

Pre-Feasibility Report for Cluster of GDK 1&3, GDK 2&2A and GDK 5 Incline Projects

1. EXECUTIVE SUMMARY

1	Name of the projects	Cluster of Godavarikhani No.1&3 Incline (GDK 1&3), Godavarikhani No. 2&2A Incline (GDK 2&2A) & Godavarikhani No. 5 Incline (GDK 5) mines		
2	Name of the Organization	The Singareni Collieries Company Limited		
3	Type of project	Enhancement of production capacity		
4	Coal Belt	Ramagundam coal belt		
5	Coal Field	Godavari Valley Coal Field		
6	Location			
		GDK 1&3	GDK 2&2A	GDK 5
	Village	Jangaon	Sundilla, Jangaon	Janagaon, Musthyala, Jallaram, Sundilla
	Mandal	Ramagundam		
	District	Peddapalli		
	State	Telangana		
	Nearest Rly Station	Ramagundam		
	Nearest AirPort	RGIA Shamshabad, Hyderabad		
	Latitudes	18 ⁰ 45' 24" to 18 ⁰ 46' 53" N	18 ⁰ 44' 42" to 18 ⁰ 45' 42" N	18 ⁰ 43' 38" to 18 ⁰ 45' 19" N
	Longitudes	79 ⁰ 30' 25" to 79 ⁰ 32' 29" E	79 ⁰ 31' 15" to 79 ⁰ 32' 38" E	79 ⁰ 31' 17" to 79 ⁰ 33' 14" E
	Topo sheet No.	56 N/9.	56N/9 & 56N/10	56 N/9 & 56N/10.
7	Mine take Area/Project area			
	GDK 1&3	541.66 Ha		
	GDK 2&2A	282.76 Ha		
	GDK 5	532.43 Ha		
8	Land Use Details of Mine take area (Figs. in Hectares)			
	Land Use description	GDK 1&3	GDK 2&2A	GDK 5
	Forest Land	Nil	Nil	Nil
	Agriculture land	232.12	61.08	59.21
	Grazing land	58.27	76.67	325.82
	Waste land	165.65	111.27	135.67
	Built-up area	40.38	6.94	6.73
	Water Bodies	45.24	26.80	5.00
	Total Mine take Area	541.66	282.76	532.43

9	Land Owner ship Details of Mine take area (Figs. in Hectares)				
	Sl. No.	Status description	GDK 1&3	GDK 2&2A	GDK 5
	1	SCCL acquired Land	195.54	201.97	445.89
	2	Private land	232.12	11.07	31.74
	3	Govt./assigned land	114.00	69.72	54.80
	Total	541.66	282.76	532.43	
10	Additional Land requirement		Nil		
11	Mineral Being Mined		Coal		
12	Seams present		1,2,3A,3 & 4 Seams		
13	Seams being worked		1,2,3A,3 & 4 Seams		
	GDK 1&3		1,2,3A,3 & 4 Seams		
	GDK 2&2A		1,2,3A,3 & 4 Seams		
	GDK 5		3A, 3 & 4 Seams		
14	Gradient		1 in 3 to 1 in 5.5		
15	Depth of Working		23m to 600m depth		
16	Thickness of working seams				
		GDK - 1 & 3	GDK - 2 & 2A	GDK - 5	
	1 Seam	4.5m to 5.0m	5.98m	-	
	2 Seam	6m	3.8 m to 4.2m	-	
	3A Seam	1.8m to 2.2m	1.5m to 1.6m	1.6m to 1.8m	
	3 Seam	6m	7.7m to 7.9m	7.0m to 8.0m	
4 Seam	3.5m to 4.0m	4.1 m to 4.5m	3.6m to 4.0m		
17	Average Grade		G'2' and G'9'		
	GDK 1&3		G-'7' and G-'9'		
	GDK 2&2A		G '7'		
	GDK 5				
18	Bore hole density		12.4 BH/Sqkm		
19	Method of Mining		Board and Pillar, Under ground		
20	Technology		SDLs		
	GDK 1&3		SDLs		
	GDK 2&2A		LHDs		
	GDK 5				
21	Production Capacity (MTPA)		Present Capacity	Proposed Capacity	
	GDK 1&3		0.344	0.486	
	GDK 2&2A		0.45	0.648	
	GDK 5		0.36	0.600	

22	Manpower GDK 1&3 GDK 2&2A GDK 5	1214 1775 1342																				
23	Reserves in Mt (as on 31.03.2017)																					
		<table border="1"> <thead> <tr> <th></th> <th>GDK 1&3</th> <th>GDK 2&2A</th> <th>GDK 5</th> </tr> </thead> <tbody> <tr> <td>Geological Reserves</td> <td>154.66</td> <td>80.53</td> <td>151.64</td> </tr> <tr> <td>Extractible reserves</td> <td>40.92</td> <td>21.36</td> <td>40.22</td> </tr> <tr> <td>Reserves Extracted</td> <td>18.64</td> <td>11.32</td> <td>23.11</td> </tr> <tr> <td>Balance extractible</td> <td>22.28</td> <td>9.54</td> <td>17.11</td> </tr> </tbody> </table>		GDK 1&3	GDK 2&2A	GDK 5	Geological Reserves	154.66	80.53	151.64	Extractible reserves	40.92	21.36	40.22	Reserves Extracted	18.64	11.32	23.11	Balance extractible	22.28	9.54	17.11
	GDK 1&3	GDK 2&2A	GDK 5																			
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24	Balance life of the Mine in years GDK 1&3 GDK 2&2A GDK 5	60 16 33																				
25	R&R involved	Nil																				
26	Additional capital required	Nil																				
27	Date of approval & Capacity of mining plan GDK 1&3 13016/2/2006-CA-II Dated 17.10.2014; capacity-0.486 MT GDK 2&2A 13016/2/2006-CA-II Dated 17.10.2014; capacity-0.648 MT GDK 5 13016/6/2013-CA-II Dated 25.11.2014; capacity-0.600 MT																					
28	Details of coal linkage : SCCL is doing commercial mining and supply the coal to the consumers as per the allotment of the MOC for power, cement, steel utilities through fuel supply agreements.																					

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.

GDK No.1&3 Incline: GDK No.1 Incline mine was opened on 28th Feb'1959 and GDK No.3 Incline mine was opened on 6th April 1960. Later on, both the mines were integrated and are now operating as a single unit. The integrated mine operating at a capacity of 0.344 MTPA in a lease hold area of 457.25 Ha with manual mining. The mine is presently operating with intermediate technology of SDL's with Bord and Pillar method. It is planned to enhance the production by improving the performance of Semi mechanization (SDL's) and also increasing the mine take area from 457.25 Ha to 541.66 Ha.

GDK No. 2&2A Incline: Gdk.No.2&2A incline block covering an area of 282.76 Ha is a working mine in Ramagundam Area with intermediate technology of SDL's with Bord and Pillar method. Gdk.2 Incline mine started in the year 1959 and production commenced from 1961. Gdk.2A Incline mine started in the year 1974 and production commenced from 1975. Both Gdk.2&2A Inclines with common vertical boundaries were amalgamated. The

project is aimed at extracting coal from underground through an inclined tunnel without causing much disturbance to the surface features lying over the property by adopting sand stowing practice. It is planned to enhance the production from 0.45 MTPA to 0.648 MTPA by improving the performance of Semi mechanization (SDL's).

GDK No.5 incline: GDK.No.5 underground mine started on 12-06-1961 and operating with a capacity of 0.36 MTPA with a mine take area of 532.43 Ha. Presently GDK No.5 incline mine is operating with Board and Pillar method of mining with LHDs. Now it is proposed to enhance the production capacity from 0.36 MTPA to 0.6 MTPA by improving the performance of existing LHDs without increasing the mine take area. This project is also aimed at extracting coal from underground through an inclined tunnel without causing disturbance to the surface features lying over the property by adopting sand stowing practice.

Present proposal is for the reconstruction of existing GDK 1&3 Incline, GDK 2&2A Incline, GDK 5 Incline underground mines for enhancing production from 1.154 MTPA (0.344+0.45+0.36) to 1.734 MTPA (0.486+0.648+0.6) by semi mechanization and increasing the Mine take area from 1272.44 Ha to 1356.85 Ha.

