

RESTRICTED CIRCULATION

Mining Plan including Mine Closure Plan NAINI COAL MINE

(Draft)

under Rule 22A (2) of Mineral Concession Rules, 1960

NAINI Geological Block (9.1279 Sq.Km)

**Talcher Coal field
Chhendipada (Village)
Angul District
Odisha State**



Plan Prepared by me

(Signature)
(P. SURENDAR RAJU)
Recognised Qualified Person UTR 22(1) of Mineral Concession Rules 1960
Ministry of Coal, Govt. of India.
Ref. 34012/1/2015-CPAM
Dt. 05-10-2017

The Singareni Collieries Company Limited

(A Government Company)

P.O. Kothagudem - 507 101.

Dist. Bhadradi Kothagudem

State: Telangana

TARGETED CAPACITY OF 10.0 MTPA

Recognised Qualified Person

Shri P. Surendar Raju, Addl. Manager

Ref. No.34012/1/2015-CPAM, dated: 05.10.2017

Department of Project Planning

P.O. Kothagudem – 507 101

Bhadradi Kothagudem District: Telangana State

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The Singareni Collieries Company Limited
(A Government Company)
(ISO 9001:2015 Certified)
CIN: U10102TG1920SGC000571



Regd. Office:

Kothagudem Collieries (PO) - 507 101
Bhadrachari Kothagudem District
Telangana, India

Director (P&P) : 08744-242328
GM (CP&P) : 08744-243108
GM (PP) : 08744-242395
Fax : 08744-244115/242305
E-Mail : gm_pp@scclmines.com
Website : www.scclmines.com

Ref.No. CRP/PP/, D/394/398

Date: 09.04.2018

Director, CA-II,
Ministry of Coal,
Govt. of India,
NEW DELHI.

Sir,

Sub: Submission of **Mining Plan & Mine Closure Plan** of "**NAINI COAL MINE**"-
Angul (Dist), Odisha (state)-The Singareni Collieries Co. Ltd - Reg.

Naini Coal Block was allotted to M/s SCCL (The Singareni Collieries Company Limited) by Ministry of Coal, Government of India, vide order No.103/21/2015/NA, dated 13.08.2015.

Mining Plan and Mine Closure Plan of 'Naini Coal Mine' for a rated capacity of 10 MTPA is hereby submitted for approval.

Yours faithfully,

DIRECTOR,
PLANNING & PROJECTS,
The Singareni Collieries Company Limited

- Encl: 1. Mining Plan & Mine Closure Plan of
'Naini Coal Mine' - Four copies.
2. Check list - Four copies.

14/5/18

प्रोचक
प्राप्ति एवं प्रेषण अनुभाग
कोयला मंत्रालय, शास्त्री भवन
नई दिल्ली-110001

1.EXECUTIVE SUMMARY

1.1. Background of the Project and Proponent:

Back ground of the Project: The exploration in Naini coal block was carried out in phases during the period from 1981 to 1998 by GSI and CMPDIL. The drilling was concentrated in the Western part of the block only. 53 nos. of boreholes have been drilled in the western part of the block spreading over an area of **3.42** sq.km, which has been considered as Proved zone for resource estimations. The remaining eastern part of the block comprising **5.70** sq km area is regionally explored.

The Ministry of Coal, Govt. of India vide letter no.13016/2007-CA-1 dated 25.7.2007 had allocated Naini coal Block in Talcher coalfield (Orissa) jointly to Gujarat Mineral Development Corporation Ltd., (GMDC) of Govt. of Gujarat and Pondichery Industrial Promotion Development & Investment Corporation Ltd., (PIPDICL) of Govt. of Puduchery. To develop the block, GMDC of Govt. of Gujarat and PIPDICL of Govt. of Puduchery had incorporated a joint venture company under the name and style of **“Naini Coal Company Limited (NCCL)”** with 50:50 equity shares.

As mentioned the status of the Naini coal block at the time of allocation is narrated below:

- Regional exploration was carried out by GSI during 1985-90 in the region and in the vicinity of Naini coal block.
- Earlier CMPDIL carried out exploration during 1991-98 with 50 Nos. of boreholes.
- The borehole density in the total block with GSI & CMPDI is about 6.35 boreholes per sq. km.

The coal resources of Naini coal block were projected for 1500 MW proposed power plant at Angul in Odisha or near Dumka in Jharkhand by GMDC and proposed pit head power plant of 1500- 2000 MW capacity by PIPDIC.

M/s Naini Coal Company Ltd., vide office letter No. NCCL/CMPDI/2010/1 dated 25th August 2010 requested CMPDIL for preparation of geological report for Naini coal project of Talcher coalfield.

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Ref: S-4012C/12015-CPAA
Dt: 05-10-2017

Hence, it would be worth to mention that:

1. Detailed exploration had not been carried out for Naini coal block.
2. CMPDIL has drilled 50 nos. of boreholes towards western part of the block concentrating only within an area of around 3 sq.km.
3. The GSI has drilled 8 boreholes within the block covering an area of 9.1279 sq. km as part the regional drilling.
4. Eastern part of the block covering an area of about 6 sq.km has only 5 GSI boreholes and needs the detail exploration to assess the structure, lay & it's position of coal seam in that part of the block.
5. The coal seam XVII to IX occur only towards the southern part of the block below fault F1-F1 over a small area.
6. The coal seams-VI/VII/VIII, Seam-III (with its splits) and Seam-I (with its ten splits) are the main coal seams of the block.

Accordingly CMPDIL has prepared GR of Naini Coal Block. The total geological reserves estimated in the block are 455.18 Million tonnes (Mt) up to a depth of 550 m of 1H seam.

Subsequently the coal block was de-allocated to M/s Naini Coal Company Ltd., and was allotted to M/s SCCL by MoC, GoI vide order No.103/21/2015/NA, dated 13.08.2015. SCCL has obtained the soft copy of GR prepared by CMPDIL from Nominated Authority.

Based on the Geological Report submitted by CMPDIL, Geomodel of Naini coal block was prepared by SCCL considering all the 25 Seams and Geological reserves are re-estimated irrespective of seam thickness as 521.27Mt.

Back ground of the proponent: The Project Proponent is M/s Singareni Collieries Company Limited (SCCL).

The Singareni Collieries Company Ltd. (SCCL) is a Government coal mining company jointly owned by the Government of Telangana and Government of India on a 51:49 equity basis. The company was initially incorporated as "Hyderabad (Deccan) Company Limited" in England and acquired mining rights in 1886 to exploit coal found in Yellandu area. The present Company was incorporated on 23rd December 1920 under the Hyderabad Companies Act as a public limited company with the name 'The Singareni Collieries Company Limited' (SCCL).

In the year 1945, the State of Hyderabad, the Nizam's Dominion, took over Singareni Collieries Company Limited by acquiring all the stocks in the company, thereby continuing the mandate to mine coal from entire Godavari Valley Coal Field. In 1948, with annexation of Nizams' Dominion into Union of India, SCCL became a Government Company. From 1960, Govt. of India participated in Equity with 49% shares.

In 1972-73, all coking and non-coking coal mines of private operators (except the captive mines of IISCO, TISCO, and DVC) were nationalized and brought under Coal India Limited with a view of centralizing the Coal mining operation in all coal fields, other than Godavari Valley Coal Field. Since then, Ministry of Coal has been referring to Godavari Valley Coal Field as command area for SCCL. The mining rights of SCCL cover a stretch of 350 km in Godavari Valley with proved coal reserves of about 10,474.90 Million Tonnes as on 01.04.2018 as per SCCL estimation.

SCCL currently operates 29 underground mines and 19 opencast mines located in 6 districts of Telangana State viz. Kumram Bheem, Mancherial, Peddapalli, Jayashanker-Bhupalpalli, Bhadradi-Kothagudem and Khammam. For administrative convenience, coal mines in Kumram Bheem & Mancherial districts are grouped under one region called Bellampalli Region, mines in Peddapalli & Jayashanker-Bhupalpalli districts are grouped under Ramagundam Region and mines in Bhadradi-Kothagudem & Khammam district are grouped under Kothagudem Region.

The proposed project is planned with the following important features.

- a. As the entire coal block is coal bearing area and no non-coal bearing is available for external dumping of OB, it is proposed to dump the OB temporarily over the coal bearing area in initial years, and to re-handle the same to internal dump, in later stages.
- b. The overall weighted average grade produced from Naini coal block is G-10 with GCV of 4520 Kcal/Kg. As per the stipulation of MoEF & CC, regarding transportation of coal with >34 % of ash beyond 500 km, it is proposed to establish a washery to wash G10 & below grade coal.
- c. It is proposed to transport the washed coal from pit head to nearest railway siding (proposed) which is 4.0 Km away from the project by laying closed conveyor system. Till the commissioning of proposed railway line the coal will be dispatched by road to nearby (about 30 Km away) railway station JARAPADA, for further dispatch to STPP. Tentative land requirement for the proposed railway siding etc. is 50 Ha.

- d. Seasonal nallahs passing across the coal block, follow the course of flow of the drains planned along West, South and East boundaries of the project area to join Gaudani Nalla flowing from West to east along North side boundary.

