



सीएमपीडीआई
cmpdi
A Mini Ratna Company

Form-I & Pre-feasibility Report Sayal D Opencast Project

Project Area (Ha)	Normative Capacity (Mcum/yr)	Peak Capacity (Mcum/yr)
286.98	1.00	1.35

(Barka Sayal Area)
Central Coalfields Limited
(May, 2015)

Prepared at

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Pre Feasibility Report of Sayal D OCP

1.0 INTRODUCTION:

Sayal Colliery presently is producing coal by underground bord & pillar (B&P) method of mining with manual as well as mechanized loading by deployment of SDLs.

Seams being worked by UG method

(i) Semana A / Lower Semana Seam (UG mine No. 3) : This seam is under development by Bord & Pillar method by manual loading of coal.

(ii) Saunda Seam (UG mine No. 5) : This seam has been mostly developed in entire available mining area by keeping a barrier against the depillared underlying Kurse, Nakari and Upper Semana seams. Some of the panels have been already been depillared.

(iii) Sayal Seam (UG mine No. 10) : This seam is presently under development by Bord & Pillar method using mechanized loaders (SDLs). At present three SDLs are in operation.

Present Proposal

Project Report for Sayal D Reorganisation UG Mine (0.36 MTY) was prepared by CMPDI in 2010 where it was decided that the PR should be recast considering opencast mining of upper seams i.e. Saunda, Sayal, Balkudra top and Upper Balkudra upto the maximum possible extent towards dip side with detailed project costing. The present proposal is an opencast mine proposal upto Upper Balkudra seam having a normative capacity of 1.00 MTPA and peak capacity of 1.35 MTPA.

The project report of Sayal D OCP was approved by CCL Board on 10.10.2013.

LOCATION

The Sayal D block & South Sayal blocks including part of Jainagar block as explored by MECL lies in the central part of the South Karanpura Coalfield. The geological blocks fall under the Survey of India Toposheet Map no. 73E/6 on scale - 1:63360). The geographical coordinates of the South Sayal block is as under :

Latitude	:	23° 40' 13" to 23° 40' 20"
Departure	:	85° 18' 30" to 85° 20' 00"

The adjoining mine leases are:

North : Khas Karanpura & Metamorphics
East : Saunda D
North East : Central Saunda
West : Southern Extension of Urimari East Block
South : Patratu Railway Station & Jainagar block

The project area of proposed opencast mine contains diverted as well as non diverted forest land and GMK Jungle Jhari. In view of MoEF OM J-11015/200/2008-IA.II(M), dated 31.03.2011 and related OMs the non diverted forest land and GMK Jungle Jhari along with adjoining non forest land has been deducted from the project area (excavation area). As such the revised area of project for seeking environmental clearance is 286.98 Ha. The details of revised project area are given below

Land Requirement

Category	Forest land	GMK JJ	Non- Forest land (GMK & Tenancy) in Ha.	Total
Area (Ha)	149.05	37.00	100.93	286.98

2.0 GEO-MINING CONSIDERATIONS:

The mine boundary has been fixed as follows: -

Northern Boundary

The Northern floor boundary has been fixed in the Upper Balkudra seam beyond existing old Quarries no. 1 to 4 on Upper Balkudra Seam.

Southern Boundary

The southern surface boundary has been fixed leaving a surface barrier of 100m from existing Patratu railway colony.

Eastern Boundary

The eastern surface boundary has been fixed at a distance of about 100 metres from existing Patratu-Giddi branch line.

Western Boundary

The western surface boundary has been fixed leaving a surface barrier of 100m from Damodar River.

Mineable Reserves-Volume of OBR-Stripping Ratio

Sl. No.	Particulars	Mineable Reserves (M.tes)
A	SEAMS	
1	Saunda	3.13
2	Saunda A	2.22
3	Sayal	8.02
4	Balkudra Top	2.47
5	Upper Balkudra	12.25
	Total Mineable reserves	28.11
B	Total Volume of Partings/OB	159.69
C	Average Stripping Ratio	5.68

The geological & mining characteristics of the proposed Sayal D Opencast (1.0 / 1.35 MTPA) are given in Table below. Total 5 numbers of coal seams are occurring within the quarriable area. Out of these, Upper Balkudra with a seam thickness of 8-9m is the most prominent seam. The coal seams are dipping at a gradient of 1 in 4.5-5.5 towards the south.

