

Kabribad OC

1.1 BACKGROUND OF THE PROJECT

Giridih Coalfield is one of the earliest coalfields to be worked in India. Mining activity in the coalfield started as early as 1871 by M/s Bengal Coal Company & then by State Railway and subsequently transferred to National Coal Development Corporation (NCDC) about 60 years back. Later in the year 1973, it came under the control of Central Coalfields limited (CCL), a subsidiary of Coal India Limited. Presently it is under the administrative control of B&K Area of CCL.

The Kabribad Re-organisation mine falls in Giridih Coalfield. It is situated in Giridih district in the state of Jharkhand. This colliery belongs to the Giridih Project, which is under B&K Area of CCL. It is located about 5km to the south of Giridih Town and is covered in Survey of India toposheet 72L/8.

The block under consideration is Deep Pit Sector (Kabribad sub-basin) of Giridih Coalfield which has an area of about 2.79 sq km. The sector has been mined extensively by a number of UG inclines and quarries in the past. Although the underground workings has been discontinued/ abandoned but the quarry operation is still being carried out in the central part of the sector.

Project report of Kabribad OCP (0.6 MTY) is being prepared based on the Report on the Exploratory Operations in the Selected Blocks, Giridih Coalfield, District – Hazaribagh, Bihar, IBM, 1959 and Geological Report on Coal Exploration of Jubilee Pit, U.K. Incline and Deep Pit Sectors, Giridih Coalfield, MECL, August, 1994. Data from the additional boreholes drilled by CCL has also been considered during the preparation of the report. This report envisages mining of seams up to Khandia-I Bottom by Opencast method.

1.2 LOCATION

The proposed Kabribad OCP is located in the Giridih Coalfield and falls in the Giridih District of Jharkhand. The OCP falls in Giridih Project which is under the administrative control of B&K Area of Central Coalfields Limited (CCL). The block is bounded by latitudes 24°8'45" to 24°10'7" North and longitudes 86°17'34" to 86°18'30" East. The block is covered in Survey of India toposheet no. 72L/8 (in 1:50,000 scale).

1.3 PRESENT STATUS OF THE MINE/PROJECT:

The Giridih coalfield can be divided into three major regions viz., north, central & southern. The southern region is an elongated basin which is divided into three sub-basins namely Kabribad/ Deep Pit, Jubilee Pit & Dhobidih-Jatkutti sectors. Kabribad Opencast Reorganisation falls in the Kabribad sector of the coalfield.

Mining activity in the Kabribad sector is going on from the pre-nationalisation era by underground method in the past and more recently by opencast method. There is a prominent dyke trending SE – WNW, having thickness ranging from 4-8m traversing the block along its entire width in the south-central part of the property. Coal reserve in the north of the dyke are nearing exhaustion. A departmental quarry is presently being run which will exhaust in another year or so. Rest of the property in the north of the dyke has already been extracted by both OC and UG method, goaved out and or dumped by OB.

In the south-west of the dyke a small outsourced patch has been earmarked for quarry operation in the seams Khandia II Top, Khandia II Bottom, Khandia I Top & Khandia I Bottom. However, the same is presently discontinued. Mining has also been done in the past in the south-eastern part of the dyke through inclines in the seams Khandia II, Khandia I Top & Khandia I Bottom and more recently opencast mining was also attempted. The workings are discontinued and waterlogged at present.

1.4 GEOLOGY AND STRUCTURE OF BLOCK AREA

1.4.1. Brief geological setting along with generalized sequence with in the block

The Kabribad sub-basin is not having any major Geological faults. The East – West running southern boundary faults marks the southern boundary of the block. The sub-basinal structure are preserved around Jubilee Pit, U.K. Incline and Deep Pit sectors. The intervening areas between the sub-basin show shallow sedimentary sequences and anticlinal rolls. Centrocinal dips varying from 12° to 15° are found in the Sub-Basins. One or two dyke running approximately East-West and having thickness of 4-5m. The general gradient is 6° to 10° towards center of the Sub basin.

The General Sequence of Sedimentary Formation in Deep Pit Sector is tabulated below:

Table 4.2 Geological sequence of Deep Pit Sector, Kabribad Coal block, Giridih Coalfield.