1.2. Brief Description of the Project

The quarry area was fixed by leaving about about 90m against State Highway on West side, minimum 60m from block boundary/Gauduni Nalah on North side, 70m against block boundary on East and South side leaving around 45 Ha of land for service buildings, crushers & coal yard and coal washery in South-West corner.

Name of the Project	Naini Coal Mine
Type of Project	OC-New
Village	Chhendipada
Tahasil	Chhendipada
District	Angul
State	Odisha
Coal Belt	South Eastern extremity of Lower gondwana Basin
Coal Field	Mahanadi Valley graben
Name of the organization	The Singareni Collieries Company Limited.
Geological Reserves	521.27MT
Extractable Reserves	340.78MT
Total HOB from Quarry	870.67M.Cum
Topsoil from the quarry	7.61 M.Cum
Total OB from the quarry	878.28 M.Cum
Average Stripping Ratio	2.58 Cum /T
Surface Area of excavation (Ha)	762.41
No. of workable seams	20
Seam Gradient	1 in 7 to 1 in 14
Avg. Grade & Grade range	G-10
Borehole density (No/Sq.km)	6.35 No/Sq.km (Detailed exploration has been done in an area of 3.42 Sq. Km with BH density of 15.5 Bh/Sq. Km. Exploration in the balance

	area is under progress)
Land requirement (Ha)	912.799Ha (Forest-783.275 & Non forest-129.524)
Technology	Shovel-dumper combination & Surface Miner
Depth range (m)	15-200
Rated capacity	10 MTPA
Life of the project (Years)	38 years (including 2 years construction period)

Plan Prepared by me


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 Ref: 34012K/2015-CPRM
 Dt: 05-10-2017

2. INTRODUCTION OF THE PROJECT / BACKGROUND INFORMATION:

(i) Identification of the project and Project Proponent.

In case of mining project, a copy of mining lease / letter of intent should be given.

Identification of the Project:

The present proposal i.e. Naini coal mine (by opencast method) project is in tune with the company's plan to minimize the gap between coal demand and supply and to have uninterrupted coal supply for its own power plant at Jaipur, Telangana state.

Project Proponent

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

Address:

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

Mining Leases (ML): Mining lease area of the project is 912.799 Ha. The lease is under process.

Environmental Clearance (EC): Environmental clearance for the project is to be obtained.

(ii) Brief description of the nature of the project

This project is an **opencast project** with rated capacity of **10.0 MTPA**.

Mining Scheme:

There are 25 coal seams {in the descending order: XVII to IX, VI/VII/VIII (merg.), IV/V (merg.), IIIT, IIIM, IIIBT, IIIBB, IIT, IIM, IIB, I AT, I AB, I B, I C, I D T, I D B, I E, I F, I G & I H} in the proposed coal block. Out of the above, 20 seams are present in the proposed quarry area. The remaining seams (from XIV to X) do not exist in the proposed quarry area. Though the seams are available in the area within the boundary of the project, their presence is limited to the south west corner of the project area and disappear in the quarry area due to up throw fault of 310m and hence could not be excavated.

It is proposed to extract coal by using Surface miner (thicker seams: III T, III M, III BT & I AB) and shovel-dumper combination (other seams). The excavation of OB is proposed by Shovel-Dumper combination. The method of work for OC operation comprises of the prime operational components such as removal of topsoil, initial opening of box cut, removal of overburden and inter-burden to expose the coal seams for extraction of coal. All the operations including beneficiation of coal are proposed to be out sourced.

- The Opencast project is designed for a rated capacity of 10.0 MTPA (to attain in 4th year of its operational year).
- The project excavates 870.67 M. Cum of hard OB and 7.61 M. Cum of top soil from the quarry. It is planned to extract coal of 340.78 Mt from the project in the life period of 36 operational years. Construction period is estimated at 2 years.
- Due to non-availability of non-coal bearing area within the project land limit line, only temporary external dump yard in the proposed quarry area is proposed for dumping of OB in initial years. The dumped OB will be re-handled to the internal dump in later stages. Thus, exclusive external dump yard is not envisaged in the project; total OB excavated from the quarry will be accommodated internally only.
- Forest land requirement for the project is 783.275 Ha out of total project area of 912.799 Ha.

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

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. In view of the power demand in the state and in order to fulfill coal requirement of thermal power project (STPP), SCCL is taking steps to enhance the production capacity by planning and implementation of new coal mining projects.

(iv) Demand-Supply gap

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. Presently SCCL supplying coal to the major power utilities & has signed fuel supply agreements (FSAs) with TSGENCO, APGENCO, KPCL and MAHAGENCO for supply of coal to the tune of 27.71 MTPA. Apart from this bridge linkages & MOU linkages for supply of coal to the tune of 23.17 Mt, for power utilities has been

executed. Apart from this SCCL has committed for supplying of about 8.2 Mt of coal to Captive Power Plants, Heavy Water Plants, Cement Factories, Sponge Iron Factories apart from 2.5 Mt to other Non-FSA customers. SCCL is also supplying coal through E-auction platform and has a mandate to sell 10% of production through E-auction. As of now, there is huge gap between demand and supply of coal in the state of Telangana. 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 production projections up to 2019-20 can only be met by starting new mines and by reorganization and reconstruction of some of the existing mines to step up production with advanced technology. The demand and supply gap is 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	62.01	68.00*	72.00*
3	Gap	19.86	16.87	9.10

***Projected production.**

As, such, SCCL has achieved 62.01 MT for the year 2017-18 & is taking the following steps for increasing/maintaining the coal production.

- ❖ Adoption of opencast technology wherever possible for high rate of production.
- ❖ Conversion of shallow depth underground mines into opencast mines for extraction of balance coal reserves.
- ❖ Further extension of the existing opencast workings to the dip side up to optimum depth.
- ❖ Improving the productivity in the existing mines by optimizing the utilization of resources like Manpower, Equipment and Time.
- ❖ Opening of new mines in the adjoining/superjacent areas/seams for higher production.
- ❖ Reconstruction of existing mines for optimum production by intermediate and high capacity technology.

There is huge demand for coal production in Southern India and to meet the requirement of newly formed Telangana State. The state is planning to set up 6000 MW new power plants within five years to meet the power requirement.

Keeping in view of power requirement, MoC, GoI has allotted NAINI COAL MINE to Singareni Collieries Company Limited to feed the coal to STPP (Singareni Thermal Power Plant), Jaipur (Telangana State).

(v) Imports Vs Indigenous production

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

(vi) Export possibility

There is no possibility of export of coal from this project, as the project is intended to feed the coal to STPP (Singareni Thermal Power Plant, owned by the Singareni Collieries Company Limited i.e. the applicant), Jaipur, Telangana state.

(vii) Domestic / export markets

The coal produced will be supplied to STPP (Singareni Thermal Power Plant, owned by the Singareni Collieries Company Limited i.e. the applicant), Jaipur, Telangana state.

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

It is proposed to operate the Naini Coal Mine by out sourcing all the operations. Hence, the only statutory manpower required for coal business including quality checks and administration will be deployed by the department. Daily employment requirement may be at about 900 including the deployment of personnel by the out sourcing agency.

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Ref: 34012/C/2015-CPAM
Dt. 05-10-2017

3. PROJECT DESCRIPTION:

(i) Type of project including interlinked and interdependent projects, if any:

The project is independent and not interlinked or interdependent on any project for its production.

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

Location details:

The Naini coal block is a Non CIL block, located in the North Central part of Talcher Coalfield in the state of Odisha. This coalfield is the southeastern extremity of the Lower Gondwana basins within Mahanadi Valley graben. The Naini coal block spans over an area between Latitude 21°03'21" & 21°05'23" North and Longitude 84°52'56" & 84°55'17" East. The block is covered under Survey of India Toposheet No.73 C/16 on R.F. 1:50000 and special topo sheet Nos. L-11 and M-11 on the RF 1:10000 and falls within Angul district of Odisha state.

District headquarter Angul, located on the National Highway 42 (Bhubaneswar-Cuttack-Angul to Sambalpur), is the nearest town at a distance of about 33 km from the south-western corner of the block via state highway 63. Angul - Chhendipada road which passes from the south-western corner of the block connecting the north western corner and forms the western boundary of the block. The block comes under Chhendipada Tahsil and police station in the district of Angul, Odisha. Talcher town is having MCL establishments both for opencast as well as underground mine which is located at a distance of 40 km from the block via Kosala village. The nearest railway station is Jharpada on Cuttack-Sambalpur line of East-Coast railway and is about 30 km from the block. The block is 164 Km from the state capital Bhubaneswar and the nearest airport is also in the capital.

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

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

(iv) Size or magnitude of operation

The Project is proposed to operate at normative capacity of 10.0 MTPA. The physical parameters of the project are furnished below:

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a	Maximum strike length along surface	3498 m
b	Minimum strike length along surface	1887 m
c	Maximum width of the quarry along surface	2690 m
d	Minimum width of the quarry along surface	1620 m
e	Minimum depth of the quarry	15 m
f	Maximum depth of the quarry	204 m
g	Floor area of quarry	520.44 ha
h	Area of excavation on surface	762.41 ha
i	Total Land requirement within the lease hold	912.799 ha
j	Average Gradient of the seam	1 in 7 to 1 in 14

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

The project is a coal producing unit referred to as coal mine. The coal produced is brought to surface and dispatched to STPP (Singareni Thermal Power Plant) only.