Mining & Geological Characteristics

Sl. No.	Particulars	Unit	THICKNES S RANGE	Average Value
1.	Seam Thickness			
A	Upper Balkudra	M	7.05-10.00	8.50
B	Balkudra Top	"	0.94-2.76	1.70
C	Sayal	"	2.65-5.94	4.70
D	Saunda A	"	0.82-2.25	1.75
E	Saunda	"	2.10-4.27	3.25
II.	Seam Gradient	Degree		11-13
III	Specific Gravity of the seams	Te/m3		1.55-1.70
IV	Excavation Category of coal	Assumed		III
E	Upper Balkudra – Balkudra Top	"	1.71-5.75	3.10
F	Balkudra Top - Sayal	"	7.46-29.87	20.00

G	Sayal – Saunda A	“	6.35-30.01	22.00
H	Saunda A - Saunda	“	9.67-14.65	11.25
I	Top OB	“	10.00-118.00	72.00
J	Excavation Category of OB	Assumed		50% Cat.III+50% Cat.IV)
K	OB Volume weight	Te/m3		2.40 (approx.)
L	Av. Strike length of the quarry	Km		2.40
M	Av. Width of the quarry	Km		0.85
N	Maximum depth of the quarry surface	M		175
O	Surface quarry area	Ha.		222.14

3.0 LIFE OF MINE:

For the rated output of 1.0 MTPA of ROM coal and with the revised mineable reserves of 22.68 M.T the revised life of the opencast mine is estimated to be 24 years.

After stage-I FC of balance forest land lying within quarry limit , another application for environmental clearance will be made for expansion in area of project to exploit the balance reserves of 5.43 MT .

4.0 YEARWISE CALENDAR PLAN:

The anticipated production programme during initial years is given below

Year	Coal (Mtes)	OBR (Mcum.)	Stripping Ratio (cum/te)
1	0.18	0.60	3.33
2	0.50	2.91	5.83
3	1.00	6.97	6.97
4	1.00	7.27	7.27
5	1.00	7.33	7.33
6	1.00	7.33	7.33
7	1.00	7.33	7.33

8	1.00	6.43	6.43
9	1.00	5.11	5.11
10	1.00	5.11	5.11
11	1.00	5.72	5.72
12	1.00	6.35	6.35
13	1.00	6.80	6.80
14	1.00	7.28	7.28
15	1.00	7.77	7.77
16	1.00	7.83	7.83
17	1.00	7.28	7.28
18	1.00	7.28	7.28
19	1.00	5.99	5.99
20	1.00	5.86	5.86
21	1.00	5.59	5.59
22	1.00	4.32	4.32
23	1.00	4.32	4.32
24	1.00	4.29	4.29
Total	22.68	143.07	6.31

5.0 MINING SYSTEM PARAMETERS:

The mining and geological conditions of the mine are as follows: -

- (a) Multiple seams to be worked
- (b) Gradient of 11-13 deg of the coal seams.
- (c) Variable thickness of OB/Partings.

Considering the above mining and geological conditions, shovel-dumper mining system has been envisaged for working the OC mine.

It is also proposed to respond to improvements in technology and equipments, which would result in, improved profitability and productivity parameters taking into account of safety and environmental parameters.

Box Cut

For the proposed quarry, no box-cut is required to be made as the existing old quarry on Upper Balkudra seam OCP (existing quarry no.3) was in operation till 1987. The existing quarry no. 3 is proposed to be extended along dip to develop the mines initially.

Mine Development

The gradient of the coal seams in the considered proposal is 11 deg to 13 deg negating the scope of any concurrent backfilling. This would result in requirement of huge external dump area if coal and OB benches are formed along strike. The total area surrounding the proposed opencast is coal bearing and with colliery establishments, colonies, railway siding etc there is no non coal bearing area surrounding this mine which may be utilized for dumping of the huge amount of OB .To overcome this difficulty it is proposed that the benches are formed along dip and concurrent backfilling may be started as soon as a portion of the mine reaches its dip side boundary limit. This may facilitate minimum external dumping. The overburden of the initial period is bound to be dumped over coal bearing area, which is adjacent to the top edge of the proposed quarry. During initial years of mine operation benches will be formed along dip and also along strike. Benches along strike are proposed to be used to extend the portion of the mine along dip to reach ultimate dip side boundary to facilitate internal dumping at the earliest. The benches along dip would be used for future production of the mine with concurrent backfilling.