As per the circular No. J-20012/11/98-IA.II (M) Dt.28.10.2004, issued by MoEF, the mines which have been started before 1994 and increased their production over and above 1993-94 production level of that mine, have to obtain for a fresh Environment Clearance. As per EIA Notification under Environment (Protection) Act, 1986 (Ref No.5802/01/2005-CPAM Dated 29th September, 2006 issued by MOC, GOI. And as per circular NoJ-11013/41/2006-IA.II (I) dated 13th October, 2006 issued by MOEF, applicants seeking prior environmental clearance with increase in lease area or production capacity or modernization of existing unit with increase in the total production capacity beyond the threshold limit shall be made an application in Form-I along with marginal scheme / pre-feasibility report to concerned Expert Appraisal committee.

Project proponent: The Singareni Collieries Company Limited (SCCL) has been exploiting coal for more than 127 years in the 350 km stretch of Pranahita Godavari Valley Coal Field spread in six districts of Telangana state viz. Kumarambhem Asifabad, Mancherial, Peddapalli, Jayashankar Bhupalpally, Badradri Kothagudem and Khammam districts with man power of 57,556 and is the second largest public sector under taking in the state. It is the coal mining company in South India catering the needs of coal based industries in the region. SCCL is currently operating 16 open cast projects and 30 underground mines and has achieved coal production of 61.33 MT in the year 2016-17 and target for the year 2017-18 is 66.06 MT.

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Mining Lease: . The block falls in the Ramagundam Revenue mandal of Peddapalli district in Telangana. All these three mines i.e. GDK 1&3, GDK 2&2A and GDK 5 incline mines fall under South Godavari Mining lease area originally granted in the year 1927 by the Nizam Government and renewed twice with the validity for a period of 20 years from 01.01.2015 to 31.12.2034 with reference to GO Ms.No.02 dated 12.01.2015.

* Copy of the Mining lease is enclosed as annexure.1.

ii. Brief description of the nature of the project

Projects under the subject involve the existing underground coal mines, GDK 1&3, GDK 2&2A, GDK 5 Incline, belonging to the Singareni Collieries Company Ltd. These projects are aimed at extracting coal from underground through an inclined tunnel without causing much disturbance to the surface features lying over the property by adopting sand stowing practice. These underground mines in Ramagundam Area are being worked with semi-mechanisation/intermediate technology of SDL's/LHDs with Bord and Pillar method for extraction of coal.

It is proposed to enhance the rated capacity of these existing GDK 1&3, GDK 2&2A, GDK 5 underground mines from 1.154 (0.344+0.45+0.36) MTPA to **1.734 MTPA (0.486+0.648+0.6)** by improving the performance of Semi mechanization and increasing the Mine take area from 1272.44 Ha to 1356.85 Ha. This pre-feasibility report is prepared for obtaining Environmental clearance.

PRESENT PROPOSAL

Present proposal is for the reconstruction of existing GDK 1&3 Incline, GDK 2&2A Incline, GDK 5 Incline underground mines for enhancing production from 1.154 MTPA(0.344+0.45+0.36) to **1.734 MTPA (0.486+0.648+0.6)** and increasing the Mine take area from 1272.44 Ha to 1356.85 Ha.

As per the circular No. J-20012/11/98-IA.II (M) Dt.28.10.2004, issued by MoEF, the mines which have been started before 1994 and increased their production over and above 1993-94 production level of that mine, have to obtain for a fresh Environment Clearance. As per EIA Notification under Environment (Protection) Act, 1986 (Ref No.5802/01/2005-CPAM Dated 29th September, 2006 issued by MOC, GOI. And as per circular NoJ-11013/41/2006-IA.II (I) dated 13th October, 2006 issued by MOEF, applicants seeking prior environmental clearance with increase in lease area or production capacity or modernization of exiting unit with increase in the total production capacity beyond the threshold limit shall be made an application in Form-I along with marginal scheme / pre-feasibility report to concerned Expert Appraisal committee.

In this context, to obtain Environmental clearance, this pre-feasibility report is prepared as per the guidelines issued by MoEF &CC vide no J- 11013/41/2006-IA.II(I) dated 30.12.2010 and the brief of proposal is as below.

- GDK No. 1&3 Incline Mine from 0.344 MTPA to 0.486 MTPA with the increase of number of SDL's and also increasing the mine take area from 457.25 Ha to 541.66 Ha.

- GDK No. 2&2A Inclines from 0.45 MTPA to 0.648 MTPA by improving the performance of Semi mechanization (SDL's), without increasing the mine take area.
- GDK No.5 incline (GDK.No.5) from 0.36 MTPA to 0.6 MTPA by improving the performance of machinery i.e. LHDs, without increasing the mine take area.

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

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, supply gap is forecasted due to the increasing demand for power.

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 and Southern India SCCL is taking following steps:

- 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/superjacent areas/seams for higher production.
- 4) Conversion of shallow underground workings to opencast method for extraction of balance coal reserves.
- 5) Extension of the existing opencast workings to further dip side upto optimum level.

As a part of Reconstruction of existing underground mines, it is now proposed to enhance production of existing GDK 1&3 Incline, GDK 2&2A Incline, GDK 5 Incline underground mines from 1.154 MTPA (0.344+0.45+0.36) to **1.734 MTPA (0.486+0.648+0.6)** with Bord and Pillar method using intermediate technology i.e. SDLs/LHDs and increasing the Mine take area from 1272.44 Ha to 1356.85 Ha.

Thus reconstruction of project by enhancing production is justified in view of demand-supply gap in the country (as given in the following section).

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 the financial year 2016-17, SCCL has supplied 49.72 Mt of coal to power utilities against 45.61 MTPA of FSA quantities. Apart from power utilities, 9.28MT coal was supplied to Cement, Captive Power Plants, Heavy Water Plant and other consumers

through fuel supply agreements during 2016-17. 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 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 demand details and gap with supply (SCCL from the existing projects, projects under implementation and approved projects) are as furnished below.

(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 by increasing the production capacities, it is planned to open new underground coal mines and to reconstruct the existing underground coal mines to increase their rated capacity indigenously.

vi. Export possibility

There is no possibility for export of coal from this mine as there is sufficient demand for industries located in Telangana, AP and elsewhere in India.

vii. Domestic / export markets

Coal produced is fed to major domestic customers namely power sector, cement industries, fertilizers, brick industries etc.

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

The detailed manpower required for the project has been worked out as per the prevailing norms based on workload, the U/G Machinery fleet and the working conditions. The average daily man shifts required to achieve the rated production of 0.486 MTPA, 0.648 MTPA and 0.6 MTPA from GDK No. 1&3 Incline and GDK No. 2&2A Incline and GDK No. 5 Incline mines is estimated to be 1030, 1503 and 1140 respectively. And the manpower (Men on Roll) required at these three GDK No. 1&3 Incline and GDK No. 2&2A Incline and GDK No. 5 Incline mines after giving due allowance for absenteeism is estimated to be 1214,

1775 and 1342 respectively. Manpower requirement with the proposed intermediate technology will be adjusted with the manpower available in the Ramagundam Area.

The above is the direct employment generated by the project where as the indirect generated employment by way of Coal transportation, Sand stowing operations, picking of Shale/Stone from the conveyor belts, colonization, supply of raw material like fly ash bricks, supply of spares and consumables, general conveyance of persons to the mine from their location by means of hired vehicles, housekeeping etc. will be much more than the above.

3. Project Description:

i. Type of project including interlinked and interdependent projects, if any.

These projects are independent and not interlinked or interdependent on any other project for its production enhancement.

ii. Location with coordinates

These three mines are located in the Northern part of the Ramagundam Coal belt and are situated at a distance 12.0 kms from Ramagundam railway station on Kazipet-Ballaharsha section in Peddapalli district.

Location Details

Village	: Jangaon, Musthyala, Jallaram, Sundilla
Mandal	: Ramagundam
District	: Peddapalli
State	: Telangana
Nearest IMD station	: Ramagundam
Nearest Town	: Ramagundam
Nearest Railway Station	: Ramagundam
Nearest Air Port	: Shamshabad, Hyderabad

The **GDK No.1&3 Incline** mine covering an area of 541.66 Ha in the Northern part of the Ramagundam Coal belt is located at East longitudes $79^{\circ} 30' 25''$ to $79^{\circ} 32' 29''$ and North latitude $18^{\circ} 45' 24''$ to $18^{\circ} 46' 53''$ in the survey of India Topo sheet No. 56N/9.

GDK No.2&2A incline mine covering an area of 282.76 Ha in the Northern part of the Ramagundam Coal belt is bound by N Latitudes $18^{\circ}44'42''$ to $18^{\circ}45'42''$ and East longitudes $79^{\circ} 31'15''$ to $79^{\circ} 32'38''$ in the survey of India Toposheet No. 56N/9 and 56N/10.