The components of the project operations: Under the prevailing geo-mining conditions such as seams of varying thickness and gradient, it is proposed to excavate the coal with Surface miner (Thicker seams i.e. 3T, 3M, 3BT & 1AB) and Shovel-dumper (for the remaining seams) and to excavate OB by shovel-dumper combination. Further it is envisaged for beneficiation of coal. The excavation operation comprise the following components.

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

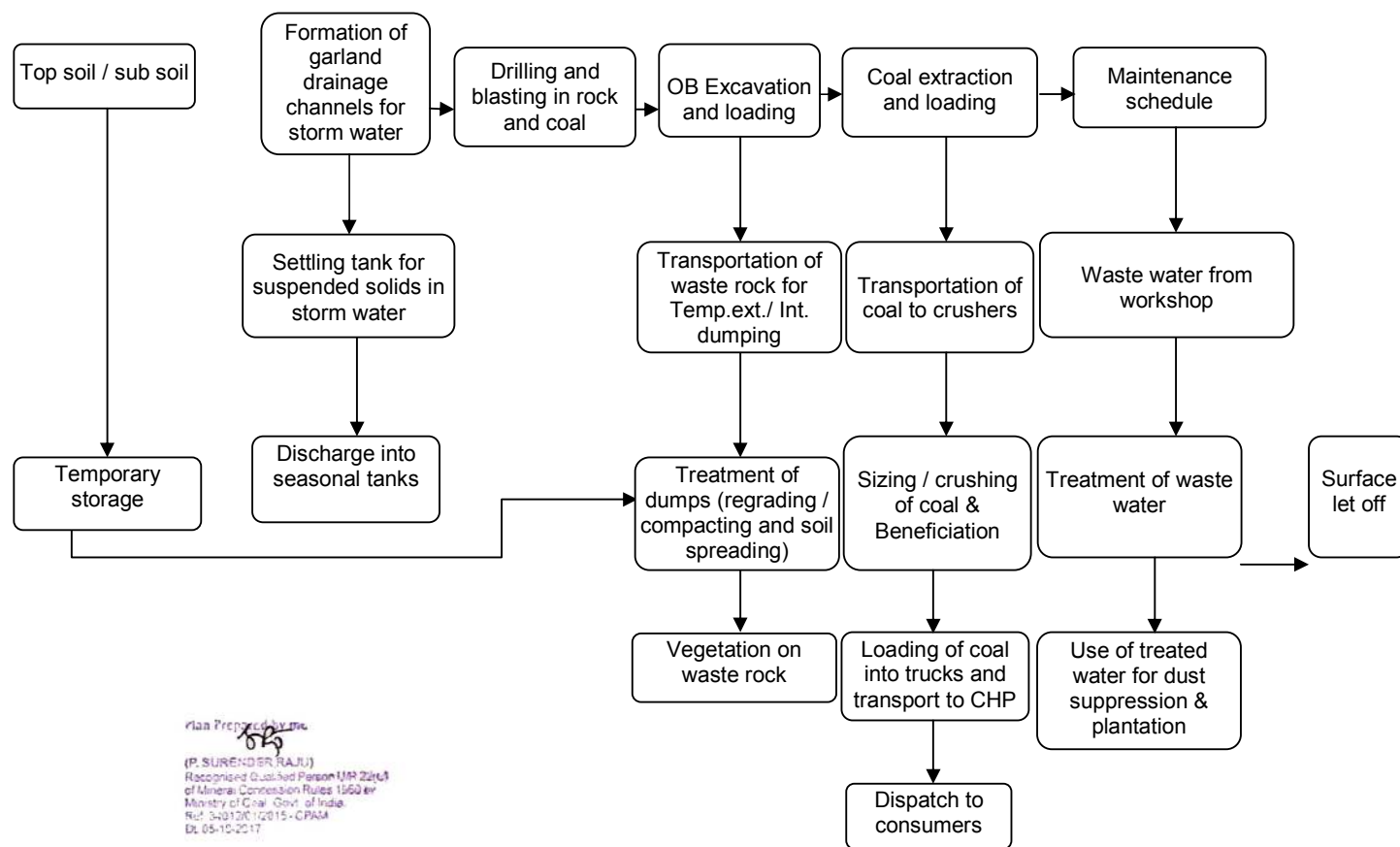
The activities involved in the process are:

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

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 of Mineral Concession Rules 1950
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MINE DEVELOPMENT AND COAL EXTRACTION PROCESS CHART



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

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

Raw material required for the project with estimated quantity:

Material	Quantity/annum	Source
Explosives (T)	10,230	Purchasing from explosive companies
Diesel Oil (KL)	45,163	Purchasing from oil companies

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

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

Marketing area of final product: The coal will be supplied to STPP as intended.

Mode of transportation of finished product (coal):

Coal transport to surface CHP bunkers from the quarry is by dumpers. From the Pit CHP, after washing, the washed coal is proposed to be transported through rail to Singareni Thermal Power plant.

The coal transported to pit head will be fed to 3no's of 1000TPH (-50mm) feeder breakers through apron feeders and vibratory screens which separate the coal size wise -10mm & -50mm. Coal of size -50mm (other than -10mm) will be processed in washing units and will be transported to GL bunker and then to railway siding, to transport to the end user i.e. STPP (Singareni Thermal Power Plant) located at Jaipur, Mancherla District, Telangana State by rail.

Out of 340.78 Mt of total planned production of different grades, coal of G-9 and of above grades is 81.10Mt. After washing the remaining coal of lower grades i.e. 259.68 Mt, 205.87 Mt coal of G-9 grade is estimated to be obtained. Hence, total of 286.97 Mt of G9 and above grade coal will be fed to STPP by rail. Rejects (53.81 Mt) will also have separate disposal arrangements. The coal quality varies from G4 to G14, seam wise. The coal of G-10 and below rank will be washed, to facilitate supply of G-9 coal to STPP.

It is proposed to transport the washed coal from pit head to nearest railway siding (proposed) which is 4.0 Km away from the project by laying conveyor system. Till the commissioning of proposed railway line the coal will be dispatched by road to nearby (about 30 Km away) railway station JARAPADA, for further dispatch to STPP.

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

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

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

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

Availability of water, its source:

The source of water for the Project activities is the water pumped out from the proposed opencast itself. After meeting the mine requirements, the excess water will be let out into nearby nallah after necessary treatment and sedimentation of solids and waste. About 2000 m³/day is required for various purposes of the mine requirements like dust suppression (1200 m³/day), washing of HEMM (600 m³/day), domestic requirement (60 m³/day) and for plantation is (140 m³/day).

Power requirement & Source:

The source of power for the project will be from 132 KV electrical sub-station located near Chhendipada, Angul District.

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

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

Plan Prepared by me

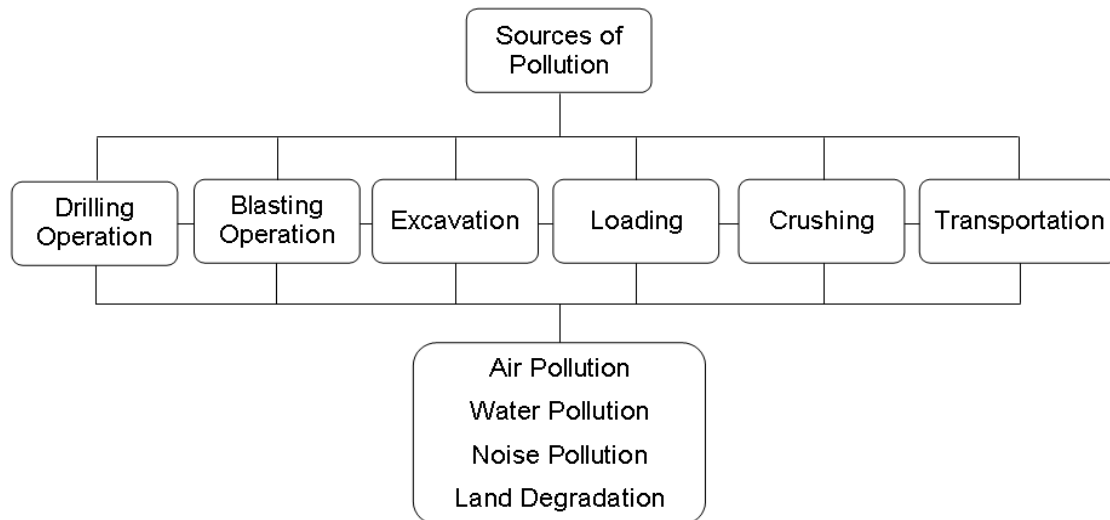
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 Ref: S-012/K/2015-CRAM
 Dt. 08-10-2017

Solid waste: The quarrying will produce **340.78 MT** of Coal and **878.28 M.Cum** of OB (including topsoil quantity of 7.61 M.Cum).

