 27/06/2038 (30 years).
3) Srirampur Extension Mining Lease (714.90 Ha), sanctioned Vide GO.NO. 279 I&C dated 24/10/2007, which is valid up to 11/03/2033 (25 years).
4) 3rd renewal of North Godavari Mining Lease (4494 Ha), sanctioned Vide GO.Ms No.01 dated 12/01/2015, which is valid for 20 years, up to 21/05/2030.

The Mining plan (III Revision) and Mine closure plan of Srirampur OC II Project (SRP OC II EXPANSION PROJECT) covering the total area of 1604.11 Ha for a rated capacity of 3.50 MTPA was submitted vide Ref No: CRP/PP/D/394/430, dated: 30.06.2017, and approval was received vide letter no 13016/1/2017 – PCA dated 21.08.2017.

Project proponent

The Singareni Collieries Company Limited is a coal mining company owned jointly by the State and Central Governments.

Address:

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

ii. Brief description of the nature of the project

- This Project is for exploitation of coal reserves in SRP OC-II Expansion Block which is carved out of Srirampur OCP Geological Block by opencast method up to a maximum depth of 350 m of No III seam.

- It is proposed to extract the Coal and Overburden with Shovel-Dumper combination. The Overburden is proposed to be removed by outsourcing throughout the life of the Project whereas coal extraction is by departmental HEMM.

- This project is planned to achieve its rated capacity of 3.5 MTPA in 2nd year as this is an ongoing project.

- Coal extraction will be done by 1 No. of 3.5 Cum Diesel and I No 5 Cu.M Hydraulic shovels along with 9 No. of 60T Dumpers.

- Out of 276.38 Ha of forest land required for the Project, 113.93 Ha was already diverted (100.82 Ha: Vide F.No: 8-27/2007-FC, dated: 16.06.2009 & 13.11 Ha is part of 278 Ha diverted vide No: 8-56/91- FC /1777/F, dated: 29.05.2001) and forest land to an extent of 162.45 Ha is under the process of diversion.
- The company employs manpower to an extent of 437 and the project requires deployment of additional manpower to an extent of 750 by way of outsourcing for removal of overburden.

Present proposal:

The proposed Srirampur Opencast-II Expansion Project is designed for a rated capacity of 3.50 MTPA. The extractable coal reserves are 74.15 Mt and overburden to be removed is about 739.71 M.Cum with an average stripping ratio of 9.98 Cum/T. The life of the project is 22 years (including construction period) from 2016-17.

iii. Need for the project and its importance to the country and region

The Singareni Collieries Company Limited is a state owned Public Sector Company operating 29 Nos. of Underground mines and 17 Nos. of Opencast mines. It has been exploiting coal since 1889. Out of 470 Km long Pranhita Godavari valley Coal field, the 350 Km sector is lying mostly in the South Indian State of Telangana. Over the years, the Company had expanded its exploitation activities in Komaram Bheem Asifabad, Mancheriyal, Peddapalli, Dr Jayashankar Bhupalpalli, Bhadradri Kothagudem and Khammam districts of Telangana.

SCCL is taking the following steps for increasing the coal production.

1) Reconstruction of existing mines for optimum production by intermediate and high technology.
2) Improving the productivity in the existing mines by improving the utilization of the equipment.
3) Opening of new mines in the adjoining areas for higher production.
4) Adopting opencast method of mining wherever possible for high rate of production.
5) Conversion of shallow underground workings to opencast method for extraction of balance coal reserves.
6) Extension of the existing opencast workings to further dip side up to optimum level.
7) Enhancing the production of existing opencast projects where ever possible.

In this context, it is proposed for reconstruction of existing mine for optimum production by annexing additional property and to mine up to a depth of 350 m.

iv. Demand-Supply gap

The total availability of coal from the existing projects, projects under implementation and approved projects is inadequate to meet the total demand and a substantial gap remains unfulfilled. The following statement reveals the gap and justifies planning of additional new projects and reconstructing the existing Projects. The terminating year production projections of 2018-19 can only be met by starting new mines and by reorganizing & reconstructing some of the existing mines to step up production with advanced technology.

Million Tonnes

Sl. No	Year	2016-17	2017-18	2018-19
1	Demand	71.59	77.55	93.05
2	Production	66.06	68.40	72.00
3	Gap	-5.53	-9.15	-21.05

Considering the likely addition of expansion of existing power projects and construction of new power units, the production and demand gap would further increase. In view of this, the company has created 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 under expansion.

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 and to increase the production capacities, now, it is proposed to expand SRP OC-II Project under the name of Srirampur Opencast-II Expansion Project.

vi. Export possibility

There is no possibility of export of coal from this 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 is fed to the major domestic customers namely Power sector, Cement industries, fertilizers, brick industries etc

viii. Employment generation(Direct and Indirect) due to the project:

Due to opening of this project, direct employment will be generated in the company for working various operations in the mine. The total manpower will be deployed by the company in this mine is 437. Further, the project requires deployment of additional manpower to an extent of 750 by way of outsourcing for removal of overburden.

Apart from the direct employment, Indirect employment may also be generated to lot many 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 and housekeeping etc.

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

The project is located in the southern part of the Somagudem–Indaram coal-belt in the Godavari Valley Coal Field and forms part of Bellampalli Region of SCCL. The project is covered in Survey of India Toposheet No.56 N/5, 56 N/6, 56 N/9 and 56 N/10 and is bounded between the North latitude $18^0$48'02" and $18^0$51'18" and East longitude $79^0$28'46" and $79^0$31'44". The block is falling in the Mancherial Mandal of Mancherial District in Telangana State.