GDK No.5 Incline mine falls in South Godavari Coal Fields of M/s S.C.Co.Ltd., and is located between latitude North $18^{\circ}43'38''$ to $18^{\circ}45'19''$ & Longitude East $79^{\circ}31'19''$ to $79^{\circ}33'14''$ in the survey of India Topo sheet No. 56N/9.

Mine Boundaries: The boundaries of the combined block consisting of GDK 1&3 Incline, GDK 2&2A Incline & GDK 5 Incline Mines are as follows:

North	- River Godavari.
South	- RG OC-III Project
East	- Fields of Sundilla, Mustyala and Jangaon Village
West	- Sector 1 &2 Colonies and GM Office colony.

Note: The Location plan and Key plan showing general location, specific location, project boundary & project layout with co-ordinates are enclosed as Plate no.1 & 2 respectively.

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

The location of the coal seams beneath the ground becomes the basis of selecting the site of the mines, hence no alternate sites are considered. In this project, it is proposed to enhance the production of existing GDK No.1&3 Incline, 2&2A Incline and 5 Incline mines from 1.154 MTPA (0.344+0.45+0.36) to **1.734 MTPA (0.486+0.648+0.6)** and thus there is no scope of selecting alternate sites.

At these mines, underground Bord & pillar method with semi-mechanization is being done in conjunction with Hydraulic sand stowing/caving, which will have less effect on environment and at the same time the surface features lying over the property are protected by restricting the surface subsidence.

iv. Size or magnitude of operation

GDK 1&3, GDK 2&2A, GDK 5 Incline mines are existing underground coal mines with a lease hold area of 541.66 Ha, 282.76 Ha & 532.43 Ha respectively. Presently these mines are being operated by conventional Bord & Pillar method of working using semi-mechanization i.e. SDL's/LHDs with a capacity of 0.344 MTPA, 0.45 MTPA & 0.36 MTPA respectively. It is proposed to enhance the production of these mines to 0.486 MTPA, 0.648MTPA & 0.6 MTPA respectively with the addition of SDL's and by improving the performance of existing SDLs/LHDs.

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

The project is a coal producing unit referred to as a Coal mine. The coal produced in underground is brought to the surface and dispatched to identified customers namely Power houses, Cement industries, fertilizer industries, and other units.

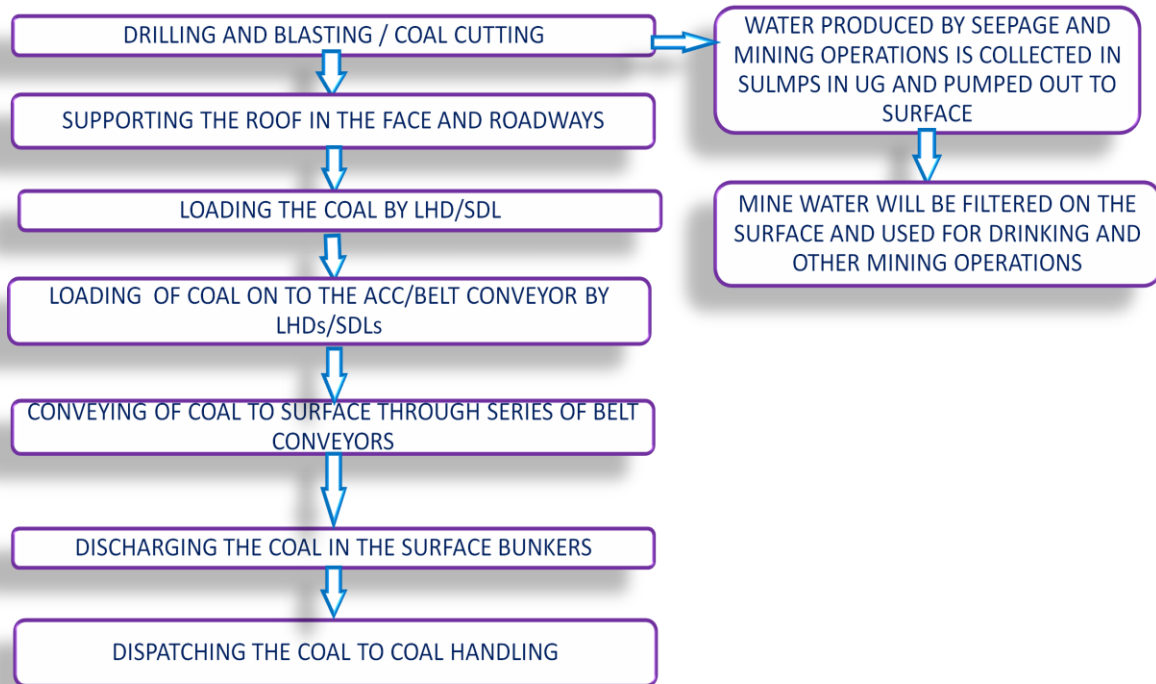
The components of the project/different operations in mine are:

- Drilling & Blasting
- Face supporting
- Roadway and Junction supporting
- Loading of blasted coal into tubs with SDLs or onto belt conveyor with LHDs
- Coal loaded in to tubs is hauled up to the surface through series of haulers whereas coal loaded onto belt conveyor is being conveyed up to surface through series of belt conveyors. Blasted coal loaded either on Belt conveyor or in tubs by Load Haul Dumpers or Side Discharge Loaders (SDL's) will be finally transported up to surface and dumped in the surface bunkers.
- The nearest coal handling plant available to these three mines is GDK-1 CHP which is within the mine take area of GDK No.1&3 Incline. Part of the coal produced from these mines will be dispatched to the Coal Handling Plant, by trucks. From

there it will be dispatched to various industries like Powerhouses, Cement, Textiles, Paper and other industries. Remaining part of the coal will be transported from the pit head bunkers to the private industries by trucks.

- Underground water is pumped out by installing pumps in stages.

A schematic diagram/flow chart showing the project components is given below.



All the mining operations are carried out under the statutory Supervision of Mining / Mechanical/Electrical supervisors as per the Mines Act.

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

The prime function of the coal mining industry is to extract the coal, which is found naturally beneath the earth surface. The coal so extracted is sold as it is or some times after crushing, screening, and washing to the consumers. No raw material is being consumed in coal extraction but explosives and oils etc. are being used for excavation of coal/OB.

Requirement of explosives with estimated quantity

Mine	Explosive quantity/annum	Source
GDK 1&3	450 T	Purchasing From Explosive companies
GDK 2&2A	650 T	
GDK 5	600 T	

Mode of Transportation of Raw Material: Explosives will be transported in Explosive Vans Approved by the Chief Controller of Explosives.

Marketing area of final product: In the process of mining operations, the in-situ coal is blasted, loaded and transported from underground to the surface, which is called Run of Mine (ROM) Coal. Majority of the times the ROM coal is the final product and is supplied to the consumers such as power plants. Sometimes the ROM coal is subjected crushing, screening to get slack, steam and crushing ROM coal as per the demand of the customers. The nearest coal handling plant available to these three mines is GDK-1 CHP which is within the mine take area of GDK 1&3 Incline.

Part of the coal produced from the mine will be dispatched to the Coal Handling Plant, and from there it will be dispatched to various industries like Powerhouses, Cement, Textiles, Paper and other industries. Remaining part of the coal will be transported from the pit head bunkers to the private industries.

Transport and Marketing of final product:

Godavarikhani No. 1&3 Incline: The G'2' grade coal is supplied to the consumers directly from the mine which will be transported through their Lorries and G'9'-grade coal is transported to GDK1 CHP located adjacent to the mine boundary by Lorries and from there the coal is supplied to the different consumers as per the fuel linkage.

Godavarikhani No. 2&2A Incline: The 'G-7' grade coal is supplied to the consumers directly from the mine which will be transported through their Lorries and 'G-9' -grade coal is transported to GDK1 CHP which is located 1 km away from the mine by lorries from there the coal is supplied to the different power plants as per the fuel linkage.

Godavarikhani No. 5 Incline:- From surface bunkers part of the 'G-7' grade coal i.e. 1.5 LTPA will be supplied directly to customers and 4.5 LTPA coal will be transported to GDK1 CHP which is located near the mine, later it will be supplied to various other consumers as per the linkage.

vii. Resource optimization / recycling and reuse envisaged in the project, if any,

The resources like Explosives, Hydraulic Oils, Machinery, Land, Power and Water are fully optimized to minimize unnecessary losses during the process of winning and supply of the coal to the customers.