Mine Inclines within the proposed quarry area

There are number of mine entries in mine no.5, 9 and 10 to work Saunda, Upper Balkudra and Sayal seams respectively within the proposed quarry area. Out of these UG mines mine 5 and 9 are no longer in operation. UG mine no. 10 is still in operation and future exploitation of Sayal seam is proposed to be done through proposed OC mine operation. The seams approached with these entries are considered for the proposed quarry and the inclines are within the mining area of the quarry. Hence, the entries of these mines will no longer be required and will be excavated while quarry operation.

Spoil Dump

Very limited space is available for external dumping. An area for external dumping has been earmarked north of northern limit of the proposed quarry leaving a surface barrier of 60m from existing Sayal siding , present approach road and incline no. 3,4 & 6. It may be noted that incline no. 1 & 2 to mine Kurse & Nakari seam falls within the proposed dumping area. UG mine No. 1 & 2 were started in April, 1959. Depillaring started in UG mine No. 1 & 2 in 1969 and these two mines have been extracted & closed (caving method). The area proposed for external dumping is coal bearing area with a very limited quarriable potentiality. Some opencast potential area to mine Upper Balkudra, Nakari and Sayal seams within the proposed external dump lies to the east of fault F5 and west of Patratu Giddi branch line. The total extractable reserves in the said patch are less than 1 Mt and can also be extracted.

In the present proposal it is proposed to form coal and OB benches along dip to optimise backfilling. Out of total OBR of 159.69 Mcum 39.73 Mcum will be required to be dumped externally. Balance 119.96 MCum of OBR will be placed internally. The details of external OB dumps A and B is given below. However the total OB considered from the revised project area is 143.07 Mcu M and dumping sequence will be maintained during initial years of mine operation till balance forest land is diverted.

Dump	Type	Volume(MCum)	Top RL (m)	Average height from surface(m)
A	External	39.73	+440	70
B	Internal	119.96	+370	0

Rehandling of External OB Dump

In order to reduce the depth of quarry void at the end of quarry operation from 175m to 30m (maximum) it is proposed to rehandle the upper 2 tiers of external dump and accommodate into the quarry void in 3 years after the end of quarry operation as per approved / planned report.

Constraints

Proposed external dumping scheme will require dismantling of existing surface features like officer's colony, project office, rest house and HT lines etc. Provision has been made in this proposal to reconstruct affected surface features required in this project.

Coal Handling Plant

The total production of Sayal 'D' OCP has been proposed as 1.00 MTY. The Coal Handling Plant has been designed to handle total coal production of the mine.

The coal handling plant shall have facilities for receiving ROM coal from rear discharge dumpers, crushing ROM coal of (-) 1200 mm to (-) 100 mm size, conveying it in the overhead hoppers for storing and loading in the trucks. Sufficient ground storage has also been provided in the coal handling plant to meet the eventualities of disrupted coal production in the mine. The coal handling plant will also be provided with other auxiliary facilities like communication, interlocking, Pollution control/environmental control measurement and suitable repair cum maintenance to meet the day to day requirement in the plant operation.

Load out system

The coal will be loaded into the trucks through overhead hoppers fitted with reciprocating feeders/Hyd.Power-pack operated gates. Crushed coal from ground stock will also be fed to tripper/tipping truck by means of pay loader of suitable capacity available in the mine for onward despatch to customer at Saunda siding with suitable feeding system.

Railway siding

The crushed coal of this mine has been proposed to dispatch through existing nearby Sayal railway siding. Therefore, provision for renovation / up gradation of existing railway siding has been made.