The plan showing general location, specific location, project boundary & project layout is enclosed as Plate No: I.

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

As the mining is site specific in nature, such details of alternative sites are not considered.

iv. Size or magnitude of operation

The mine is proposed to operate at normal capacity of 3.50 MTPA. The physical parameters of **SRP OC-II Expansion Project** are furnished below:

1	Minimum strike length along surface	2019 M
2	Maximum strike length along surface	2359 M
3	Minimum length along the dip side	2317 M
4	Maximum length along the dip side	2920 M
5	Minimum depth of the quarry	120 M
6	Maximum depth of the quarry	350 M
7	Quarry floor area (Expansion project only)	361.03 Ha.
8	Area of excavation on surface (Expansion project only)	448.35 Ha.
9	Total land required for the Project	1604.11 Ha
10	Gradient of the seam	1 in 5.8

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 a coal mine. The coal produced is brought to surface and dispatched to identified pit head customers, namely, power houses, cement industries, fertilizer industries, and other units.

The components of the project are:

Under the prevailing geo-mining conditions, with multiple seams, it is proposed to mine the property using shovel-dumper combination which is considered most suitable. The method of work with shovel-dumper mining comprises

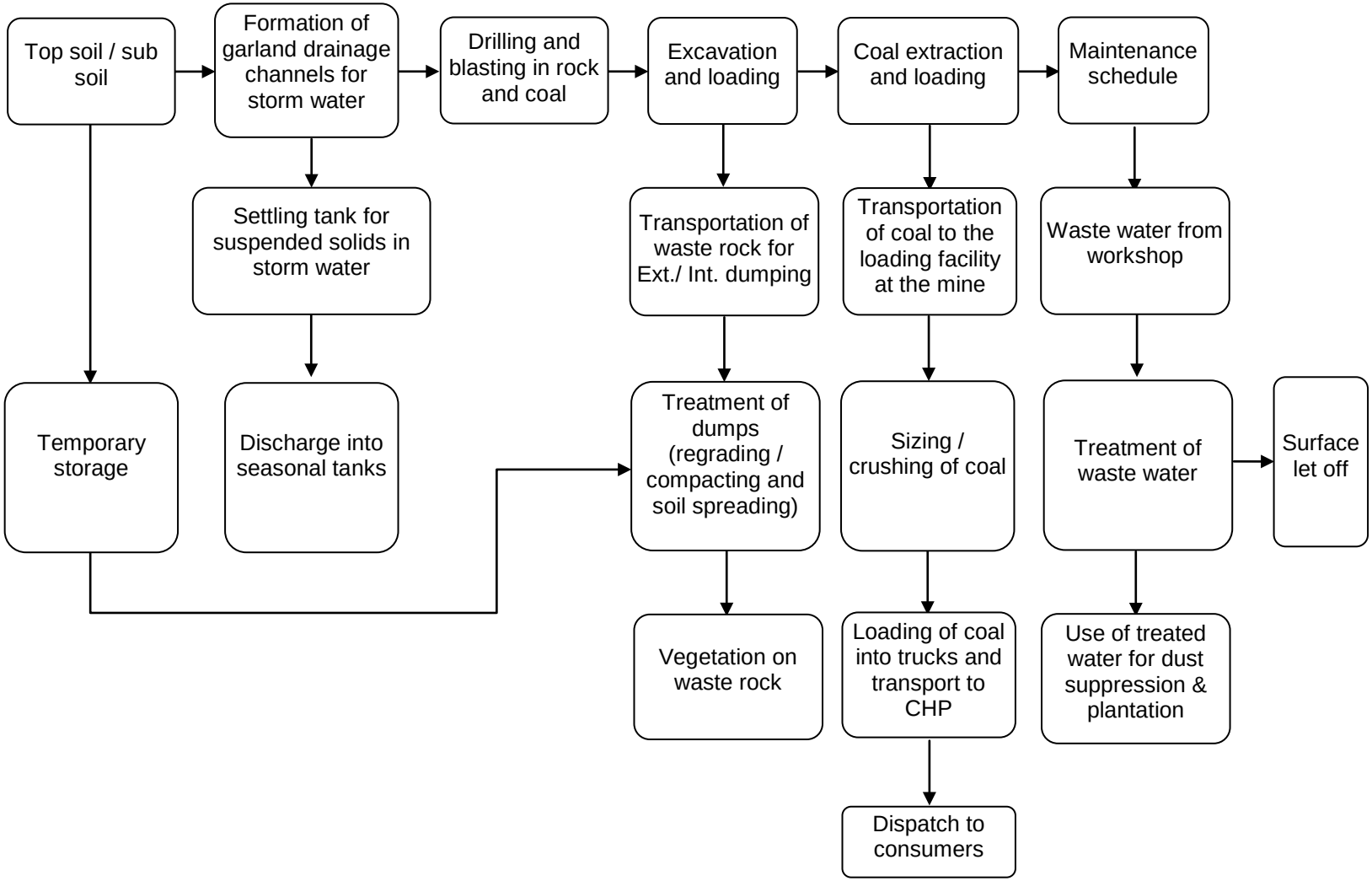
- Removal of topsoil
- Removal of OB to expose the coal seam
- Excavation of coal

The activities involved in the process are:

- Drilling & Blasting
- Haul roads formation
- OB removal
- Transportation of coal from face to surface by means of trucks/belt conveyors
- Transportation of coal from pit head to CHP and then to consumers
- Pumping operations etc.

All the mining operations are done under the supervision of mining / mechanical staff as per the Mines Act.