Waste water will be recycled in ETPs, STPs and reused for watering Parks, Lawns and Gardens etc apart from using as drinking water. Excess water 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

Water requirement & supply/source: In the process of mining, water will be accumulated in the dip most places of the mine due to natural seepage and mining operations such as stowing operations etc. The water so accumulated is collected in sumps at different places in the mine and is pumped out to the surface with suitable capacity pumps. The pumped out water is filtered on surface to make it potable and used for drinking and other purposes on the pit head as well as in the colonies. The use of total

pumped out water at these three mines is given in below tables. Quantity of water given is in kilo liters per day.

Purpose	Quantity
GDK 1&3Incline	
Water used For drinking at mine	100
Water used For dust suppression	100
Water used For stowing	700
Water used For Plantation	200
Water used For villages	100
Water used For Colonies	300
Water used For other purpose	200
Total	1700

GDK 2&2A Incline	
Water used For drinking at mine	600
Water used For dust suppression	300
Water used For stowing	2745
Water used For Plantation	200
Water used For Colonies	200
Excess water let out	320
Total	4365

GDK 5 Incline	
Water used For drinking at mine	400
Water used For dust suppression	785
Water used For stowing	5500
Water used For Plantation	400
Water used For Colonies	760
Total	7845

Power requirement & supply/source

GDK 1&3Incline: The is located at a distance of 15 Km from the Godavarikhani No.1&3 incline. The mine is receiving power from the above substation as per the arrangements made for the maximum power demand. Presently the peak connected load of Godavarikhani No.1&3 incline mine is 3.72 MW and the arrangements were made to operate the mine with the increased number of SDL's with the 2X1600 kVA transformers (total 3.2MVA capacity). No additional infrastructure is proposed for the above production enhancement.

GDK 2&2A Incline: The mine is receiving power from 132/33 kV Sub-station of SCCL near RG OC-I as per the arrangements made for the maximum power demand. The 33 kV power received will be fed to the 33 kV/ 3.3 kV Sub-station located in the mine premises. The estimated peak load is 4.85 MW and arrangements are made at the substation for the maximum power demand with the two transformers of capacity 1600 kVA and 5 MVA (total capacity of 6.6 MVA). No additional infrastructure is proposed for the above production enhancement.

GDK 5 Incline: The mine is receiving power from 132/33 kV Sub-station of SCCL near RG OC-I as per the arrangements made for the maximum power demand. The 33 kV power received will be fed to the 33 kV/ 3.3 kV Sub-station located in the mine premises. The estimated peak load is 5.38 MW and arrangements are made at the substation for the maximum power demand with the two nos of transformers of capacity 1600 kVA and 3150 kVA. No additional infrastructure is proposed for the above production enhancement.

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

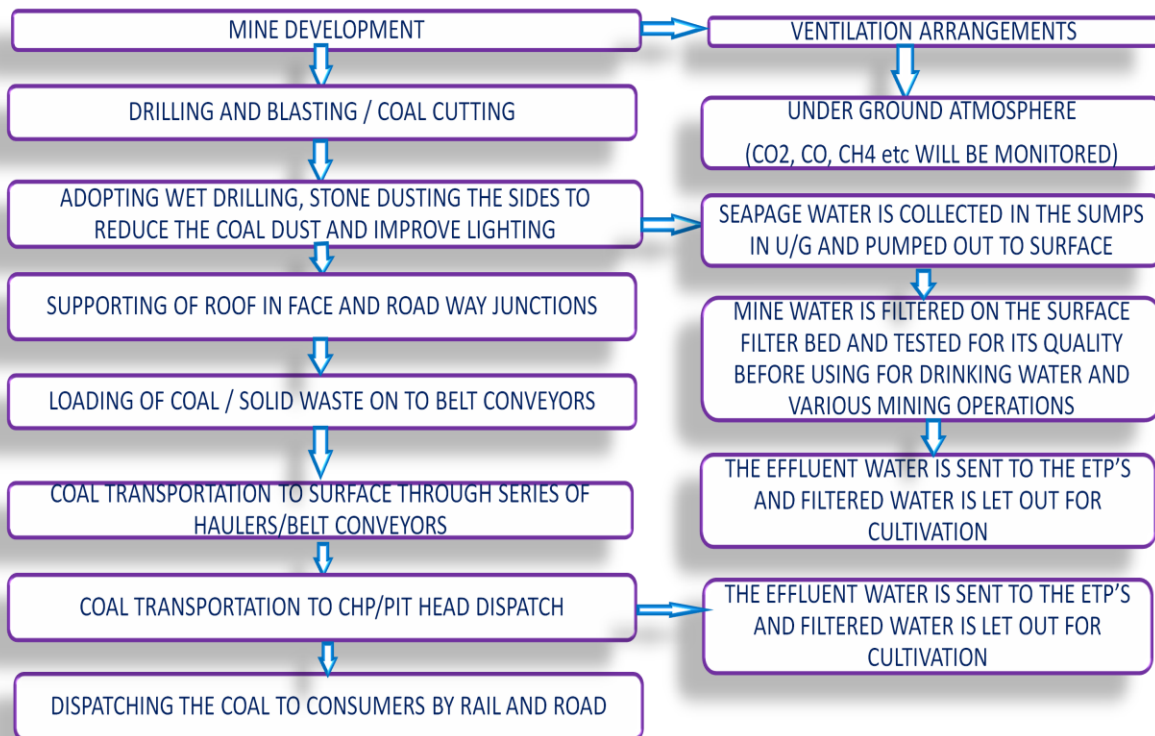
In underground mine wastes generated during the mining is very less compared to that of opencast mining. The liquid wastes like used oils, grease etc; are stored in separate tins/drums and sent to the surface at regular intervals.

The solid waste generated is generally the stone bands/dirt bands/shale produced during mining activity. The debris so produced is used for underground track ballasting, leveling of the uneven floors and strengthening of surface bank head.

x. Schematic representations of the feasibility drawing which give information of EIA purpose.

The project under proposal is to enhance the production capacity of the existing GDK 1&3, GDK 2&2A & GDK 5 incline mines to a peak of **1.734 MTPA (0.486+0.648+0.6)** with the increase in number of SDL's and improving the efficiency of existing equipment.

The schematic representation of the prime operations involved in the Mining process which give information of EIA purpose is given below.



Activity	Potential Environmental Impact	Remarks
Coal Extraction	Dust, waste water generation & noise	Confined to underground
Coal handling arrangements (Including crushing, loading & unloading operations)	Dust, noise and water pollution	Open to atmosphere
Transportation	Dust and noise	Open to atmosphere

4. Site Analysis:

(i) Connectivity

These three mines are well connected by Coal Corridor Road which connects all the underground and opencast mines of Ramagundam area with Rajiv Rahadari (State Highway). This highway is passing through the block. Coal Handling Plant over this block is connected by Coal Corridor Road. The Mine area is well connected with state capital Hyderabad (220 Km) and district head quarters Peddapalli (30 Km) by all weather roads. Ramagundam Railway Station which is on Kazipet- Ballarshah line of S.C. Railways is at about 12.0 Km from the boundary of the block. Coal Handling Plant is connected to this main railway line. These Mines are well connected with telephonic communication facility. The required internal roads are already developed.

(ii) Land form, Land use and Land ownership

Land Use Details: The mine take area of GDK 1&3, GDK 2&2A & GDK 5 incline mines is 541.66 Ha, 282.76 Ha and 532.43 respectively. ***There is no forest land in this block.*** Land use details, land ownership details and details of use of acquired land are given in the following tables.