Period	Formation	Lithology
Recent		Soil & Alluvium.
~~~~~ UNCONFORMITY ~~~~~		
Lr. Cretaceous		Dolerite & Lamprophyre Intrusive.
Lower Permian	Barakar	Fine to Coarse grained Sand stones, Grey Shale,

Period	Formation	Lithology
		Carbonaceous Shale and Coal Seams.
	Karharbari	Medium to Very Coarse Grained sandstone with minor Shale bands and Coal seams.
Up. Carbonaceous to Lr. Permian.	Talchir	Green and Buff colored Sandstones, Needle shales and Tillites.
~~~~~ <b>UNCONFORMITY</b> ~~~~~		
Precambrian		Gneisses, Schists and Pegmatites.

1.4.2. Structural Setting:

The deep pit sector forms a very small basin like structure showing accurate configuration of the beds.

1.4.3. Dip and Strike:

The dip amount varies from 6° to 10° towards center.

1.4.4. Fault description:

From the underground development of different coal seams it is revealed that the area is less disturbed by faulting. Two major faults F1-F1 and F2-F2 have been deciphered in the block.

Fault F1-F1 is a major boundary fault having strike WNW-ESE with a maximum throw of 300m towards north. The throw decreases towards east.

Fault F2-F2 is also having strike WNW-ESE with a throw varying from 25-60m towards north. The fault occurs around boreholes GRD/A/10, GRD/A/1A and NCGR-31.

In addition to the above two faults the occurrence of some minor faults cannot be ruled out. However, no additional faults have been reported while actual working.

1.5. MINE BOUNDARIES

The total coal bearing area of the proposed OCP is around 42.89 Ha. The maximum quarriable depth will be around 80m in the west-central part of the quarry.

Mine Boundary

The mine boundary of the OCP has been fixed as follows:

East: The eastern floor boundary has been fixed along the incrop of Khandia-I Bottom seam.

West: The western floor boundary has been fixed along the incrop of Khandia-I Bottom seam.

North: The northern floor boundary has been fixed along the SE – WNW trending dyke.

South: The southern floor boundary has been restricted to fault F2.

Necessary straightening of boundary has been made for convenience of mining.

Future Expansion Potential: A Geophysical study was done to delineate the boundary fault F1-F1, so that the southern boundary of the quarry could be extended towards south and additional coal reserves, if any, could be added. However, the study revealed that the sedimentary-metamorphic contact is actually further north of the trace of the fault F1-F1 predicted in the Geological Report (please refer Geological Plan). Since the study could not predict the presence or absence of coal between Fault F2-F2 and F1-F1, the southern quarry floor boundary been restricted to fault F2 only. However, during mining if presence of coal is observed, the quarry may be extended in the south if it is operationally convenient.

1.6 MINING STRATEGY / MINING SEQUENCE

Mine operation will start from 1st year. The starting of the quarry has been proposed in the north-eastern part, to the east of borehole GRD/A/2 near Pit Office. It is proposed to touch the floor of Khandia-I Bottom as shown in the Box-cut Plan. As the seams are moderately dipping, (dip varies from 6 to 10deg towards the centre), mine is being proposed to be worked in inclined slicing method. Once the proper benches are formed and full strike is open, the mine will progress towards dip in the south-west direction and subsequently progress towards WNW due to swing in the strata. The maximum depth of the quarry is about 80m (where the floor RL of Khandia-I Bottom seam is 180m).

The quarry will be able to achieve its rated production of 0.60 MTY in the 2nd year. With the available coal reserve, the mine will have a life of 7 years.

The width of the working and non-working benches has been kept at 40m and 20m throughout the life of the mine. Transporting of coal from the bench to the pit head will be carried out by hauling dumpers.

1.7 MINEABLE RESERVES:

The cumulative mineable reserve is estimated as 3.60 MT with corresponding volume of O.B estimated as 5.14 Mm³ with an average stripping ratio of 1.43 cum/t.

19% of Geological loss and Mining loss has been considered to arrive at the net mineable reserve of the project. The seams having less than 1m thickness has been excluded for the calculation of the mineable reserve.

Seamwise details of Geological vis-à-vis Mineable Reserves

Seam	Avg Thickness (m)	Net Geological Reserve (MT)	Net Reserve Extracted by UG (MT)	Reserve Lost in Batter (MT)	Mineable reserve (MT)
Khandiha II Top	2.91	1.137	0.056	0.261	0.821
Khandiha II Bot	2.60	1.094	0.046	0.315	0.732

Khandiha I Top	4.11	2.146	0.122	0.734	1.290
Khandiha I Bot	2.40	1.373	0.178	0.438	0.757
Total		5.750	0.402	1.748	3.600

Sector wise mineable reserves:

The calendar program has been drawn by dividing the whole mining block into a number of sectors. The sector wise mineable reserves in the order in which these sectors are proposed to be exploited is given in the following table.