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

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

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



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4. SITE ANALYSIS:

(i) Connectivity

District headquarter Angul, located on the National Highway 42 (Bhubaneswar-Cuttack-Angul to Sambalpur), is the nearest town at a distance of about 33 km from the south-western corner of the block via state highway 63. Angul - Chhendipada road which passes from the south-western corner of the block connecting the north western corner and forms the western boundary of the block. The block comes under Chhendipada Tahsil and police station in the district of Angul, Odisha. Talcher town is having MCL establishments both for opencast as well as underground mine which is located at a distance of 40 km from the block via Kosala village. The nearest railway station is Jharpada on Cuttack-Sambalpur line of East-Coast railway and is about 30 km from the block. The block is 164 Km from the state capital Bhubaneswar and the nearest airport is also in the capital.

(ii) Land form, Land use and Land ownership

The project involves forest Land. The land requirement for the mine take area of the project comprising of quarry area, service buildings, CHP etc. is 912.79 Ha.

Pre-mining land use details:

Tenancy/Private	Agriculture	109.969
	Township	1.782
	Others	0.076
	Sub-total	111.827
Government/Non forest	Agriculture	2.793
	Township	1.809
	Grazing	4.514
	Road	0.884
	Water body	0.238
	Nala	6.654
	Others	0.805
	Sub-total	17.697
Forest	Reserve forest (chhendipada and kankurpal)	643.095
	Village-forest	140.180
	Sub-total	783.275
Grand total		912.799

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The land requirement for the proposed project is given below.

S.No.	Type	Land use
1	Excavation Area	762.414
	(a) Backfilled Area	479.546
	(b) Excavated Void	282.868
2	Safety Zone//Rationalisation area	109.492
	(a) Safe Barrier along the Quarry & others	65.314
	i) Safety Barrier along the Quarry	30.135
	ii) Road	24.884
	iii) Nallah	10.295
	b) Embankment	8.755
	i) Embankment Slopes	4.955
	ii) Embankment Top Road	3.800
	c) 7.5m Corridor	6.794
	d) Others	28.629
3	Road & Infrastructure area (CHP, Coal Yard, & Washery)	40.893
Grand total		912.799

(iii) Topography

Physiography:

The surface topography is generally rugged and undulating. The Naini coal block is mostly covered with forest. Most of the part of the block lies under Chhendipada reserve forest zone. However south eastern part is covered with open scrub/less dense forest cover. The surface topography is undulating with a general northerly slope. The highest elevation above Mean Sea Level is about 159metres (near the borehole CMBT-05, RL 158.85 metres) in the southwestern corner and the surface elevation gradually decreases to 125 metres (near borehole TCC-23, RL 125.09 metres) in the northeastern and northern part of the block.

Drainage:

Brahmani river, flowing in approximately north-south direction along the eastern boundary of the Talcher coalfield, provides the main drainage of the region. The Gauduni nalla forming the northern boundary of the block flows from south-west to north-east/north. Another Kudaposi nalla flows from south to north across the Naini coal block. These two nallas-Gauduni and Kudaposi controls the drainage and topographical pattern of the block.

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Both the nallas are discharging in Tikra nadi, which is running along the northern boundary of the coalfield. The Tikra Nadi merges in its downstream into Brahmani river towards the northeastern corner of the coalfield.

Small ponds and dug wells are common in this block which are utilised for irrigation and drinking purpose

The main drainage system of the area/coalfield is controlled by the southerly flowing Brahmani river passing through eastern extremity of the coalfield. The other seasonal nallas, viz. Tikra nadi, Singhada jhor, Nandira jhor etc. also feed the Brahmani river.

Diversions or shifting involved:

No major diversions are involved in this Project. One power line from on the west side situated along the proposed excavation line is to be diverted.

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

The proposed project area does not fall under CRZ area. The project does not fall within 10 Km radius of any Wild Life Sanctuary. Forest land of 752.46 Ha of the land is involved in the project area. The Gauduni nalla forming the northern boundary of the block flows from south-west to north-east/north.

(v) Existing Infrastructure

The infrastructure facilities existing are:

- ❖ Well-established township
- ❖ Source of power and existing substation
- ❖ Connecting road and communication systems
- ❖ guest houses, schools and hospitals

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(vi) Soil classification

To assess impact of the mining on soil in and around project site and the effect on agricultural field, soil quality of the area has been evaluated with respect to physical and chemical parameters. The physico-chemical properties of soil, which are important for plant growth and agricultural productivity i.e. texture, bulk density, moisture content, water holding capacity, pH, EC, Organic Carbon etc. are analyzed in the study area.

Textural Class of Soil

S.No	Sampling Stations	Soil Texture	Soil Depth
1	Brahmanbil	Sandy Clay Loamy	30 cms
2	Santarabandha	Clay	30 cms
3	Khanguria	Clay	30 cms
4	Kasidin	Sandy Clay Loamy	30 cms

Physical Characteristics of Soil

S.No.	Sampling Stations	Particle Size Distribution			Water Holding Capacity	Porosity
		Sand (%)	Silt (%)	Clay (%)	(%)	(%)
1	Brahmanbil	54.4	10.9	34.5	36.0	49.0
2	Santarabandha	18.0	9.8	72.1	55.0	57.0
3	Khanguria	23.8	14.9	61.1	51.0	55.0
4	Kasidin	57.1	14.3	28.5	34.0	41.0

Chemical Characteristics of Soil Extract

S.No.	Sampling Stations	pH	EC (mmhos/cm)	CEC (meq %)	SAR	Organic Carbon (%)
1	Brahmanbil	6.9	0.168	21.1	0.04	5.1
2	Santarabandha	6.8	0.105	49.3	0.02	5.2
3	Khanguria	6.8	0.194	30.55	0.04	5.1
4	Kasidin	6.9	0.163	7.05	0.1	4.9

Exchangeable Cations of Soil

S.No.	Sampling Stations	Ex-Ca	Ex-Mg	Ex-Na	Ex-K
		(meq/100gr)			
1.	Brahmanbil	11.5	7.1	0.77	0.43
2.	Santarabandha	38.1	9.3	0.52	0.25
3.	Khanguria	21.8	5.6	0.83	0.28
4.	Kasidin	2.8	0.8	0.72	0.34

Fertility Status of Soils in Study Area

S.No.	Sampling Stations	N	P ₂ O ₅	K ₂ O
		Kg/ha		
1.	Brahmanbil	50	0.41	381
2.	Santarabandha	111	0.27	224
3.	Khanguria	38	0.59	247
4.	Kasidin	38	0.49	301

Trace Metals Content in Soil

S.No.	Sampling Stations	Cd	Cr	Pb	Ni	Cu	Zn	Mn
		mg/kg						
1.	Brahmanbil	BDL	28	13	16	105	44	266
2.	Santarabandha	BDL	20	9	14	82	30	342
3.	Khanguria	BDL	21	10	13	59	22	194
4.	Kasidin	BDL	33	9	12	64	24	234

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DTPA Extractable Micro Nutrients

S.No.	Sampling Stations	Zn	Cu	Fe	Mn
		(µg/g)			
1	Brahmanbil	0.55	1.59	33	32
2	Santarabandha	3.72	2.17	15	92
3	Khanguria	0.97	0.90	14	29
4	Kasidin	1.81	1.20	12	43

From the above tables, it is clear that the soil is conducive for the growth of different species which are commonly found in nature. Effluents from the project and proposed land degradation will have Impact on soil quality.

(vii) Climatic data from secondary sources

Meteorological data

The predominant wind direction is blowing from South South West (SSW) direction and calm conditions prevailed is for 3.14% of the time during this period. The maximum wind speed recorded was 11.2m/s. The maximum temperature recorded was found to be 46.4⁰C, while the minimum temperature was 20.0⁰C and the average temperature is 30.7⁰C. The average relative humidity was found to be 76.4%. The total rainfall observed was 4.4mm. The summary of monthly micro-meteorological data (wind speed, wind direction, temperature, relative humidity and rainfall) for entire study period is given hereunder.

Summary monthly-wise micro-meteorological data

Month	Wind Speed (m/s)			Temperature (°C)			Relative Humidity (%)			Rainfall (mm)	
	Mean	Max	Calm %	Mean	Max	Min	Mean	Max	Min	Total	Hourly highest
March-2017	4.19	10.8	7.11	29.8	38.0	24.0	82.5	98.0	58.0	0.0	0.0
April-2017	5.33	10.3	2.08	30.5	46.4	20.0	74.5	98.0	22.0	0.0	0.0
May-2017	5.38	10.8	2.42	31.2	42.0	23.0	71.3	95.0	22.0	0.6	0.2
June-2017	5.18	11.2	2.22	31.1	44	24	77.6	98.0	40.0	3.8	0.4

**Summary of micro-meteorological data for summer season
(March 2017 – June 2017)**

S.No	Parameter (s)	Min	Max	Mean
1.	Temperature ($^{\circ}\text{C}$)	20	46.4	30.7
2.	Wind Speed (m/s)	Calm (%) 3.14	11.2	5.12
3.	Relative Humidity (%)	22	98	76.4
4.	Predominant Wind direction for the entire study period	South South West (SSW)		
5.	Total Rainfall (mm)	4.4		

. METEOROLOGY- RAINFALL DATA

The climate is tropical. The summer is severe during May-June when temperature rises to as high as 49°C accompanied by high humidity. Winter is very pleasant, prevails during December-January. The temperature recorded generally varies from 6.7°C to 38.1°C (December -February). Monsoons break towards the end of June and continues up to end of October. Relative humidity varies from 31% in March to 88% in July. Annual rain fall varies between 758 mm and 1588 mm for a period of 23 years from 1980 to 2003 with annual average rainfall of 1317 mm as recorded by IMD, Angul. More than 70% rainfall occurs during the months of June to September.