MINE DEVELOPMENT AND COAL EXTRACTION PROCESS CHART
SRP OC-II EXPANSION PROJECT



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 along with estimated quantity:

Material	Quantity/annum	Source
Explosives (T)	12000	Purchase from explosive companies
Diesel Oil (KL)	30000	Purchase from oil companies

Mode of Transportation of Raw Material:

- 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 lorries.

Marketing area of final product:

- The coal will be supplied to the major customers like Powerhouses, Cement, Textiles, Paper, Railways, and other industries.

Mode of Transportation of Finished Product (Coal):

- The coal will be transported to SRP OC-II expansion pit head coal handling plant and from there by rail to consumers.

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 losses during the process of excavation and supply of coal to the customers.

As the coal mining process does not involve any chemical process, the excess pumping water will be useful for supply for domestic purpose, drinking and irrigation to nearby fields. The effluents from workshop will be treated in ETPs and waste water will be utilized for watering plantations, parks, lawns, gardens and for spraying arrangement for dust control, etc.

viii. Availability of water, its source, Energy / Power requirement and source should be given

- The water that comes out of strata in the mine during mining activity will be collected at identified sumps and will be pumped to surface by means of suitable capacity pumps. The water treated in slow sand filters followed by disinfectants will be utilized for drinking washing, bathing etc. The water required for industrial purpose such as washing, spraying, etc. will be met from the pumped out water.

The source of power for the project is from 132KV Mandamarri sub-station which is about 15 Km. away. Mandamarri sub-station is having sufficient spare capacity and no additional capital is required for strengthening the sub-station. 33 KV overhead transmission line originating from this sub-station feed power to the SRP OC-II Expansion Project. There is an increase in power requirement for this project from 3.05 MW to 4.38 MW due to new CHP, in-pit crushers and increase in production (OB removal is by hiring HEMM and Coal by departmental HEMM, which are mainly diesel operated equipment).

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

The project involves the excavation of coal from the earth crust. During the process of excavation, the superincumbent strata required to be removed and dumped in the earmarked sites as a solid waste.

Solid Waste

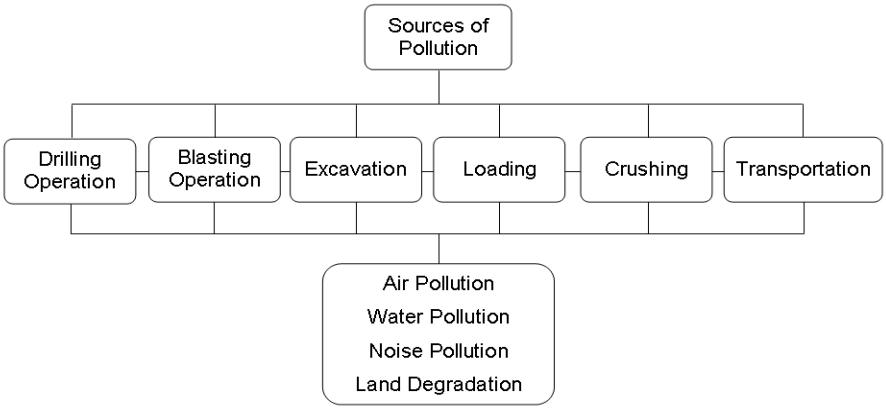
The quarrying of SRP OC-II Expansion Project produces 74.15 Mt of Coal and 739.71 M.Cum of OB. The area of excavation will be 448.35 Ha. The life of the project is estimated as 22 years (including construction period) from 2016-17 at a rated capacity of 3.50 MTPA.

Liquid waste

The liquid waste generated in the mine like used engine oil, used gear oil, used brake oils and other lubricants are stored in separate tins/drums/cans and will be 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 involved in the existing project which are 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 project is connected to Chennur/Mancherial Highway by 1.5 Km road. Srirampur town-ship and Mancherial town are at a distance of 1.5 Km and 7.5 Km due west respectively. The nearest railhead is Mancherial Railway Station, which is at a distance of about 7.5 Km on Kazipet-Balharshah section of South Central Railway.

ii. Land form, Land use and Land ownership

The land form for the existing project ownership wise is given below:

Sl.No.	Land owner ship	Land required (Ha)	Land under possession/diverted (Ha)	Land to be Acquired/diverted (Ha)
1	Forest land	276.38	113.93	162.45
2	Non forest land			
a	Govt./assigned land	490.17	244.58	245.59
b	Private land	837.56	489.98	347.58
Total		1604.11	848.49	755.62

The detailed land use activity wise is furnished here under:

Area in Ha

Sl. No.	Description	Total land requirement (SRP OC-II Expansion Project - 2016)		
		Forest	Non Forest	Total
1	Quarry Area	249.39	398.03	647.42
2	Safe barrier & Drain along the Ext dump	26.99	67.69	94.68
3	External Dump yard	0.00	518.72	518.72
4	Safe barrier & Drain along the Quarry	0.00	183.00	183.00
5	Top Soil & BC Soil storage dump yard	0.00	25.63	25.63
6	Protection Bund along the Godavari River	0.00	15.99	15.99
7	Railway line*	0.00	53.44	53.44
8	Service Buildings and CHP	0.00	13.23	13.23
9	Plantation	0.00	52.00	52.00
	Total Land	276.38	1327.73	1604.11

*Note: The railway line leading to STPP is falling in the project area of SRP OCP-II Expansion Project.
Note: *The Land requirement Plan of the area is shown in Plate No: VB.*

Comparison of land use as per present proposal vis a vis earlier proposal:

Nature of land and Extent (Ha)		**Land Use (Ha)**	
Existing	**Present Proposal**	**Existing**	**Present Proposal**
Forest land: 113.93 Ha	Forest land: 276.38Ha	Quarry area : 101.75 Ha, Safe barrier and drainage along dump : 12.18 Ha	Quarry area : 249.39 Ha, Safe barrier and drainage along quarry : 26.99 Ha
Non- Forest land: 593.70 Ha	Non- Forest land: 1327.73 Ha	Quarry area: 270.32, OB Dump: 246.42 Ha, safe distance and drainage along quarry and dump: 76.96 Ha	Quarry area: 398.03 Ha, Safe barrier & Drain along the Quarry: 67.69 Ha, OB & Top soil External Dump: 518.72 Ha, Safe barrier & Drain along the Ext dump: 183.00 Ha, Top Soil & BC Soil storage dump yard: 25.63 Ha, Protection Bund along the Godavari River: 15.99 Ha, Railway line: 53.44 Ha, Service Buildings and CHP: 13.23 Ha, Plantation: 52.00 Ha
Total: 707.63 Ha	**Total: 1604.11 Ha**	**Total: 707.63 Ha**	**Total: 1604.11 Ha**

iii. Topography (along with map)

Physiography & Drainage

The Block area is of gently sloping plains with local undulations towards south. The undulatory sandy clays are imperfectly drained, while the hilly region is of beveled cuesta type with intervening depressions. The topographic elevation varies from 142.76 m to 164.03 m above Mean Sea Level. The general slope of the area is 5.7 m/Km towards Godavari River in the south central part. The Godavari River flows in the northwest- southeast direction on the south side of the mining lease area.

The area is mainly drained by perennial river Godavari, which is flowing NW to SE direction in the southern part of the area. The major streams Ralla Vagu, Tolla Vagu and Tekumatla Vagu, which are ephemeral tributaries of Godavari River in the region, are draining the area. Three no. of small tanks existing over the project area and these tanks will be breached as the mining operations progress. In the earlier proposal, a tank near Thallapalli village also fell in the project area, but in the present proposal this tank is protected.

RAINFALL

A critical review of the rainfall data reveals that the southwest monsoon season for this area is active from July to September and peak rain is expected during the month of August. Rainfall during the span of 28 years (1986 to 2013) is measured at Mancherial rain gauge station. The yearly rain fall varies widely from 716 mm (1987) to 1724 mm (1990) with an average number of 61 rainy days per year.

Note: The Topographical Plan showing the entire surface features with 10 Km radius of the project boundary is enclosed a*s* ***Plate No: III***

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.

Core zone:

There are three revenue villages namely Tallapalli, Singapur, Guttedarpalli and one hamlet namely Dubbapalli are located within the core zone. There are few ephemeral streams flowing through the block area. Two irrigational tanks are located within the core zone. About 276.38 Ha of forest area is involved in the core zone. Most of the remaining area is agricultural land.

Pre mining land use status in the total project area of 1604.11 Ha is as follows:

Forest Land : 276.38 Ha (17.23 %)
Agricultural Land : 1161.05 Ha (72.38 %)
Grazing Land : 60.23 Ha (3.75 %)
Barren Land : 41.91 Ha (2.61 %)
Built up area : 39.15 Ha (2.44 %)
Water bodies : 20.15 Ha (1.26 %)
Roads : 5.24 ha (0.33 %)

The same is reproduced in the following table:

Land owner ship	Land use	Extent (Ha)
Forest	Forest	276.38
Private land	Agriculture	
	Single Crop	547.50
	Double Crop	234.69
	Grazing	12.19
	Barren	4.03
	Built up area	39.15
Sub Total		837.56
Government land	Agriculture	
	Single Crop	265.20
	Double Crop	113.66
	Grazing	48.04
	Barren	37.88
	Water bodies	20.15
	Roads	5.24
Sub Total		490.17
Total		1604.11

Buffer Zone:

There are 22 revenue villages and two reserve forests namely Indaram Reserve Forest and Kundaram Reserve Forest existing in the buffer zone. Both the reserved forests are located in the north and northeastern side of the mining lease area. Most of the area is under cultivation. Besides this, several blocks are under the various stages of settlement. Besides this, several blocks are under the various stages of settlement.

The area is mainly drained by Godavari River. There are number of nallahs around the periphery of Mining Lease area which flow towards the Godavari River. Rallavagu, Tallavagu and Tekumatlavagu are major tributaries to Godavari River. Most of the other nallahs are seasonal and flows in to Godavari River only during rainy season. There is one small residual hill, which is oriented in the direction of north-south. The plain and undulated areas have thick shrubs. The Godavari River flows in the northwest- southeast direction on the south side of the ML area.

48531.62 Ha of buffer zone of the Project consists of cultivatable land (45.07%), forest land (15.41%), water bodies (9.04%), settlement area (9.83%), waste land (15.70%), industrial area (0.92%), and mining area is 4.03%.

v. Existing Infrastructure

The infrastructure is well established in this project and the same will be utilized for the expansion project under the present proposal. The mine can produce the enhanced capacity of coal with less additional requirement of infrastructure. There is a proposal of new CHP with wagon loading arrangement near the quarry.

The existing office buildings, workshops and CHP will cater the needs of the project. Except some additional development activities such as new pit head CHP, roads & culverts and strengthening of SRP CHP, there is no need for major infrastructure facilities.