Land Use Details

Sl. No	Land description	GDK 1&3	GDK 2&2A	GDK 5
1	Forest Land	Nil	Nil	Nil
2	Agricultural land	232.12	61.08	59.21
3	Waste Land	165.65	111.27	135.67
4	Grazing Land	58.27	76.67	325.82
5	Water Bodies	45.24	26.80	6.73
6	Built up area	40.38	6.94	5.00
	Total	541.66	282.76	532.43

Land Ownership Details: (Area in Ha)

Status description	Land Details	GDK 1&3	GDK 2&2A	GDK 5
SCCL acquired Land	Private land	137.27	125.30	115.07
	Govt./Assigned land	58.27	76.67	330.82
	<i>Total</i>	<i>195.54</i>	<i>201.97</i>	<i>445.89</i>
Land not required to be acquired	Private land	232.12	11.07	31.74
	Govt./assigned land	114.00	69.72	54.80
	<i>Total</i>	<i>346.12</i>	<i>80.79</i>	<i>86.54</i>
Total Mine take Area/Leased Area		541.66	541.66	532.43

Use of acquired land

Sl. No.	Description	GDK 1&3	GDK 2&2A	GDK 5
1	Pit head infrastructure	4.32	4.87	6.05
2	Infrastructure for area administration (MVTC, Stores, CHP, etc.)	5.60	6.27	0.67
3	Approach Roads	12.24	5.88	18.34
4	Township/ colony	6.00	Nil	Nil
5	Sand Stock Yard and stowing bunker	22.60	20.50	47.43
6	Plantation Existing	62.71	107.46	128.60
7	Plantation proposed	27.20	14.75	205.12
8	Other purpose	54.87	42.24	39.68
Total SCCL Acquired Land		195.54	201.97	445.89

Plantation Details (Area in Ha)	GDK 1&3	GDK 2&2A	GDK 5
Land used for Plantation	62.71	107.45	128.60
Land proposed for plantation	27.20	14.75	205.12
Total	89.91	122.20	333.72

The plan showing land form, land use and land ownership is enclosed as Plate no. 4A, 4B & 4C.

(iii) Topography (along with map)

Physiography: The block area covering all the three GDK 1&3 incline, GDK 2&2A incline and GDK 5 incline mines is covered by thin mantle of soil and no structural features are observed on the surface. The stratigraphy and sequence of coal seam is based on sub-surface data. The coal bearing Barakar formation comprises mainly white to grayish white Mg to Cg feldspathic sand stones. Sandy soil cover ranging in thickness from 1.5 to 4.6 m. underlies the area and at places it is up to 7.0 m. The block is gently sloping area towards north and north east with minor undulations. The topographic elevation varies from 156 m to 131 m above mean sea level dipping towards north and north east i.e. towards Godavari River. The slope is about 8 m/km. The drainage is affected by Godavari River supplemented by seasonal nallahs.

Drainage:

GDK 1&3 Incline: River Godavari flows along East – West direction and is situated towards North side of the property. Highest Flood Level (HFL) of the same, recorded in the year 1995, was 835.95m. The RL of the pit mouth of Gdk.No.1incline is 852.885m and Gdk.No.3 Incline is 850.008. Over the property of the Gdk.No.1 Incline one Janagaon Tank exists at the Dip side of the property, below which workings are situated at a depth of 350m. A seasonal Nallah flows along South side of the property where the depth of the working would be more. A surface drain exists beside Gdk.1incline office, through which over flow water of the filter bed flows.

GDK 2&2A Incline: The area is mostly plain with gentle slope towards East. The ground elevation with reference to MSL varies from 138.28m to 154m with an average slope of 6m/km. The surface drainage of the mine take area is affected by a nallah running along the raise side boundary and Southern boundary of the property joining into Sundilla tank situated on the dip side property. The size of the nallah was 3m to 12m wide x 3m to 6m depth. The HFL of the nallah was 145.9m. Against this nallah embankment was provided about 1.2KM length having 3m width at the top and 14m width at the bottom. The top RL of the bund is 148.0m. The nallah flows at a minimum distance of 150m from mine entries. The entries of the mine are 5m higher than HFL.

This Sundilla tank at South Eastern side of the of the property is of the size 600m in length x 300m in width x 1m in depth. Against this tank an embankment has been provided having 3m wide x 2m height with top of the RL of 843.92m. The water overflows towards outside of the mine area along dip side mine boundary and joins at Jangaon tank which is 1KM away from the mine boundary.

GDK 5 Incline: The surface drainage of the mine take area is affected by three small nallahs. All the mine entries are 5m higher than HFL of these nallahs.

- Nallah No.1 is flowing over the rise side boundary barrier of GDK No. 5 Incline & GDK No. 6 Incline on south east direction.
- Nallah No. 2 is flowing between 26 Dip- 28 Dip and 10L-37L of 4 Seam in North East direction and merged in Nallah No.4.
- Nallah No.4 is flowing over the Dip side boundary barrier of GDK No. 5 Incline and GDK No.2 Incline on South East direction.

Topographic plan showing surface features in the buffer zone is enclosed as Plate no.3.

(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.

Sl. No	Land description	GDK 1&3	GDK 2&2A	GDK 5
1	Forest Land	Nil	Nil	Nil
2	Agricultural land	232.12	61.08	59.21
3	Waste Land	165.65	111.27	135.67
4	Grazing Land	58.27	76.67	325.82
5	Water Bodies	45.24	26.80	6.73
6	Built up area	40.38	6.94	5.00
	Total	541.66	282.76	532.43

There is no national park, wild life sanctuary, national monument, tourist attractions, historical monument, and important landscape etc. over the mine take area of these mines or nearby in the study area.

The shortest distance between the periphery of the Indaram Reserve forest and the periphery of GDK 1&3 Incline, GDK 2&2A Incline & GDK 5 Incline is 5.42 km, 7.45 Km & 8.12 km respectively.

GDK 1&3 Incline: There is one tank and one seasonal nallah passing over the GDK 1&3 incline mine which is ephemeral to the Godavari River. The seasonal Nallah flows along South side of the property. The tank called Janagaon Tank exists at the Dip side of the property, below which workings are situated at a depth of 350m. River Godavari flows along East – West direction and is situated towards North side of the property. Highest Flood Level (HFL) of River Godavari, recorded in the year 1995, was 837.16m. The mine entry near the River is the air shaft with an RL of 843 m which is 5.84m above the HFL.

GDK 2&2A Incline: There is one tank and one seasonal nallah passing over the GDK No.2&2A incline mine running along Southern boundary of the property. The HFL of the nallah was 145.9m. Against this nallah embankment was provided about 1.2KM length having 3m width at the top and 14m width at the bottom. The nallah flows at a minimum distance of 150m from mine entries. The entries of the mine were 3m higher level than HFL. The tank called Sundilla Tank was towards dip side South Eastern side of the property. The size of the tank was 600m in length x 300m in width x 1m in depth. Against this tank an embankment has been provided having 3m wide x 2m height with top of the RL of 843.92m with overflow point at 840.25m RL.

GDK 5 Incline: There are three seasonal nallahs passing over the Godavarikhani No.5 incline mine which are ephemeral nallahs flowing in to the Godavari River. Nallah No.1 is flowing over the rise side boundary barrier of GDK No. 5 Incline & RG OC-III on south east direction. Nallah No. 2 is flowing between 26 Dip- 28 Dip and 10L-37L of 4 Seam in North East direction and merged in Nallah No.4 which is flowing over the Dip side boundary barrier of GDK No. 5 Incline and GDK No.2 Incline on South East direction. The river Godavari is at a distance of 13 km from the mine boundary. The distance between HFL (849.2) of nearest water body (Nallah No. 2) and the mine opening (RL is 851.6) is 110m. The distance between Highest Flood Level of River Godavari (837.16m, recorded in the year 1995) and the mine opening (RL is 851.6) is 2.29 Km.

(v) Existing Infrastructure

SCCL provided the necessary infrastructure for its operations and for the well-being of its workforce. Among the infrastructure that provided are workshops & stores, roads, water management structures and machinery, potable and industrial water supplies, offices, communications and other service facilities. The existing infrastructure in these mines is sufficient to cope up with the change in technology and production enhancement.

Transport and Communication: These three mines are well connected by Coal Corridor Road which connects all the underground and opencast mines of Ramagundam area with Rajiv Rahadari (State Highway). Hyderabad – Nagpur highway is passing through the block. Coal Handling Plant over this block is connected by Coal Corridor Road. The Mine area is well connected with state capital Hyderabad (220 Km) and district head quarters Peddapalli (30 Km) by all weather roads. Ramagundam Railway Station which is on Kazipet- Ballarshah line of S.C. Railways is at about 12.0 Km from the boundary of the block. Coal Handling Plant is connected to this main railway line. These Mines are well connected with telephonic communication facility. The required internal roads are already developed.

Power supply:

GDK 1&3 Incline: The mine is receiving power from the 132/33 kV Sub-station of SCCL near RG OC-I is located at a distance of 15 Km from the Godavarikhani No.1&3 incline. Presently the peak connected load of Godavarikhani No.1&3 incline mine is 3.72 MW and the arrangements were made to operate the mine with the increased number of SDL's with the 2X1600 kVA transformers (total 3.2MVA capacity).

GDK 2&2A Incline: The mine is receiving power from the 132/33 kV Sub-station of SCCL near RG OC-I. The 33 kV power received will be fed to the 33 kV/ 3.3 kV Sub-station located in the mine premises. The estimated peak load is 4.85 MW and arrangements are made at the substation for the maximum power demand with the two transformers of capacity 1600 kVA and 5 MVA (total capacity of 6.6 MVA).