The annual mean wind speed recorded at Angul Station is 2.43 km/hour whereas the monthly mean wind speed ranges between 2.8 km/hour (January-February) and 3.02 km/hour (May). During the Pre-monsoon season, the prominent wind direction remains in east. During the monsoon season, the wind direction shifts to north-west and north-east. During post monsoon and winter season, the direction of wind is generally towards north-west and north-east. During 29th to 31st October '99 there was a super cyclone with wind speed upto 300km/hour at costal areas of Odisha. The reading during super cyclone possibly could not be recorded. Vegetation in the area are mainly eucalyptus, acasia, palas, sal and aran with some fruit bearing trees like mango, mahua and neam.

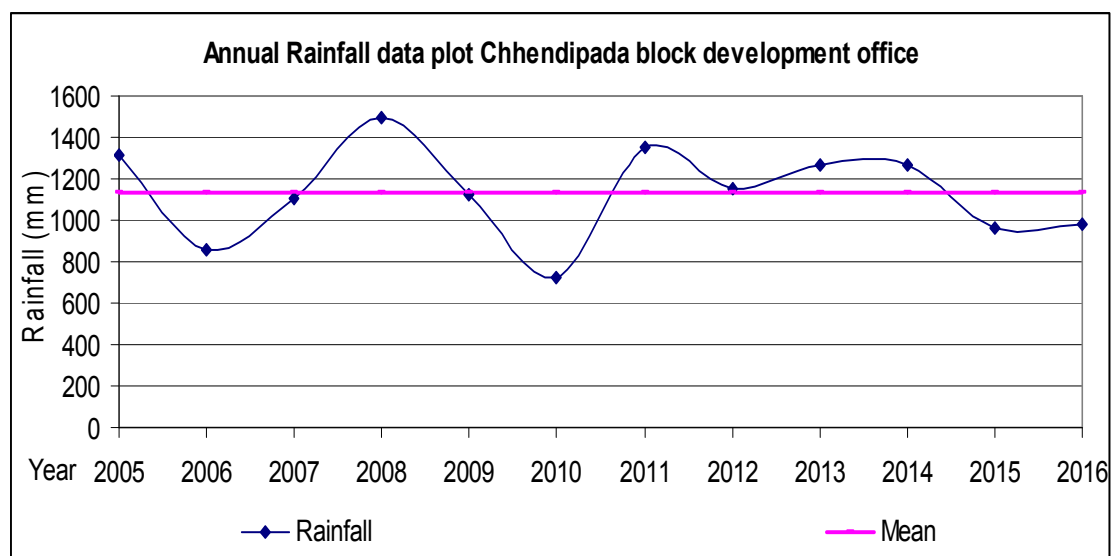
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Rainfall: Monsoon breaks towards the end of June and continues till end of October. An exceptional downpour recorded during 24 hours was 217 mm on 28 July 1992. The annual rainfall varies from 932 to 1464 mm (with a mean of 1269.57 mm for the period of 1992 to 2009). More than 77% of rainfall occurs during the month of June, July, August and September. December is the month of least rainfall.

Rainfall data at Chhendipada block development office and Deviation from Mean

Year	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	OCT	NOV	DEC	TOTAL	Deviation % from mean	Status
2005	3.0	0.0	19.0	0.0	40.0	160.0	599.0	99.0	179.0	219.0	0.0	0.0	1318.0	16.27	Normal
2006	0.0	0.0	33.0	2.0	123.0	124.7	142.5	330.0	92.5	11.4	2.0	0.0	861.1	-24.04	Normal
2007	0.0	0.8	9.1	18.6	55.2	183.0	218.4	210.9	378.2	14.0	18.4	0.0	1106.6	-2.38	Normal
2008	32.4	5.1	5.3	29.9	20.7	299.8	351.2	298.8	444.5	11.4	0.0	0.0	1499.1	32.24	Excess
2009	0.0	0.0	19.6	0.0	12.5	50.6	452.7	283.9	128.0	141.2	33.3	0.0	1121.8	-1.04	Normal
2010	0.0	0.0	1.4	6.4	79.0	45.6	152.5	138.4	141.4	111.0	20.0	28.4	724.1	-36.12	Deficit
2011	0.0	22.6	4.2	86.4	68.4	188.8	69.2	398.0	495.6	17.8	0.0	0.0	1351.0	19.18	Normal
2012	119.6	38.4	0.0	0.0	15.2	86.1	306.6	267.0	203.2	52.4	60.2	0.0	1148.7	1.34	Normal
2013	3.2	4.0	0.0	42.6	36.4	222.6	365.8	222.7	102.8	263.8	0.0	0.0	1263.9	11.49	Normal
2014	0.0	33.4	14.2	2.0	59.2	122.8	446.9	210.8	272.2	106.6	0.0	0.0	1268.1	11.86	Normal
2015	11.0	13.4	11.4	52.8	33.4	179.3	279.8	201.2	131.4	0.0	0.0	44.0	957.7	-15.52	Normal
2016	0.0	30.6	19.5	0.0	49.6	243.8	152.7	346.0	85.4	55.9	0.0	0.0	983.5	-13.24	Normal
Mean	14.1	12.4	11.4	20.1	49.4	158.9	294.8	250.6	221.2	83.7	11.2	6.0	1133.6		



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(viii) Social Infrastructure available

The proposed project site is situated at Naini area, Chhendipada tehsil, Anjuli district in Odisha state. The social infrastructure in terms of connectivity by road, communication, health, sanitation, community centers, education, financial institutions, income source etc. is well established. Other facilities provided are:

- Connectivity to District and State head quarters.
- Power supply network and communication network.
- Private & government hospitals.
- Bank facility and ATM counters.
- Schools for providing necessary education.
- Parks for recreation.
- Necessary market facilities and shops.
- Sports & Cultural activities.
- Encouraging Horticulture.

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5. PLANNING BRIEF:

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

Coal Reserves

The exploration in Naini coal block was carried out in phases during the period from 1981 to 1998 by GSI and CMPDIL. The drilling was concentrated in the Western part of the block only. 53 nos. of boreholes have been drilled in the western part of the block spreading over an area of **3.42** sq.km, which has been considered as Proved zone for resource estimations. The remaining eastern part of the block comprising **5.70** sq km area is regionally explored.

Based on the Geological Report submitted by CMPDIL, Geomodel of Naini coal block was prepared by SCCL considering all the 25 Seams and Geological reserves are re-estimated irrespective of seam thickness as 521.27Mt.

The details of reserves (Mt) are as given below:

Geological Res.	Blocked Res.	Mineable Res.	Mining losses	Extractable Res.
521.27	142.62	378.64	37.86	340.78

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

Details of coal seams:

There are 25 coal seams (in descending order, 9 seams from XVII to IX, VI/VII/VIII (merge), IV/V (merge), III TOP, III MID, III BOT TOP, III BOT BOT, I A TOP, I A BOT, I B, I C, I D TOP, I D BOT, I E, I F, I G & I H) in the proposed coal block. Out of the above, 20 seams are present in the proposed quarry area. The remaining seams from XIV to X do not exist in the proposed quarry area. Though the seams are available in the area within the boundary of the project, their presence is limited to the south west corner of the project area and disappear in the quarry area due to up throw fault of 310m and hence could not be excavated.

Rated capacity and life of the project:

The proposed project is planned for rated capacity of 10.0 MTPA . The total mineable Coal reserves are **340.78** MT and OB to be removed is **878.28** M.Cum with an average stripping ratio of **2.58** Cum/T. The operational life of the project is estimated at 36 years. Construction period for the project is 2 years.