The existing infrastructure is given below:

- Office buildings
- Service buildings
- Pumps of different HP & Head
- HEMM of different capacities
- Electrical equipment
- Source of power and existing substation
- Connecting road and communication systems
- Pit head CHP, which will cater the needs till establishment of new pit head CHP.

vi. Soil classification

The proportion of sand, silt and clay particles in a soil is an important property of soils since many of the physical (and chemical) characteristics of the soil are determined by soil texture. Soil texture also affects the water permeability or

percolation rate of a soil. Percolation is the downward movement of free water and is often referred to in the laboratory as the saturated hydraulic conductivity rate. The coarser the soil, the faster is the rate and finer the soil, the slower is the rate of infiltration. That is why sands, which have small amounts of silt and clay, have higher water permeability rates than loamy sands or sandy loams.

vii. Climatic data from secondary sources

Climate

The area enjoys a typical tropical climate. A distinct hot summer between March and May with temperatures recording around 45^0 C, a good rainy season spreading from June to September and mild pleasant winter between October and February characterizes the climate of the area.

Rainfall

A critical review of the rainfall data reveals that the southwest monsoon season for this area is active from July to September and peak rain is expected during the month of August. Rainfall during the span of 28 years (1986 to 2013) is measured at Mancherial rain gauge station. The yearly rain fall varies widely from 716 mm (1987) to 1724 mm (1990) with an average number of 61 rainy days per year.

viii. Social Infrastructure available

The mining activities in the proposed project area are being carried out since 1980s. The social infrastructure in terms of connectivity by road and rail, communication, health, sanitation, community centers, education, financial institutions, income source, etc. are well established. Infrastructure facilities were fully developed in the area. SCCL has constructed quarters for residential accommodation of the employees employed in the mine. Other facilities provided were:

- Well connected to District and State head quarters
- Power supply network and communication network
- Hospital for necessary medical aid with specialist doctors
- Acute Medical cases referred to Super specialty hospitals by the company
- 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

Details of coal seams

SEAM/ STRATA	DEPTH RANGE (M)		AVERAGE THICKNESS	MOISTURE%	ASH%	GCV	AVG
	MIN	MAX	(m)			(K.cal/Kg)	GRADE
IA	10	282	0.86	5.27	27.41	4659	G9
PARTING			27.00				
I	22	286	4.99	5.69	34.20	4284	G11
PARTING			15.83				
II	11	308	2.36	5.89	26.46	4971	G8
PARTING			38.04				
IIIB	30	347	1.38	5.65	29.02	4494	G10
PARTING			9.88				
IIIA	28	360	1.89	5.78	24.02	4855	G9
PARTING			17.42				
III	18	377	5.28	5.63	24.47	5160	G8
PARTING			11.34				
IVA	28	386	1.00	6.06	21.37	5351	G7
PARTING			17.91				
IV	47	394	0.75	6.13	19.04	5596	G6
PARTING			8.62				
V	36	405	0.50	6.19	21.00	5625	G6
PARTING			12.91				
VI	31	409	1.39	5.28	24.86	5612	G6

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.

Geological reserve estimation was done in SRP OC – II Expansion block by using MINEX software. The pit design was done using Carlson software and thus, extractable reserves were arrived. The SRP OC II Expansion Project is carved out of SRP OCP Geological Block consisting 179.56 MT geological reserves in an area of 7.64 Sq.Km. However, in the present proposal, 136.59 MT of reserves pertaining to

an area of 5.60 Sq.Km. are considered. Mineable reserves are arrived by deducting the reserves excavated by UG method and reserves lost due to low thick/impersistent seams from geological reserves. Extractable reserves are arrived by deducting the loss of reserves in batters from mineable reserves. The summary of the 136.69 MT reserves is tabulated below:

Reserves in million tonnes

Sl. No	Seam	**Geological Reserves in SRP OC-II Expansion Project Block in 5.60 Sq.Km)**	Reserves excavated by U/G method	Reserves lost due to low thick/impersistent seams	Mineable reserves by OC	Mining losses	**Extractable Reserves by OC**	Extracted by OC up to 31-03-2016	Balance Reserves
1	IA	**5.91**			5.91	1.71	**4.2**	0.62	3.58
2	I	**35.53**	2.19		33.34	6.88	**26.46**	2.87	23.59
3	II	**16.02**	1.6		14.42	2.99	**11.43**	1.14	10.29
4	IIIB	**9.68**	0.19		9.49	1.91	**7.58**	1.44	6.14
5	IIIA	**12.8**	1.29		11.51	2.36	**9.15**	1.05	8.1
6	III	**36.41**	1.81		34.6	7.01	**27.59**	5.14	22.45
7	IVA	**5.85**		5.85					
8	IV	**4.51**		4.51					
9	V	**2.9**		2.9					
10	VI	**6.98**		6.98					
TOTAL		**136.59**	7.08	20.24	109.27	22.86	**86.41**	12.26	74.15

The details of total Coal to be extracted and OB to be removed for the balance life of 22 years from 2016-17 along with stripping ratio are as indicated below:

Particulars	
Coal (Mt)	74.15
Overburden (M.Cum)	739.71
Stripping Ratio (Cum/T)	9.98

The Year wise coal and OB schedule along with stripping ratios is given below:

Sl. No	**Year**	**Coal (Mt)**	**OB (M.Cum)**	**SR (Cum/T)**
1	2016-17	2.50	22.59	9.04
2	2017-18	3.50	49.91	14.26
3	2018-19	3.50	31.64	9.04
4	2019-20	3.50	27.16	7.76
5	2020-21	3.50	25.01	7.15
6	2021-22	3.50	30.82	8.81
7	2022-23	3.50	30.80	8.80
8	2023-24	3.50	30.80	8.80
9	2024-25	3.50	30.80	8.80
10	2025-26	3.50	30.80	8.80
11	2026-27	3.50	37.63	10.75