GDK 5 Incline: The mine is receiving power from the 132/33 kV Sub-station of SCCL near RG OC-I. The 33 kV power received will be fed to the 33 kV/ 3.3 kV Sub-station located in the mine premises. The estimated peak load is 5.38 MW and arrangements are made at the substation for the maximum power demand with the two nos of transformers of capacity 1600 kVA and 3150 kVA.

Water supply: In the process of mining, water will be accumulated in the dip most places of the mine due to natural seepage and mining operations such as stowing operations etc. The water so accumulated is collected in sumps at different places in the mine and is pumped out to the surface with suitable capacity pumps. The pumped out water is filtered on surface to make it potable and used for drinking and other purposes on the pit head as well as in the colonies. The use of pumped out water at these three mines is given in below tables. Details of water pumping and use are given under Point No.3 (viii).

Physical infrastructure: Office buildings, Man way office, Executive's and supervisors rooms, Canteen, Rest Room, Lamp Room, Car and cycle sheds, Hauler shed, Black smith and maintenance work shop, Substation, Electrical Room, Stores, Stowing plant, Weigh

bridge, Magazine etc are provided in the pithead infrastructure over the mine take area. The existing infrastructure in these mines is sufficient to cope up with the change in technology and production enhancement.

(vi) Soil classification

The soil in the region may be classified as sandy loam/sandy clay, which is conducive for the growth of different species. Along the Godavari River thick clayey soil and alluvial soil prevails. The colour of the soils varies from black to light brown, with pH varying from 6.2 to 9.1.

(vii) Climatic data from secondary sources

CLIMATE:- The area experiences typical tropical climate of hot summer from March to June, a good monsoon between mid June & middle of September and a pleasant winter from October to February.

Rainfall:- Rainfall monitored at Indian Meteorological Department at Ramagundam gauging station during the last 37 years (1974 - 2010) varied from 621.10 mm (2004) to 1697.3 mm (1983). The mean annual rainfall is 1105.8 mm, with a median of 1044.20 mm, standard deviation of 267.12, skewness is 0.496, kurtosis is - 0.289 and coefficient of variation is 24.16%. The maximum monthly rainfall during the period is 707.2mm (July'88). The maximum daily rainfall is 216.3mm (5th Aug' 2006). The most severe storm of 644.2 mm. over a period of 32 days had occurred between 5th July and 5th Aug'1986.

Temperature and Relative humidity:- December and January are the coolest months of the year while July to September are the rainy months. May is the hottest month of the year. The maximum and minimum temperatures range 30⁰C to 48⁰C and 15⁰C to 29⁰C respectively. The average relative humidity of 64% may reach up to 80% during rainy season.

(viii) Social Infrastructure available

The project has yielded a positive impact on the socio-economic environment. Commencement of the project has helped in improving the employment opportunities of this area including infrastructure facilities. Opening up of this project enhanced the living conditions of the mining and surrounding area due to generation of indirect employment to the local community. SCCL has constructed quarters for residential accommodation of the employees employed in the mine. The housing satisfaction of the employees is around 95%.

These three mines are part of Ramagundam-1 Area of SCCL where 5 Underground mines, an opencast mine and a SMS plant exists. Mining by SCCL in this area resulted infrastructure development, improvement in quality of life, employment generation, establishment dependent industries like NTPC Super Thermal Power Station, APGENCO Power Station etc.

Following Social infrastructure is available in this area:

- State Highway & Railway line

- Power stations & FCI
- Residential Colonies
- Dispensaries and Hospitals for necessary medical aid with specialist doctors
- Clubs for social interactions and recreation
- Bank facility and ATM counters
- Schools and other educational institutes
- Parks for recreation
- Necessary market facilities and shops
- LPG Godowns and petrol bunks
- Stadium/Ground for Sports & Cultural activities

(ix) Places of Historical Importance

There are no historical/protected monuments or sanctuaries in the study region.

5. PLANNING BRIEF:

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

The Project under the subject involves production enhancement of the existing underground coal mines GDK 1&3 Incline, GDK 2&2A Incline & GDK 5 Incline mines belonging to Singareni Collieries Company Ltd., a major coal producing company in South India. The project is aimed at extracting coal from underground through an inclined tunnel without causing any disturbance to the surface features lying over the property by adopting sand stowing practice.

The proposed projects are aimed to reduce the gap between the demand and production of the coal in the country and to maintain the sustained growth of the economy and in turn the growth of the nation. Ultimately it gives financial and social benefits for the local people there by improving their standard of living.

Present proposal is for the reconstruction of existing GDK 1&3 Incline, GDK 2&2A Incline, GDK 5 Incline underground mines for enhancing production from 1.154 MTPA (0.344+0.45+0.36) to **1.734 MTPA (0.486+0.648+0.6)** by semi mechanization and increasing the Mine take area from 1272.44 Ha to 1356.85 Ha. Manpower required for the production enhancement from these projects will be adjusted from the available manpower in the area.

Facilities: The facilities available for this project is as follows.

- Surface infrastructure buildings including roads.
- Surface Coal Handling arrangements.
- Water filtration and supply arrangements.
- Rest shelters, Canteen and First Aid facilities.
- Provision of residential quarters to the employees.

- Provision of Hospital, schools, Recreation clubs and Shopping Complex etc.

Transportation:- Coal loaded in to tubs is hauled up to the surface through series of haulers whereas coal loaded onto belt conveyor is being conveyed up to surface through series of belt conveyors. Blasted coal loaded either on Belt conveyor or tubs by Load Haul Dumpers or Side Discharge Loaders (SDL's) will be finally transported up to surface and dumped in the surface bunkers having sufficient storage capacities.

Part of the coal is supplied to the consumers directly from the mine which will be transported through their Lorries and remaining coal is transported to GDK1 CHP by lorries and from there the coal is supplied to the different power plants as per the fuel linkage.

Method of working:- Coal extraction from underground mining by Bord and Pillar method of working with sand stowing.

(ii) Population projection

The manpower requirement for GDK 1&3 Incline, GDK 2&2A Incline, GDK 5 Incline underground mines for the proposed production enhancement is 1214, 1775 and 1342 persons respectively. Manpower required for the project will be adjusted from the manpower available in the Ramagundam area.

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

The lease hold area of GDK 1&3 Incline, GDK 2&2A Incline, GDK 5 Incline underground mines is 541.66 Ha, 282.76 Ha and 532.43 Ha respectively. Land use details in the lease hold area of these mines are given in section 4(ii). The details of acquired land and its use are as below.

Use of acquired land - Godavarikhani No.1&3 Incline

Sl. No.	Description	GDK 1&3	GDK 2&2A	GDK 5
1	Pit head infrastructure	4.32	4.87	6.05
2	Infrastructure for area administration (MVTTC, Stores, CHP, etc.)	5.60	6.27	0.67
3	Approach Roads	12.24	5.88	18.34
4	Township/ colony	6.00	Nil	Nil
5	Sand Stock Yard and stowing bunker	22.60	20.50	47.43
6	Plantation Existing	62.71	107.46	128.60
7	Plantation proposed	27.20	14.75	205.12
8	Other purpose	54.87	42.24	39.68
	Total SCCL Acquired Land	195.54	201.97	445.89

Green belt Program: The plantation program has been designed within the natural constraints of the site and in particular species selection will reflect the flora known to be resistant to the local conditions. Trees were grown as below.

- Around fan house
- Along the road sides both in the project, mine complex and in the vacant lands of the residential area
- Within the mine premises.

Area already taken up plantation and area proposed to take up plantation in the mine take area of these three mines is as below (Area in Ha).

Plantation Details	GDK 1&3	GDK 2&2A	GDK 5
Area of Plantation	62.71	107.45	128.60
Area proposed for plantation	27.20	14.75	205.12
Total Area	89.91	122.20	333.72

The mine closure plan showing green belt at the post mining stage is shown in the Plate no.6A, 6B & 6C.

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

The present physical infrastructure available at these mines as given in Sl. No. 4(V) and Sl. No. 6(i) will be sufficient to cope with the proposed production enhancement. Social Infrastructure available in the Ramagundam Area will cater the needs of the employees working in the mine. The social infrastructure available is already given above at Sl.No. 4(viii).