Production Schedule

Year	YEAR WISE			CUMULATIVE		
	Coal(Mt)	Total OB(Mcu m)	SR	Coal(Mt)	Total OB(Mcu m)	SR
1st year	2.5	9.36	3.74	2.5	9.36	3.74
2nd year	5.00	14.97	2.99	7.50	24.33	3.24
3rd year	7.50	23.60	3.15	15.00	47.93	3.20
4th year	10.00	26.89	2.69	25.00	74.82	2.99
5th year	10.00	21.21	2.12	35.00	96.03	2.74
6th year	10.00	21.61	2.16	45.00	117.64	2.61
7th year	10.00	21.60	2.16	55.00	139.24	2.53
8th year	10.00	21.60	2.16	65.00	160.84	2.47
9th year	10.00	21.60	2.16	75.00	182.44	2.43
10th year	10.00	21.60	2.16	85.00	204.04	2.40
11th year	10.00	26.83	2.68	95.00	230.87	2.43
12th year	10.00	26.83	2.68	105.00	257.7	2.45
13th year	10.00	26.83	2.68	115.00	284.53	2.47
14th year	10.00	26.83	2.68	125.00	311.36	2.49
15th year	10.00	26.83	2.68	135.00	338.19	2.51
16th year	10.00	26.01	2.60	145.00	364.2	2.51
17th year	10.00	26.00	2.60	155.00	390.2	2.52
18th year	10.00	26.00	2.60	165.00	416.2	2.52
19th year	10.00	26.00	2.60	175.00	442.2	2.53
20th year	10.00	26.00	2.60	185.00	468.2	2.53
21st year	10.00	26.46	2.65	195.00	494.66	2.54
22nd year	10.00	26.46	2.65	205.00	521.12	2.54
23rd year	10.00	26.46	2.65	215.00	547.58	2.55
24th year	10.00	26.46	2.65	225.00	574.04	2.55
25th year	10.00	26.46	2.65	235.00	600.5	2.56
(Final) 36th year	105.78	277.78	2.63	340.78	878.28	2.58
T O T A L	340.78	878.28	2.58			

Method of work:

There are 25 coal seams in the proposed coal block. Out of the above, 20 seams are present in the proposed quarry area. The remaining seams from XIV to X do not exist in the proposed quarry area. Though the seams are available in the area within the boundary of the project, their presence is limited to the south west corner of the project area and disappear in the quarry area due to up throw fault of 310m and hence could not be excavated.

Face preparation for deployment of shovels for coal extraction will be done by 410 HP track dozers. The OB excavation contractor will deploy suitable equipment to extract the generated OB and envisaged thin seams coal.

The sequence of quarry operations will commence from South-West corner of the quarry area and progress towards dip side i.e. from South to North direction in the proved coal reserves zone. The initial 3 years the quarry operations are up to III BB seam. From 4th year onwards the quarry operations are deepened to the bottom most seam i.e. I H seam. The quarry operations will continue till 15th year in the proved coal reserves zone. From 16th year to till the end of the project, the quarry operations are projected towards East direction by keeping the benches along North-South. The width and height of working benches in weathered zone are 15m and 5 m respectively and the width and height of working benches in hard OB are 30m and 10m respectively and bench angle is 70°. The bench configuration in Final Pit is bench height 5 m, bench width 10 m and bench angle is 70° in weathered zone and bench height 10m, bench width 10m and bench angle is 70° in hard OB. The overall slope angle of the quarry is 39°.

The external and internal dump heights are 120m from ground level in four decks and each deck height is 30m. As the entire block is coal bearing there is no provision for external dumping of OB. The OB produced in the initial 5 years will be accommodated in the temporary external dump yard over coal bearing area and the same will be re-handled in later stage in a phased manner as the quarry progresses and dumped into internal dump yard.

Three nallas are passing over the proposed quarry area from South-West to North East direction and all joins in Eastern corner in Gauduni nalah. One nalah whose catchment area is on other side of the National Highway road, is to be diverted along the Western boundary of the block to a length of 1158 m upto the Gauduni nalah before commencement of the mining operations.

A suitable protection bund against the Gauduni nalah is to be provided along the Northern boundary of the block.

The initial opening of the deposit has been designed considering –

- Low stripping ratio zones at progressively increasing depths.
- Availability of sufficient coal exposure to sustain a steady level of production.
- To create a void to accommodate internal dump at the earliest.
- Accessibility to the deposit by haul roads.

Entering from surface ensures systematic development, provides space for future internal dumps and also gives a better stripping ratio and touches the quarry floor at the earliest.

The deposit is proposed to be opened along the strike by main haul road from the side of river Godavari and it is envisaged that local ramps will be suitably laid for transportation of Coal and overburden. Opening along strike direction will provide comparatively longer face length. Once the initial opening is formed, it is envisaged to extract the coal from roof to floor. Excavation from roof to floor is expected to result in less contamination at the coal / overburden interface. Thin seams demand more attention to avoid dilution during mining.

After sufficient widening of the initial cut, the bench is proposed to be deepened by 10 m. Top OB benches on the high-wall side are to be advanced thereby creating space for deepening of the quarry. During this stage, the entire overburden is proposed to be dumped externally.

The method of work comprises of -

- Initial opening of Box cut
- Removal of topsoil and intermediate hard rock.
- Removal of OB to expose the coal seam
- Excavation of coal.

Sequence of OB removal and Coal winning operations are as given below.

- ❖ Top soil removal-Temporary storage/Spreading
- ❖ Drilling and blasting in Over Burden (OB)
- ❖ Preparation of roads, ramps
- ❖ Excavation of OB
- ❖ Loading, transportation and dumping of OB by HEMM
- ❖ Cleaning of OB at the Coal-OB interface
- ❖ Excavation of coal by Shovels
- ❖ Loading of coal into dumpers
- ❖ Transportation of coal to surface coal handling points by dumpers

In Naini Coal block, it is proposed to remove the OB by Shovel-Dumper combination and Coal extraction by Surface miner/Shovel-dumper combination.

It has been envisaged that wherever possible, coal and OB faces may be staggered along the strike to avoid intermixing of material. Sufficient numbers of dozers have been provided to minimize the mixing of OB materials so that the dilution is kept at a minimum possible extent. The quarry has been so planned considering geo-mining

parameters like strike length, faults & gradient of seam etc and maximum accommodation of OB in internal dump.

Ramps at 1 in 16 gradients for evacuation of coal and OB from different working horizons will be required to be prepared while working the quarry.

The coal will be transported largely through advancing benches and the mine floor up to the main haul road and also through the side batters. Coal through this haul road will be transported up to the Coal receiving hopper. From there coal will be transported to the CHP/Washery through series of belt conveyors.

Mechanization:

The project is proposed to be operated by out sourcing all the operations. Equipment proposed is Shovel-dumper combination and Surface miner for coal excavation and Shovel-dumper combination for OB removal. Tentatively main equipment details are as given below.

Operation	Equipment	Capacity	Numbers
Coal by Shovel-dumper	Shovel	5 Cum	3
	Dumpers	60T	15
Coal by Surface Miner	Surface Miner	4 MTPA	2
	Loader	5 Cum	8
OB by Shovel-Dumper	Shovel	12 Cum	10
	Dumper	100T	100

Additional equipment envisaged for Coal

Description	Number
Shovel-dumper combination	
150mm drill	3
320 HP dozers	2+1 (for Emp. etc)
280HP motor grader	2+1 (for Emp. etc)
28 KI water sprinkler	4+1 (for Emp. etc)
1 Cum shovel	3
Tyre handler	2
Surface miner-loader-dumper combination	
320 HP dozers	2
280HP motor grader	2
28 KI water sprinkler	2
60T dumpers	20

Plan Prepared by me:

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 Dt. 05-10-2017

Additional equipment envisaged for OB

250mm drill	10
410 HP Dozer	10+1 (with ripper)
280 HP motor grader	5
28 KL Water Sprinkler	10

OB removal & Disposal**Dumping strategy:**

The quarrying of Naini Coal block produces 340.78 Mt of Coal and 878.28 M. Cum of overburden and the total volume of excavation of overburden and coal are estimated at 1089.65 M. Cum. The entire area of the block is coal bearing area. Hence, there is no area for external dump yard. Hence, 168.57 M. Cum (19.12 % of total OB) of OB generated in the initial years of the project is accommodated over the coal bearing area temporarily and the same is re-handled in a phased manner and dumped in the internal dump yard.

Design criteria:

The following design criteria has been considered for waste dumps.

- i) Separate spoil dumps for Top soil and Hard OB.
- ii) Maximum height of Top soil dump will be 10 meters.
- iii) Hard OB is to be dumped in 30 m high decks.
- iv) 30 m berm width for allowing safe transport of HEMM.
- v) Dump slope for each deck to be at 37.5° and overall slope at 26°.
- vi) Track Dozers will be deployed for shaping the dumps.
- vii) Maximum height of internal dump yard is 120m above ground level.
- viii) Maximum height of temporary external dump is 120m above ground level.

Location of Dump Yards

It is proposed to accommodate the overburden in the following dump yards:

- (1) Internal dump yard.
- (2) Temporary dump yard (over Coal bearing area) where from OB is to be re-handled to internal dump yard.
- (3) Temporary storage of Top soil.

Hard OB:

The total hard OB proposed to be excavated in the project is 870.67 MCum. During initial five years of mining operations, the total hard OB produced will be dumped in temporary external dump yard over quarry area. From 6th to 10th year of mining

operations, part of the hard OB is dumped in temporary external dump yard and remaining in internal dump yard. From 11th year onwards the total hard OB generated from quarry and from 16th year onwards the re-handled OB from temporary external dump yard will be accommodated in the internal dump yard only.

The internal dump yard is designed on South West side of the quarry leaving a safety clearance of 100 - 150m. The maximum height of this dump yard is 120m above ground level.