12	2027-28	3.50	37.63	10.75
13	2028-29	3.50	37.63	10.75
14	2029-30	3.50	37.63	10.75
15	2030-31	3.50	37.63	10.75
16	2031-32	3.50	43.76	12.50
17	2032-33	3.50	43.74	12.50
18	2033-34	3.50	43.63	12.47
19	2034-35	3.50	43.63	12.47
20	2035-36	3.50	43.63	12.47
21	2036-37	3.00	11.42	3.81
22	2037-38	2.15	11.42	5.31
	TOTAL	74.15	739.71	9.98

Rated Capacity and life of the project:

Srirampur Opencast-II Expansion Project is planned to extract 74.15 Mt of reserves with a rated capacity of 3.50 MTPA which will be achieved in 2nd year. At 100% performance level, the life of the project will be 22 years from 2016-17.

Method of work:
It is proposed to extract the coal by open cast method in the proposed expansion project.

Mechanization:
Based on the available data, most of the strata will be required by undertaking drilling and blasting operations before excavation. In view of this, total overburden is planned to be removed by Shovel Dumper combination by hiring of HEMM.

Waste Management
During the process of coal extraction, overlying strata consisting of topsoil and sedimentary rock formation is removed separately as overburden. Solid waste mainly consists of overburden material excavated during mining operations at different stages and a negligible quantity of shale/rejects separated from the excavated coal.

About 739.71 M.Cum of overburden (737.03 M.Cum of hard OB and 2.68 M.Cum of topsoil) will be removed during the balance life of the project. The details are given in the table below.

The details of hard OB and Top soil quantities excavated and to be excavated is given below:

Project	Hard OB accommodation(M.cum)			Top soil	Total
	External	Internal	Total	(M.Cum)	(M.Cum)
Up to 31-03-2016	59.67	14.26	73.93	2.04	75.97
During the balance life (Present proposal)	233.36	503.67	737.03	2.68	739.71
Total	293.03	517.93	810.96	4.72	815.68

		Hard OB accommodation (Cumulative in M.Cum)		
Stage	Year	Internal Dump yard	External Dump yard	Total
1st year	2016-17	0.00	22.35	22.35
2nd year	2017-18	0.00	71.95	71.95
3rd year	2018-19	0.00	103.43	103.43
4th year	2019-20	17.04	113.43	130.47
5th year	2020-21	36.92	118.43	155.35
10th year	2025-26	75.30	233.36	308.66
15th year	2030-31	262.68	233.36	496.04
20th year	2035-36	480.83	233.36	714.19
22nd year	2037-38	503.67	233.36	737.03

Stage wise Top soil management (All figures Cumulative in M.Cum)

Year	Top soil removal	Top soil Spreading	
		Internal	External
1st year	0.24	0.00	0.00
2nd year	0.55	0.00	0.24
3rd year	0.71	0.00	0.40
4th year	0.83	0.00	0.52
5th year	0.96	0.03	0.62
10th year	1.67	0.31	1.05
15th year	2.44	0.93	1.20
20th year	2.68	1.14	1.23
22nd year	2.68	1.45	1.23

Design criteria:

The following design criteria have been considered for stability of waste dumps.

a) External Dump Yard

In order to avoid the soil erosion from the dump and also keeping in view the Godavari River, which is about 500m from the boundary of the external dump, the following design criteria have been considered:

i) Height of the dump in each deck is 30m
ii) Width of the berm is 30 m
iii) Dump slope for each deck is maintained at natural angle of repose of 37.5^0 from the horizontal and overall slope of the dump will be maintained at 28^0.
iv) Track dozers are deployed for shaping the dumps
v) Maximum height of external dump will be 90 m above the ground level.

b) Internal Dump Yard

The following design criteria has been considered for internal dumping.

i) Hard OB to be dumped in 30 m high decks.
ii) 30 m berm width for allowing safe transport in each deck.
iii) Dump slope of each deck is formed at natural angle of repose of 37.5^0
iv) Track dozers to be deployed for shaping the dumps.
v) Maximum height of internal dump is 90m above ground level.

vi) At the end of mining operations, slopping of internal dumps will be made towards the final void such that silt from dump will be settled in the void.

Dump Yards:

It is proposed to accommodate the hard overburden, top soil and black cotton soil in the following dump yards during the life of the mine.

External Dump Yard:

External dump yard for the project is located in the southern side of the quarry and it is continuation of old SRP OC-I Project external dump yard. Up to 31-03-2016 about 59.67 M.Cum of hard OB and about 0.18 M.Cum of top soil was already accommodated in this dump yard.

It is planned to accommodate 233.36 M.cum (31.66%) of hard OB in this dump yard during balance life of the project. It is also planned to spread about 3.09 M.Cum of top soil in this external dump yard during the balance life.

The maximum height of the external dump yard is planned for 90m above ground level.

As per the SRP OC-II Project EC (2.50 MTPA), the maximum permitted height of the external dump was 120m. In the present proposal i.e. SRP OC-II expansion Project, it is planned to accommodate the OB up to 90m height only.

Indaram OCP is adjacent to the external dump of SRP OC-II Expansion Project. To optimize the land requirement for Indaram OCP, the part of OB generated i.e. 49.91 M.Cum during the initial years is planned to dump over the finished external dump of SRP OC-II Expansion Project by raising its height to 120m from 90m.

Internal Dump Yard:

As on 31-03-2016 about 14.26 M.Cum of hard OB was accommodated in this internal dump yard. It is planned accommodate about 503.67 M.Cum (68.34%) of hard OB in the internal dump yard during the balance life of the Project. It is also planned to spread 1.45 M.Cum of top soil in the internal dump yard during the balance life of the Project. The maximum height of the internal dump yard is planned for 90m above ground level.