6.0 PRECAUTIONS:

- a) Quarry shall be worked by Heavy Earth Moving Machinery only. No manual operation in the quarry will be done.
- b) HEMMs, except drilling machines shall not be deployed on the bench where thickness of coal or overburden above the UG galleries, as proved by advance boreholes or other suitable methods, is less than 6m.
- c) Exposed coal faces (including UG galleries shall be kept covered with fine grained incombustible OB material to prevent breathing of air and control fire to dip side working. This cover shall be removed only at the time of coal extraction.
- d) Overburden containing carbonaceous material shall not be dumped within 30m of the exposed side of the coal benches. Hot overburden shall be quenched and cooled at dump sites.
- e) No person shall be allowed at any place in the opencast working where the thickness of overburden and/or coal over any gallery is less than 1.5m.
- f) Except for the purpose of inspection and support work no person shall be allowed in the underground mine beneath and within 200 m of the opencast excavation. The person visiting UG will take all safety precautions for safe working.
- g) Blasting in fire area
- i) No explosive other than slurry and emulsion explosive shall be used.
- ii) Blasting shall be done with detonating fuse down the hole. Fresh drill holes should be tightly plugged at the mouth.
- iii) Temperature inside the hole shall be measured by Bi-Metallic thermocouple heat sensor (before filling with water) and if the temperature exceeds 80°C in any hole the hole will not be charged.

- iv) All blast holes shall be kept filled with water. When any hole is traversed by cracks or fissures the hole shall not be charged unless it is lined with an asbestos pipe and the hole filled with water. In addition, bentonite should be used for sealing any cracks at the bottom of the hole.
- v) Detonating fuse shall not be laid on hot ground without taking suitable precautions.
- vi) Charging and firing of holes in any one round shall be expeditiously completed and in any case within 2 hours.
- vii) A parting of at least 2m between the bottom of a short hole and roof of underground gallery shall be left intact.
- viii) Effective muffling of hot shot holes with old wire rope screens shall be done for prevention of flying hot fragments.
- ix) No blasting shall be done in crushed or broken ground.
- x) No person shall be employed within 150m when blasting the heated material.
- xi) The spacing of hole in the coal/Ob benches lying immediately above the galleries shall be so adjusted that the holes do not lie immediately above the galleries in order to ensure that blast holes do not directly fire into the underground working.
- xii) All holes in the coal/Ob benches lying immediately above the galleries shall be charged with water impulses or with moist sand of at least 0.6m in length at the bottom of the hole.
- xiii) No person including a shotfirer shall take shelter within 100m of the quarry opening. Such shelter shall be of an approved design.

7.0 JUSTIFICATION OF OPENING THE PROJECT

As per GR, the quality of coal from Saunda, Sayal & Balkudra Top is expected to be of Grade 'D to F' (non-coking), mostly Grade 'E', i.e. power grade coal. Considering this coal quality, the coal may be suitable for thermal power houses.

However, coal from seams Saunda & Sayal has been categorized as G-5. Also, coal price realized for the coal presently produced from Sayal seam is about Rs. 3500/- per tonne (Approx). Considering this, the coal may be utilized for many other purposes.

AVAILABLE LINKAGE & COAL DISPATCH

Coal produced from existing Sayal D UG is being dispatched to power houses and is included in basket linkages. Coal produced from the proposed OC mine will be dispatched to Sayal railway siding at a distance of about 1.0km.

JUSTIFICATION FOR THE PROJECT BASED ON MARKETABILITY

- ❖ The company is facing a negative gap between demand and availability of coal . Coal produced from the mine is likely to supplement to availability of coal from CCL.
- ❖ The demand of power grade coal is very high in the country. Hence, it can be easily marketed.
- ❖ Hence, this report will help in reducing the gap with consistent supply of coal.

Project Cost

Capital cost of project is Rs. 336.14 Crores (upto target year).

Mine Closure Cost

Rs 22.58 per tonne (approx) of coal produced

Cost of Environmental Control Measures

Capital Cost

SN	Particulars	Amount (Rs)
1	Cost of compensatory afforestation	164.05
2	Cost of restoration	1169.99
3	Anti-pollution measures in mine & Industrial area	643.02
4	Cost of Anti-pollution measures in township	46.70
5	Other provisions	86.01
6	Compensation for non-forest land	0.00
7	TOTAL CAPITAL	2109.77

Enclosed

Plate No –1: Final Stage Quarry & Dump Plan

Plate No –2: Location Plan On SOI Topo-sheet

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