Thus, 100% of overburden produced during the project life is accommodated in the internal dump yard. However, 19.36% of total HOB i.e. 168.57 M. Cum of HOB is to be re-handled during project life due to non-availability of external dump area.

Temporary External dump yard over the coal bearing area

Non-availability of non-coal bearing area for the purpose of external dump yard in the project area led to the proposal of accommodating the excavated OB (from the quarry) at an earmarked location (temporary external dump) on proposed quarry area itself in initial stages and re-handling the same to internal dump in later stages.

Temporary External dump yard is located on the East side of project area and occupies an area of 283.71 Ha. The total hard OB that is estimated to be accommodated in this dump yard is 168.57 M. Cum. The dump yard is planned to a maximum height of 120 m above ground level.

Internal dump yard

The internal dump yard is designed on South West side of the quarry leaving a safety clearance of 100 - 150m. From 6th to 10th year of mining operations, part of the hard OB will be dumped in temporary external dump yard and the remaining in internal dump yard. Internal dumping will continue till the end of the project life. It is proposed to dump 870.67 M. Cum of hard overburden in the internal dump. The maximum height of this dump yard is 120m above ground level.

The details of Hard OB (in M. Cum) in different stages (cumulative) till the end of the project are indicated below:

End of Year	Temp. Ext. dump over Quarry Area	Internal Dump			Total
		Up to GL	Above GL	Total	
1st	9.01	0	0	0	9.01
2nd	23.52	0	0	0	23.52
3rd	36.73	0	0	0	36.73
4th	73.53	0	0	0	73.53
5th	94.54	0	0	0	94.54

10th	168.57	33.08	0	33.08	201.65
15th	168.57	166.39	0	166.39	334.96
20th	118.36	257.45	87.71	345.16	463.52
25th	74.02	390.22	130.42	520.64	594.66
Final	0	710.11	160.56	870.67	870.67

Top soil:

A total of 7.61 MCum of Top soil will be produced during the project life. Adequate care has been taken to preserve the Top soil in temporary storage dump yards and spread over the finished decks of dumps in the later stage in a systematic manner.

The top soil is preserved in temporary top soil storage yard on the North-East side of the block in an area of 46.18 Ha. The maximum height of topsoil dump proposed is 10m.

The details of Top soil production and spreading on the internal dumps, storage and re-handling from the Temporary storage area in different stages is indicated below:

Top Soil Management (cumulative in M.Cum)					
Year	Removal	Temp. Storage	Spreading (Int. Dump)	Spreading (Temp.Ext.Dump)	Total
1st	0.35	0.35	0	0	0
2nd	0.81	0.81	0	0	0
3rd	1.2	0.64	0	0.56	0.56
4th	1.29	0.7	0	0.59	0.59
5th	1.49	0.87	0	0.62	0.62
10th	2.39	0.71	0	1.68	1.68
15th	3.23	0.46	0	2.77	2.77
20th	4.68	0.89	1.02	2.77	3.79
25th	5.84	0.83	2.24	2.77	5.01
Final year (36th)	7.61	0	4.84	2.77	7.61

100% of overburden produced during the project life is accommodated in the internal dump yard. But 19.36% of total HOB i.e. 168.57 MCum of HOB is to be re-handled during project life due to non availability of external dump area.

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 Dt: 08-10-2017

Details of dump yards

The parameters of dumps are detailed below:

Details of Dumps			
Description	Temp. External Dump	Internal Dump	Top Soil Dump
Max. Height (m)	120	120	10
Area (Ha.)	283.71	479.54 (Ground) 593.44 (Floor)	30.79
Hard OB	*168.57	870.67	
Top Soil (Mcum)	*2.77	4.84(Spreading) 2.77(Re-handled)	*0.71

*Proposed to be re-handled to internal dump.

At the end of the life there will be no external dump yard as total OB of the temporary dump is proposed to be re-handled to internal dump yard.

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

Final Void

The depth of the void at the final stage of mining operations i.e. by the end of 36th operational year is varying from 115m to 193m. The volume of the void will be 1506.5 M.cum. This void will be utilized as water body. Area of the void at ground level is 282.87 Ha.

ii. Population projection

The average daily attendance required to achieve the rated production of 10.0 MTPA is estimated to be 900 (total of out sourcing except a few from department for monitoring of statutory & business administration).

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

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

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 Dt. 05-10-2017

Post Mining Land Use:

S.No.	Type	Land use (Ha)		
		Total land	Un-reclaimed	Reclaimed
1	Excavation Area	762.414	363.229	399.185
	(a) Backfilled Area	479.546	80.361	399.185
	(b) Excavated Void	282.868	282.868	-
2	Safety Zone//Rationalisation area	109.492	43.008	66.484
	(a) Safe Barrier along the Quarry & others	65.314	39.208	26.106
	i) Safety Barrier along the Quarry	30.135	4.029	26.106
	ii) Road	24.884	24.884	-
	iii) Nallah	10.295	10.295	-
	b) Embankment	8.755	3.800	4.955
	i) Embankment Slopes	4.955	-	4.955
	i) Embankment Top Road	3.800	3.800	-
	c) 7.5m Corridor	6.794	-	6.794
	d) Others	28.629	-	28.629
3	Road & Infrastructure (Service buildings, CHP, washery)	40.893	40.893	-
Grand total		912.799	447.130	465.669

Post closure land use:

Sl. no.	Type	Land use (Ha)				
		Agriculture	Plantation	Water Body	Public/ Company use.	Total
1	Excavation Area	-	479.546	282.868	-	762.414
	(a) Backfilled Area	-	479.546	-	-	479.546
	(b) Excavated Void	-	-	282.868	-	282.868
2	Safety Zone//Rationalisation area	4.029	73.482	3.297	28.684	109.492
	(a) Safe Barrier along the Quarry & Others	4.029	33.104	3.297	24.884	65.314
	i) Safety Barrier along the Quarry	4.029	26.106	-	-	30.135
	ii) Road	-	-	-	24.884	24.884
	iii) Nallah	-	6.998	3.297	-	10.295
	b) Embankment	-	4.955	-	3.800	8.755
	i) Embankment Slopes	-	4.955	-	-	4.955
	ii) Embankment Top Road	-	-	-	3.800	3.800
	c) 7.5m Corridor	-	6.794	-	-	6.794
	d) Others	-	28.629	-	-	28.629
3	Road & Infrastructure (Service buildings, CHP, Washery)	40.893	-	-	-	40.893
Grand total		44.922	553.028	286.165	28.684	912.799

iv. Assessment of infrastructure demand (Physical & Social)

Though infrastructure is available to some extent as the area is nearer to Chhendipada tahasil, the concerned out sourcing agency will provide suitable accommodation and other facilities for the employees.

v. Amenities/Facilities

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

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

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Dt: 05-10-2017

6. PROPOSED INFRASTRUCTURE

i. Industrial area (Processing area)

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

Residential area (Non processing area)

The out sourcing agency shall plan for the residential area for the employees with all basic amenities.

ii. Green belt (Plantation details)

In the Project area, plantation is proposed year wise, gradually to attain green belt of area of 553.028 ha. Plantation is planned on internal dumps, embankment and safety zone. Plantation is also planned on temporary external dump, which is to be disturbed in later stages while re-handling the OB to internal dump yard. In Post closure stage 44.922 ha of the land is planned to be reclaimed for agriculture purpose.

iii. Social Infrastructure

Social Infrastructure available in the area will cater to the needs of the employees working in the mine. Additional social infrastructure required for the employees will be arranged by the out sourcing agency.

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

District headquarter Angul, located on the National Highway 42 (Bhubaneswar-Cuttack-Angul to Sambalpur), is the nearest town at a distance of about 33 km from the south-western corner of the block via state highway 63. Angul - Chhendipada road which passes from the south-western corner of the block connecting the north western corner and forms the western boundary of the block. The block comes under Chhendipada Tahsil and police station in the district of Angul, Odisha. Talcher town is having MCL establishments both for opencast as well as underground mine which is located at a distance of 40 km from the block via Kosala village. The nearest railway station is Jharpada on Cuttack-Sambalpur line of East-Coast railway and is about 30 km from the block. The block is 164 Km from the state capital Bhubaneswar and the nearest airport is also in the capital.

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

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

vi. Sewerage system

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

vii. Industrial waste management

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

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

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

viii. Power requirement & supply/source

The source of power for the project will be from 132 KV electrical sub-station located near Chhendipada, Angul District.