(v) Amenities/Facilities

The amenities/ facilities provided to the persons employed in and around the mines are as follows:

- Rest shelters for taking rest,
- Canteen facilities at subsidized rates,
- Washing/bathing facilities,
- First aid room,
- Provision of motor cycle/Cycle sheds,
- Provision of drinking water points etc.

6. Proposed Infrastructure:

Industrial area (Processing area): These mines are having well established facilities and infrastructure to produce the proposed production. The existing permanent type of civil constructions will serve through the remaining life of the Projects.

The service buildings cover sheds required as per the technology selection, statutory buildings and other office buildings. The technological buildings cover Lamp room, Pithead workshop, stores, substitute office etc. The Plinth area provided for all the above buildings have been based on standard guidelines. Further arrangements are provided for water supply, sewerage, street lighting and horticultural operations. No additional infrastructure is proposed for the above production enhancement.

(i) Residential area (Non processing area)

The GDK 1&3, GDK 2&2A and GDK 5 incline mines of Ramagundam-I area are located near well-communicated Godavarikhani town. In Ramagundam area, there are well developed colonies. The percentage satisfaction provided for different categories of employees in Ramagundam-I area is 95%. As such no residential buildings are required for this project as existing infrastructure will meet this requirement. No additional infrastructure is proposed for the above production enhancement.

(ii) Green belt (area in Ha)

	GDK 1&3	GDK 2&2A	GDK 5
Area of Plantation	62.71	107.45	128.60
Area proposed for plantation	27.20	14.75	205.12
Total Area	89.91	122.20	333.72

The plantation was carried out as a part of Green belt development all over surface in the mine take area, along the roads, along ML boundary and also in the township outside the lease area.

(iii) Social Infrastructure

Social Infrastructure available in the Ramagundam Area will cater the needs of the employees working in the mine. The social infrastructure available is already given above at Sl.No. 4(viii) and no further social infrastructure is proposed for the above production enhancement.

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

Ramagundam Area with 8 underground and 4 open cast mines is a major working area of SCCL and developing ahead of the surrounding area. The major customers are industries like Cement, Textiles, Paper, Railways, Powerhouses and other industries.

These three mines i.e. GDK 1&3, GDK 2&2A and GDK 5 Incline Mines are well connected by rail and road. Ramagundam Railway Station which is on Kazipet- Ballarshah line of S.C. Railways is at about 12.0 Km from the eastern boundary of the block. Hyderabad – Nagpur highway is about 1.0 kms from the block. The Mine area is well connected with state capital Hyderabad (230 Km) and district head quarters Peddapalli (30 km) by all weather roads. No additional infrastructure is required for the above production enhancement.

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

Water produced in the mines 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. The mine discharge water may contain coal fines and contamination due to underground mechanization, need sedimentation and filtration before re used as drinking water at the mine or supplied to colonies for domestic purposes like drinking, washing, bathing etc.

Filter bed Constructed on surface is providing drinking water for the mine requirements and nearby colonies. Make of water from underground workings is pumped out and delivered in to the suitable filter bed constructed on the surface. After sedimentation and filtration the clear water is supplied to underground for drinking purpose through pipeline. Part of the Water is used for underground spraying purpose. Excess water is let out into open drain to join with the main drainage system of the area. Details of water availability and use are given at Point No.3 (viii). No additional infrastructure is proposed for the above production enhancement.

(vi) Sewerage system

GDK 1&3 Incline: A surface drain exists beside Gdk.1incline office, through which over flow water of the filter bed flows and it merges with a seasonal Nallah.

GDK 2&2A Incline: The surface area of GDK No.2&2A incline mine is drained by seasonal nallah passing over the mine.

GDK 5 Incline: The surface drainage of the mine take area is affected by three small nallahs.

No additional infrastructure is proposed for the above production enhancement.

(vii) Industrial waste management

Solid Waste management:- The solid waste management is dealt in the next section.

Liquid waste/Effluent management:-The major effluent source will be mine water pumped out from the mine, 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 is being treated in septic tank followed by soak pits. No additional infrastructure is proposed for the above production enhancement.

(viii) Solid waste management

The solid waste is generated from the proposed project by

- (a) Tunneling, shaft sinking etc.
- (b) Bottom stone blasting for leveling purpose etc
- (c) The separation of Shale/stones etc at CSP

The maximum depth of the workings will be around 400m from surface. The solid waste produced during drivage of tunnels and debris so produced from inter-seam drifts will be utilized for underground track ballasting, leveling of the uneven floors and strengthening of surface band head. Further, the rejects from mine and CHP's will be used for laying road, filling cracks developed due to subsidence and pitching of embankments etc.

In the coal extraction process, coal-containing impurities such as shale or sometimes sandstone will be transported to the coal handling plant. Here, the shale and sand stone will be picked out manually. This solid waste will be in the form of lumps. The sandstone varies greatly in mineral composition and may include such common minerals as quartz feldspar and several clay minerals. The solid waste from the townships will be collected

from the collection bins and tricycles provided by SCCL. The domestic solid waste collected will be transported to the disposal sites of SCCL.

The solid waste disposal sites are identified in the low-lying areas, over burden dumps and subsidence areas of SCCL. Hence, no appreciable impact is anticipated due to disposal of solid wastes. There will be 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. The coal produced from the mine is not washed or treated otherwise. Coal-containing impurities such as shale or some times sandstone will be transported to the coal handling plant. Here, the shale and sand stone will be picked out manually. This solid waste will be in the form of lumps. The sandstone varies greatly in mineral composition and may include such common minerals as quartz feldspar and several clay minerals. No additional infrastructure is required for the above production enhancement.

(ix) Power requirement & supply/source

GDK 1&3 Incline: The mine is receiving power from the 132/33 kV Sub-station of SCCL near RG OC-I is located at a distance of 15 Km from the Godavarikhani No.1&3 incline as per the arrangements made for the maximum power demand. Presently the peak connected load of Godavarikhani No.1&3 incline mine is 3.72 MW and the arrangements were made to operate the mine with the increased number of SDL's with the 2X1600 kVA transformers (total 3.2MVA capacity).

GDK 2&2A Incline: The mine is receiving power from the 132/33 kV Sub-station of SCCL near RG OC-I. The 33 kV power received will be fed to the 33 kV/ 3.3 kV Sub-station located in the mine premises. The estimated peak load is 4.85 MW and arrangements are made at the substation for the maximum power demand with the two transformers of capacity 1600 kVA and 5 MVA (total capacity of 6.6 MVA). No additional infrastructure is proposed for the above production enhancement.

GDK 5 Incline: The mine is receiving power from the 132/33 kV Sub-station of SCCL near RG OC-I. The 33 kV power received will be fed to the 33 kV/ 3.3 kV Sub-station located in the mine premises. The estimated peak load is 5.38 MW and arrangements are made at the substation for the maximum power demand with the two nos of transformers of capacity 1600 kVA and 3150 kVA.

No additional infrastructure is required for the proposed production enhancement.

7. Rehabilitation and Resettlement (R&R) Plan: *Policy to be adopted in respect of the project affected persons including home oustees, land oustees and landless labourers (a brief outline to be given)*

The production enhancement planned from the existing GDK 1&3, GDK 2&2A and GDK 5 incline mines is by increasing the number of production equipment or by improving the performance of existing production equipment. Envisaged method of extraction of coal by sand stowing will not have any impact on surface land or structures.

Hence, the project does not require any displacement of persons and hence no R&R is envisaged for the project.

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)

GDK 1&3, GDK 2&2A and GDK 5 incline mines are working mines having well established infrastructure and these mines will achieve their rated capacity in the sixth, first and first year respectively.

Balance reserves of GDK 1&3, GDK 2&2A and GDK 5 incline mines as on 01-04-2017 are 22.28 MT, 9.54 MT and 17.11 MT respectively. With a proposed production capacity of 0.486 MTPA, 0.648 MTPA and 0.6 MTPA, these mines will operate for another 60, 16 and 33 years from 2017-18 respectively.

Unlike manufacturing industry, the production from mining is subjected to variance over the calendar programme but not exceeding the peak production of 1.734 MTPA. The projection plans of the three projects are enclosed in plates.

Production achieved in last three years and production projection for the balance life are furnished in the below tables.