Top Soil Storage Yard:

As on 31-03-2016, about 1.86 M.Cum of top soil was stored in the temporary storage yard located on the south side of the quarry. It is planned to store about 0.31 M.Cum of top soil in another temporary storage yard located on the north side of the quarry. Later total top soil from the above two temporary storage yards will be spread over the finished decks of external as well as internal dump yards. The maximum height of the dump yard is 10 m.

Final Void

Total requirement of land for Srirampur Opencast-II Expansion Project is 1604.11 Ha which includes 276.38Ha of forest land. As a result of phase-wise reclamation

programme of the project, an area of 1077.33 Ha of land will be reclaimed (236.57 Ha land reclaimed for agricultural use and 840.76 Ha of land is reclaimed with plantation) at mine closure stage. A total void of 360.74 Ha will be left over at the end of mining operations.

ii. Population projection

The average daily attendance required to achieve the rated production of 3.5 MTPA is estimated to be 380. After considering absenteeism towards authorized leave, sick etc., the men on roll for the project will be 474 excluding Area level. Contractor manpower for removal of overburden is about 750.

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 mine closure scenario will be as follows:

The post closure land use pattern of Mining Lease area is furnished below:

Sl. No.	Type	Total Area (Ha)	Agricultural (Ha)	Plantation (Ha)	Water Body (Ha)	Public/ company use
1	**Excavation/Quarry Area:**					
	(a) Backfilled Area	286.68		286.68		
	(b) Excavated Void	360.74			360.74	
		647.42		**286.68**	**360.74****	
2	Top Soil Dump including BC Soil storage dump yard	25.63	6.26	19.37		
3	External Dump	518.72		518.72		
4	**Safety Zone /Rationalisation area:**					
	(a) Safe barrier & Drain along the Quarry	94.68	5.92			64.66
	(i) Roads					9.53
	(ii) Garland drains				9.57	
	(iii) Settling ponds				5	
	(b) Safe barrier & Drain along the Ext dump :	183.00	159.16			
	(i) Roads					9.35
	(ii) Garland drains				10.49	
	(iii) Settling ponds				4	
		277.68	**165.08**		**29.06**	**83.54**
5	Road & Infrastructure area (Service Buildings and CHP)	13.23	13.23			
7	Embankment (Protection Bund along Godavari)	15.99		15.99		
8	Green Belt	52	52			
9	Others (Railway line)	53.44				53.44
Grand Total		**1604.11**	**236.57***	**840.76***	**389.80**	**136.98**

***NOTE:** The actual area of plantation is 1077.33 Ha out which 236.57 Ha of land will be reclaimed for agricultural use and balance area to an extent of 840.76 Ha will be left as plantation area.

iv. Assessment of infrastructure demand (Physical & Social)

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

v. Amenities/Facilities

The following facilities will be provided to the persons connected to mining operations 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. Service Buildings:

It is proposed to construct New service buildings, pit stores etc.

Residential area (Non processing area)

No additional township is required for the envisaged proposal.

Green Belt (Plantation details)

The progressive greenbelt development program in Srirampur Opencast-II Expansion Project is indicated below:

Year	Year wise Plantation area (Ha)	Progressive plantation area (Ha)
Up to 31-03-2016	135.36	135.36
year-1	126.32	261.68
year-2	99.77	361.45
year-3	57.97	419.42
year-4	91.31	510.73
year-5	5.24	515.97
year-10	250.44	766.41
year-15	114.43	880.84
year-20	55.53	936.37
Year-22	108.49	1044.86
Post Closure Stage	32.47	1077.33*

***NOTE:** 1077.33 Ha includes 236.57 Ha of land reclaimed for agricultural use and 840.76 Ha of reclaimed area after post closure.

ii. Social Infrastructure

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

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

The production capacity of Srirampur Opencast-II Expansion Project is 3.50 MTPA. A Pit Head CHP is proposed to be installed. It is planned to produce G-9 grade coal and to transport it to pit head CHP by series of belt conveyors through crushers. The coal is transported to GL bunkers located at pit head CHP and from there coal is transported by rail through pre-weigh bins to customers.

iv. 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 treatment, it will be used for drinking purpose.

v. Sewerage system

The sewerage water is being treated in septic tank followed by soak pit.

vi. Industrial waste management

The major effluent source is mine water pumped out from the mine, which is being 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.

In the coal extraction process, coal-containing impurities such as shale or some times, sandstone is being transported to the coal handling plant. There, the shale and sand stone is being picked out manually. This solid waste is in the form of lumps.

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.

vii. Solid waste management

The following design criteria have been considered for waste dumps

a) Top soil is stacked dip side of quarry

b) Separate spoil dumps for topsoil and hard OB

c) Height of top soil dump is about 10 meters.

d) Main hard OB will be dumped in 30 m high decks up to a height of 90 m.

e) Ramp width of 30 m. is for safe transport.

f) Dump slope for each deck to be at natural repose of $37½^0$ and overall slope at 26.5^0

g) Track dozers to be deployed for shaping the dumps & dozing of OB.

h) Final reclamation will be achieved by using the equipment provided for the purpose and top soil will be spread over dump slopes and non-active dump area for reclamation.