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Dt. 05-10-2017

7.Mine closure cost details

WPI as on August'09				Aug-09	129.60
WPI as on base date	Base Year 11-12	156.13	April, 2018	116.30	181.58
Escalation rate of Closure cost					1.40

						UG	OC
Base Rate of Closure Cost "Rs. Crs./Ha"						0.01	0.06
Closure Cost "Rs. Crs/Ha"						0.01	0.0841
Lease Area							912.799
Amount to be deposited into Escrow Account "Rs. in Crs"						0.00	76.734
Rate of compounding of Annual Closure Cost							5.00%
Balance Life of the project "in Yrs"							38
Annual Closure Cost "Rs. in Crs"						0.000	2.019

Amount to be deposited into Escrow Account after compounding @ of 5% "Rs. in Crs"							217.50
Amount already deposited into Escrow Account "Rs. in Crs"							
Net Amount to be deposited into Escrow Account "Rs. in Crs"							217.50

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 Ministry of Coal, Govt. of India
 Ref: S-0120/12015-CPMA
 Dt: 05-10-2017

Amount to be deposited into Escrow Account annually ("Rs. in Crs")					
Year	OC	UG	Total	Already Deposited	Balance to be Deposited
1	2.019	0	2.019	0	2.019
2	2.120	0	2.120	0	2.120
3	2.226	0	2.226	0	2.226
4	2.338	0	2.338	0	2.338
5	2.454	0	2.454	0	2.454
6	2.577	0	2.577	0	2.577
7	2.706	0	2.706	0	2.706
8	2.841	0	2.841	0	2.841
9	2.983	0	2.983	0	2.983
10	3.133	0	3.133	0	3.133
11	3.289	0	3.289	0	3.289
12	3.454	0	3.454	0	3.454
13	3.626	0	3.626	0	3.626
14	3.808	0	3.808	0	3.808
15	3.998	0	3.998	0	3.998
16	4.198	0	4.198	0	4.198
17	4.408	0	4.408	0	4.408
18	4.628	0	4.628	0	4.628
19	4.860	0	4.860	0	4.860
20	5.103	0	5.103	0	5.103
21	5.358	0	5.358	0	5.358
22	5.626	0	5.626	0	5.626
23	5.907	0	5.907	0	5.907
24	6.202	0	6.202	0	6.202
25	6.513	0	6.513	0	6.513
26	6.838	0	6.838	0	6.838
27	7.180	0	7.180	0	7.180
28	7.539	0	7.539	0	7.539
29	7.916	0	7.916	0	7.916
30	8.312	0	8.312	0	8.312
31	8.727	0	8.727	0	8.727
32	9.164	0	9.164	0	9.164
33	9.622	0	9.622	0	9.622
34	10.103	0	10.103	0	10.103
35	10.608	0	10.608	0	10.608
36	11.139	0	11.139	0	11.139
37	11.696	0	11.696	0	11.696
38	12.280	0	12.280	0	12.280
Total	217.499	0.000	217.499	0	217.499

8. ANALYSIS OF PROPOSAL (FINAL RECOMMENDATION):

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

IMPROVEMENT IN PHYSICAL INFRASTRUCTURE

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

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

IMPROVEMENT IN SOCIAL INFRASTRUCTURE

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

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

- i) The project will have a strong positive employment and income effect, both direct and indirect. Migrant - non-migrant ratio will shift towards migrant side because a number of people will migrate towards the central region of study circle in the years to come. This will happen because of better indirect employment opportunities due to this project.
- ii) The project is going to have positive impact on consumption behavior by way of raising average consumption and income through multiplier effect.
- iii) The project is going to bring about changes in the pattern of demand from food to non-food items and sufficient income will be generated.

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

OTHER TANGIBLE BENEFITS

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

- i) Indirect employment opportunities to local people in contractual works like housing construction, transportation, sanitation, for supply of goods and services to the project and other community services.
- ii) Additional housing demand for rental accommodation will increase.
- iii) Market and business establishment facilities will also increase.
- iv) Cultural, recreation and aesthetic facilities will also improve.
- v) Improvement in communication, transport, education, community development and medical facilities.
- vi) Overall change in employment and income opportunity.
- vii) The State Government will also benefit directly from the proposed project, through increased revenue from royalties, excise duty and etc.

JUSTIFICATION

The following are the justified reasons for approval of capital as to ensure grounding the project at the earliest.

- Coal from this block ensure SCCL with consistent supply of coal required for it's dedicated power plants (STPP).
- Coal deposit is amenable for opencast mining with relatively low stripping ratio of 2.58 cum/T.
- Opencast method is relatively safe and provides better recovery/conservation of coal and reduces gestation period.
- The development of this coal block will provide better social and economic life to the surroundings. It will also give a boost to the industrial activity in around the coal block area with direct and indirect employment opportunities.

RISK FACTORS ANALYSIS

- A Gauduni Nalah passing along the Northern boundary of the Naini coal block from west to east. Adequate protective bund against this nalah is to be provided to avoid sudden inrush of water. Care has to be taken to ensure free flow of water.
- A railway line is proposed from Jarapada railway station (Angul to Sambalpur railway line) to cover the all coal blocks and land acquisition by IDCO is under process. The proposed railway line is passing 4.0 Km away from the Naini coal block. Till the commissioning of proposed railway line the coal will be dispatched by road to nearby (about 30 Km away) railway station JARAPADA, for further dispatch.
- The reserves estimations are tentative in nature as the 60% of the block reserves are under indicated category.
- Other surface features are to be explored for grounding of project.

Plan Prepared by me.

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Ministry of Coal Govt. of India.
Ref. S-012/C/1/2015-CRAM
DL 05-10-2017



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A Mini Ratna Company

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कोल इण्डिया लिमिटेड की अंतर्गत कंपनी / भारत सरकार का एक लोक उद्योग
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Central Mine Planning & Design Institute Limited
(A Subsidiary of Coal India Limited / Govt. of India Public Sector Undertaking)
Gondwana Place, Kanke Road, Ranchi - 834 031, Jharkhand (INDIA)
CORPORATE IDENTITY NUMBER - U14292TH1975GO1001223

पत्रांक: सीएमपीडीआई/डी.जी/860(ए)/ 1840

दिनांक. १२.०६.२०१८

E - 213392

सेवा में,

श्री एन. के. सिंह

उप सचिव, भारत सरकार,

कोयला मंत्रालय, शास्त्री भवन,

नई दिल्ली - 110115

Sub: Bounding Coordinates of Naini Coal Block, Talcher Coalfield.

महाशय,

In reference to the allottee, M/s. SCCL, letter no. Naini Area/GMO/5/2018/264 dated 28.08.2018, regarding the verification and certification of Block Boundary Plan of Naini Coal Block, it may be mentioned that the designated committee met on 11.09.2018 to deliberate on the issue and observations are as follows:

1. The Geological Report of Naini Coal Block, Talcher Coal field was prepared by RI-VII, CMPDI in November, 2011.
2. The bounding Geographical coordinates given in the vesting order no. 103/21/2015/NA dated 13th August, 2015 is as per the Geological Report and are in Modified Everest Coordinate System. The details of the coordinates given in the Geological Report as well as in the vesting order is as follows-

As per Vesting Order/GR		
	MIN	MAX
LATITUDE	20°48' 07" N	21°07' 07" N
LONGITUDE	84°52'56" E	84°53' 06" E

3. Since, the coordinates given in the geological plan of Geological Report was in Local Grid, M/s. SCCL requested CMPDI to provide boundary Coordinates in WGS 84 Coordinate System of Naini Coal Block vide its letter no. CRP/EXP/B-74(Naini)/76 dated 03.09.2015 and CMPDI provided the same vide letter no. CMPDI/DG/CAPTIVE/133/1262 dated 29.09.2015.
4. Subsequently, ORSAC Conducted DGPS Survey of the Block Boundary on behalf of SCCL and requested CMPDI for further verification and certification vide its letter no. Naini Area/GMO/5/2018/264 dated 28.08.2018.
5. CMPDI, upon vetting, found that the block boundary plan prepared by ORSAC is same w.r.t the block boundary supplied by CMPDI in 29.09.2015. The area of the plan, as per ORSAC, is 9.12 sq. km which is also as per GR.
6. The Block is surrounded by:
East- Western Boundary of Bankhui Coal Block (Captive)
West- Road Eastern Boundary of State Highway-SH-63/ Eastern boundary of Baitarani East block
North- Southern bank of Gauduni Nalla
South- Northern Boundary of Kardabahal Coal Block (Add. CIL Block)



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CORPORATE IDENTITY NUMBER - U14292.TM1975GOI001223

-2-

7. There is no CBM boundary overlap.

The committee observed that geographical coordinates given in the vesting order varies significantly with the geographical co-ordinates derived geological plan of the Geological Report.

Hence, if Ministry of Coal agrees, the Geographical Coordinates (Longitudes & Latitudes) given in the vesting order may be revised and modified as per the following details.

BOUNDING CO-ORDINATES IN WGS-84 COORDINATE SYSTEM		
	MIN	MAX
LATITUDE	21°03' 21" N	21°05' 23" N
LONGITUDE	84°52' 56" E	84°55' 17" E

धन्यवाद,

भवदीय

Anmolante

(ए.के.मोहंती) 12.9.18

महाप्रबंधक (गवेषण)

प्रतिलिपी:

1. अध्यक्ष-सह-प्रबंध निदेशक, सी.एम.पी.डी.आई, रांची को सादर सूचनार्थ।
2. निदेशक (तकनीकी/ सी.आर.डी), सी.एम.पी.डी.आई, रांची को सादर सूचनार्थ।
3. महाप्रबंधक (यू.एम.डी), सी.एम.पी.डी.आई, रांची।
4. क्षेत्रिय निर्देशक, सी.एम.पी.डी.आई., क्षेत्रिय संस्थान - ७, भुवनेश्वर।



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