Table - Production in last three years

Sl. No.	YEAR	PRODUCTION IN LT			
		GDK 1&3	GDK 2&2A	GDK 5	TOTAL
1	2014-15	2.9	5.49	4.74	13.13
2	2015-16	2.87	5.69	4.43	12.99
3	2016-17	2.28	4.55	3.82	10.65

Table - Production projections

Sl.No	YEAR	PRODUCTION IN LT			
		GDK 1&3	GDK 2&2A	GDK 5	TOTAL
1	17-18	3.24	6.48	6.00	15.72
2	18-19	3.24	6.48	6.00	15.72
3	19-20	3.24	6.48	6.00	15.72
4	20-21	4.59	6.48	6.00	17.07
5	21-22	4.59	6.48	6.00	17.07
6	22-23	4.86	6.48	6.00	17.34
7	23-24	4.86	6.48	6.00	17.34
8	24-25	4.86	6.48	6.00	17.34
9	25--26	4.59	6.48	6.00	17.07
10	26-27	4.32	6.48	6.00	16.8
11	27-28	2.97	6.48	6.00	15.45

Sl.No	YEAR	PRODUCTION IN LT			
		GDK 1&3	GDK 2&2A	GDK 5	TOTAL
12	28-29	2.97	6.48	6.00	15.45
13	29-30	2.97	6.48	6.00	15.45
14	30-31	2.97	6.48	6.00	15.45
15	31-32	3.24	2.91	6.00	12.15
16	32-33	3.24	1.77	6.00	11.01
17	33-34	3.24		6.00	9.24
18	34-35	3.24		6.00	9.24
19	35-36	3.24		6.00	9.24
20	36-37	3.24		6.00	9.24
21	37-38	4.59		6.00	10.59
22	38-39	4.59		6.00	10.59
23	39-40	4.59		3.00	7.59
24	40-41	4.59		3.00	7.59
25	41-42	4.86		3.00	7.86
26	42-43	4.86		3.00	7.86
27	43-44	4.86		3.00	7.86
28	44-45	4.59		3.00	7.59
29	45-46	4.59		3.00	7.59
30	46-47	4.59		3.00	7.59
31	47-48	4.59		3.00	7.59
32	48-49	4.86		3.00	7.86
33	49-50	4.86		2.40	7.26
34	50-51	4.86		2.40	7.26
35	51-52	4.86		2.40	7.26
36	52-53	4.86		1.20	6.06
37	53-54	4.86		0.70	5.56
38	54-55	3.78			3.78
39	55-56	3.78			3.78
40	56-57	3.78			3.78
41	57-58	3.78			3.78
42	58-59	3.78			3.78
43	59-60	3.78			3.78
44	60-61	3.24			3.24
45	61-62	3.24			3.24
46	62-63	3.24			3.24
47	63-64	3.24			3.24
48	64-65	3.24			3.24
49	65-66	3.24			3.24
50	66-67	3.24			3.24
51	67-68	3.24			3.24

Sl.No	YEAR	PRODUCTION IN LT			
		GDK 1&3	GDK 2&2A	GDK 5	TOTAL
52	68-69	3.24			3.24
53	69-70	3.24			3.24
54	70-71	3.05			3.05
55	71-72	2.16			2.16
56	72-73	2.16			2.16
57	73-74	2.16			2.16
58	74-75	1.62			1.62
59	75-76	1.62			1.62
60	76-77	0.78			0.78
	TOTAL	222.8	95.4	171.1	489.3

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

Capital Requirement: These are working mines and it is now proposed for production enhancement by increasing the production equipment and by improving the performance of the existing equipment. The existing infrastructure at these mines is to be supplemented by some developmental activities to handle the increased production. Capital required for the activities envisaged for the proposed production enhancement is given below.

Capital Requirement GDK 1&3 Incline (Cost in Rs. Lakhs)

S.No.	Description	Cost
1	Construction of Sand Stowing Plant	100.00
2	Drivage of tunnels of length 1150m	550.00
3	2.0 Km length belt conveyor with 6 No.s of Drive heads	450.00
4	Miscellaneous(@ 3% on drive head costs)	20.00
5	Environmental Protection measures	100.00
	Total	1220.00

Capital Requirement GDK 2&2A Incline (Cost in Rs. Lakhs)

Sl.No.	Description	Cost
1	Surface bunkers (2X50T) with gantry length of 25m	30.00
2	Surface tunnel to 3 seam (90m) with 4.0mx 3.0m size.	54.00
3	Erection of belt conveyors	770.00
4	Strata bunkers of 300T capacity with 4.3mx 4.3m x 20m size	30.00
5	315 KVA Transformers	25.00
6	Miscellaneous	20.00
7	Environmental Protection measures	50.00
	Total	979.46

Capital Requirement GDK 5 Incline (Cost in Rs. Lakhs)

S.No.	Description	Cost
1	Erection of belt conveyors	482.00
2	4 nos of inter seam tunnels of 102 m length each (4.0mx 3.0m)	60.00
3	Miscellaneous	20.00
4	Environment Protection measures	100.00
	Total	662.00

Economic viability: Present cost of production at GDK 1&3, GDK 2&2A and GDK 5 incline mines for the financial year 2016-17 (as on Feb-2017) is given below:

Sl.No	Particulars	Cost per tonne in Rs		
		GDK 1&3	GDK 2&2A	GDK 5
1	Wages	4336	5401	4023
2	Power	284	174	233
3	Stores	225	342	337
4	Sand Stowing	32	16	75
5	Environmental Monitoring	4	3	3
6	Mine Closure Cost	5	3	4
7	Other expenses	170	285	66
8	Depreciation	133	162	209
	Total Cost of Production in	5189	6386	4950
	Avg. sales realization (Rs /T)	2582	2518	2721
	Profit (+)/Loss (-) (Rs /T)	-2607	-3868	-2229

As seen from the above table, all these three mines are running in loss. However, with the proposed production enhancement, cost of production will be reduced considerably as the additional capital requirement is marginal.

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.

Improvement in Physical Infrastructure: These projects are located in an area where communications and other facilities are well established. The following physical infrastructure facilities will further improve 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 is the basic sector of employment for the local people in this area. This project will lead to direct and indirect employment opportunity. Employment is expected during civil construction period, in trade, garbage lifting, sanitation and other ancillary services, Employment in these sectors will be primarily temporary or contractual and involvement of unskilled labor will be more. A major part of this labor force will be 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.

- The project will have 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.
- The project is going to have positive impact on consumption behavior by way of raising average consumption and income through multiplier effect.
- The project is going to bring about changes in the pattern of demand from food to non-food items and sufficient income is generated.
- 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 expansion of GDK 1&3, GDK 2&2A and GDK 5 incline mines is likely to have other tangible benefits as given below.

- Indirect employment opportunities to local people in contractual works like housing construction, transportation, sanitation, for supply of goods and services to the project and other community services.
- Establishment of coal based / dependent industries in the area
- Additional housing demand for rental accommodation will increase.
- Market and business establishment facilities will also increase.
- Cultural, recreation and aesthetic facilities will also improve.
- Improvement in communication, transport, education, community development and medical facilities.
- Overall change in employment and income opportunity.
- The State Government will also be benefited directly from the proposed project, through increased revenue from royalties, excise duty and etc.

Justification:

- (i) To decrease the gap between the demand and production of the coal in the country and to maintain the sustained growth of the company by improving productivity and profits. Ultimately it gives financial and social benefits for the local people there by improving their standard of living, hence the proposal to enhance the production of GDK 1&3, GDK 2&2A and GDK 5 incline mines is justified.
- (ii) The above proposal is aimed at increasing the production from 1.17 MTPA to 1.734MTPA in existing GDK 1&3, GDK 2&2A and GDK 5 incline mines by increasing the number of SDL's and by improving the performance of existing LHDs/SDLs.
- (iii) With the proposed enhancement in production, the productivity will increase which in turn reduces the cost of production.
- (iv) With the increased mining activities number of roads will be laid to connect the remote areas to main roads, there by communication facilities will be improved in that area which will improve the condition of the people in surrounding villages.
- (v) The manpower for the proposed production enhancement at GDK 1&3, GDK 2&2A and GDK 5 incline mines will be 1214, 1775 and 1342 respectively. This is the direct employment generated by the project where as the indirect generated employment by way of Coal transportation, Sand stowing operations, picking of Shale/Stone from the conveyor belts, colonization, supply of raw material like fly ash bricks, supply of spares and consumables, general conveyance of persons to the mine from their location by means of hired vehicles, housekeeping etc. will be much more than the above.
- (vi) Due to starting of new mines or expansion of existing mines, the supporting industries will also be developed in that area there by direct and Indirect employment will be generated for the local people in the area and helps to develop the area and the company will also prosper.
- (vii) Ultimately it gives financial and social benefits for the local people there by improving their standard of living, hence the proposal to enhance the production of GDK 1&3, GDK 2&2A and GDK 5 incline mines is justified.