The waste management program is furnished hereunder:

		Hard OB accommodation (Cumulative in M.Cum)		
Stage	Year	Internal Dump yard	External Dump yard	Total
1st year	2016-17	0.00	22.35	22.35
2nd year	2017-18	0.00	71.95	71.95
3rd year	2018-19	0.00	103.43	103.43
4th year	2019-20	17.04	113.43	130.47
5th year	2020-21	36.92	118.43	155.35
10th year	2025-26	75.30	233.36	308.66
15th year	2030-31	262.68	233.36	496.04
20th year	2035-36	480.83	233.36	714.19
22nd year	2037-38	503.67	233.36	737.03

viii. Power requirement & supply/source

The source of power for the project is from 132 KV Mandamarri sub-station which is about 15 Km. away. Mandamarri sub-station is having sufficient spare capacity and no additional capital is required for strengthening the sub-station. 33 KV overhead transmission line originating from this sub-station feed power to the Srirampur Opencast-II Expansion Project. There is an increase in power requirement for this project from 3.05 MW to 4.38 MW due to new CHP, in-pit crushers and increase in production (OB removal is by hiring HEMM and Coal by departmental HEMM, which are mainly diesel operated equipment).

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

Four villages namely Tallapalli, Singapur, Guttedarpalli and Dubbapalli, which are falling within the Project Area, have to be evacuated. About 1209 PDF's and 653 PAF's belonging to these four villages have to be rehabilitated.

8. PROJECT SCHEDULE & COST ESTIMATES:

i. Likely date of start of construction and likely date of completion(Time schedule for the project to be given)

The life of the project is 22 years (including construction period) from 2016-17.

The Year wise coal and OB schedule along with stripping ratios is given below:

Sl. No	Year	Coal (Mt)	OB (M.Cum)	SR (Cum/T)
1	2016-17	2.50	22.59	9.04
2	2017-18	3.50	49.91	14.26
3	2018-19	3.50	31.64	9.04
4	2019-20	3.50	27.16	7.76
5	2020-21	3.50	25.01	7.15
6	2021-22	3.50	30.82	8.81
7	2022-23	3.50	30.80	8.80
8	2023-24	3.50	30.80	8.80
9	2024-25	3.50	30.80	8.80
10	2025-26	3.50	30.80	8.80
11	2026-27	3.50	37.63	10.75
12	2027-28	3.50	37.63	10.75
13	2028-29	3.50	37.63	10.75
14	2029-30	3.50	37.63	10.75
15	2030-31	3.50	37.63	10.75
16	2031-32	3.50	43.76	12.50
17	2032-33	3.50	43.74	12.50
18	2033-34	3.50	43.63	12.47
19	2034-35	3.50	43.63	12.47
20	2035-36	3.50	43.63	12.47
21	2036-37	3.00	11.42	3.81
22	2037-38	2.15	11.42	5.31
Total		74.15	739.71	9.98

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

Capital: The head-wise capital requirement of the project is given below:

(Capital in Rs.Crores)

Sl No.	CAPITAL HEAD	**Capital**
1	Land	**97.19**
2	R&R	**72.13**
3	Cost of Buildings	**8.06**
4	Plant & Machinery	**44.01**
5	Furniture & Fittings	
6	EMP Related Cost	**4.80**
7	Development	**90.45**
8	Coal Handling Plant	**67.68**
	Capital Outlay	**384.33**
9	IDC	
10	REC	**-111.59**
	CAPITAL	**272.73**

Cost of Production

The elements of cost of production such as wages, stores, power, interest on loan capital, depreciation, General Administrative Overheads etc., are estimated as below:

(Cost in Rs/Tonne)

Sl.No	Particulars	Performance level	
	Performance Level	At 100%	At 85%
1	Wages	118.90	135.68
2	Stores	119.58	124.59
3	Power	35.05	36.90
4	a) OB Removal Outsourcing	1231.99	1231.99
	b) Cenvat Credit	-63.88	-63.88
5	Post-Project Environmental Monitoring	0.59	0.69
6	Mine closure Cost	32.49	38.23
7	General Administration	19.20	22.59
8	CSR Cost	5.00	5.88
9	Interest on Working Capital	44.03	45.02
10	Interest on Loan Capital	0.42	0.49
11	Depreciation	79.98	94.09
	Total cost of Production	**1623.34**	**1672.27**

Profitability as per accounting analysis and Internal Rate of Return is given below:

Sl. No.	Parameter		
	Performance level	100%	85%
1	Production (Mt)	3.500	2.975
2	Cost of production (Rs)	1623.34	1672.27
3	Sales realization (Rs)	1952.00	1952.00
4	Profit/Loss (RS)	328.66	279.73
5	Financial IRR	35.96%	**28.77%**
6	Economic IRR	38.32%	30.98%

9. ANALYSIS OF PROPOSAL (FINAL RECOMMENDATION):

Financial and social benefits with special emphasis on the benefit to the local people including tribal population, if any, in the area:

Four villages namely Tallapalli, Singapur, Guttedarpalli and Dubbapalli, which are falling within the Project Area, have to be evacuated. About 1209 PDF's and 653 PAF's belonging to these four villages have to be rehabilitated.

Improvement in physical infrastructure:

This project is located in the Mancherial district of Telangana State. The project is also located in an area where communications and other facilities are well established. The following physical infrastructure facilities will further improve due to 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 is the basic sector of employment for the local people in this area. This project will provided to indirect employment opportunity to local community. Employment is expected during civil construction period, 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 is having a strong positive employment and income effect, both direct as well as 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 is 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 Srirampur Opencast-II Expansion 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 enhance the production. The project will contribute 3.50 Mt of coal per annum.
- Thin seams, which are not amenable for extraction by underground method, can now be extracted by opencast method.
- 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.
- Opencast method yields better recovery of coal at 90% of geological reserves with short gestation period.

*****