Sector wise and Seam wise details of Mineable Reserves (MT)-A

Coal (MT)	Sec 1	Sec 2	Sec 3	Sec 4	Total
Khandiha II Top	0.127	0.291	0.343	0.061	0.821
Khandiha II Bot	0.098	0.231	0.298	0.105	0.732
Khandiha I Top	0.104	0.368	0.600	0.217	1.290
Khandiha I Bot	0.104	0.245	0.311	0.097	0.757
TOTAL	0.433	1.135	1.551	0.481	3.600

1.8 MINE SCHEDULING AND CALENDAR PROGRAMME OF EXCAVATION

The mining schedule has been formulated based upon the adopted sequence of mine development. No construction period has been considered for the project. The land required for starting the project is already in physical possession. Based on the normative annual capacity of the mine as 0.6MT, the proposed mining schedule is generated for 7 years of mine life.

The targeted coal production from the mine is envisaged in 2nd year. Peak overburden load for the project has been estimated as 0.95 Mcum during 2nd year of the mine life and peak-stripping ratio of 1.88 cum/te in the 1st year. The average stripping ratio of the OCP is 1.43 cum/te.

The summarized mining schedule for coal extraction and corresponding overburden load for the project, seam-wise annual coal & OB production schedule has been provided in the tables below:

SUMMARISED MINING SCHEDULE

Year	Coal Production (MT)	OB Removal (Mcum)	Stripping Ratio (cum/te)
1	0.40	0.75	1.88
2	0.50	0.80	1.59
3	0.50	0.79	1.57
4	1.00	0.80	1.34
5	0.60	0.78	1.30
6	0.50	0.62	1.24
7	0.30	0.29	0.97
TOTAL	3.60	5.14	1.43

SEAM-WISE ANNUAL COAL & OB PRODUCTION SCHEDULE**1.9 DUMPING STRATEGY**

The dumping strategy has been formulated with due consideration of the following aspect:

1. Minimal use of the land for external dumping
2. Rationalization of the lead distance for hauling
3. Stability of the dump both internal and external, which ultimately leads to the safety of the person working in the mine.

Based on the above criteria the following dumping strategy has been adopted:

Two places for external OB dump has been identified. They are designated as Dump-A and Dump-B as shown in the Final stage dump plan. Total external OB dumping requirement is about 1.00Mcum of solid OB. Dump-A can accommodate about 0.35Mcum of solid OB and rest of the external OB will be dumped in Dump-B. In the first year and half, OB will be dumped externally in these two locations. Internal OB dumping will start from 2nd year onwards. Land required for external OB dumping is already in the possession of CCL.

About 19% of OB needs to be dumped externally.

1.10 LAND REQUIREMENT

The total requirement of land for Kabribad OCP is 88.33 Ha, out of which 81.20 Ha land is acquired and under possession of Giridih OCP. Additional 7.12 Ha Non Forest land is required for road and safety zone and this land has to be acquired. Due to non-availability of data, the total non-forest land has been divided into Tenancy land & Govt. land in the ratio of 60:40 for the calculation of compensation for non-forest land as detailed in Appendix-A.1. The break-up of land under different heads is shown in the following table:

Area in Ha.

Sl. no	Particulars	Total
1	Quarry	42.89
2	External OB dump	18.38
3	Infrastructures (W/S, CHP, S/S etc.)	2.68
4	Road	2.69
5	Colony *	0.00
6	Safety zone & vacant land	24.20
7	Total Land Required	90.84

1.11 SAFETY MEASURES-**1.11.1 SAFETY ASPECTS FOR OF HEMM / EQUIPMENT**

Special precaution should be taken while deploying workers in the mine. Before employing any labour to the mine proper vocation training should be imparted and recommendations of VIII Safety Conference should be strictly followed. Some of the major aspects are as follows:-

A) For persons:

- i) No persons shall be deployed unless he is trained at VTC.
- ii) Records in Form-B and Form-D shall be maintained.
- iii) Records of Vocational training Certificate and driving license of operators shall be kept by competent authority and shall be made readily available for inspection by management.
- iv) No person shall be employed unless person holds VTC. A record of it shall be maintained.
- v) Adequate supervision shall be maintained by qualified competent persons only.

B) For Machineries as recommended by DGMS Cir. (Tech.) 1 of 1999:

- i) All the machineries to be deployed in mines should be checked before deployment by competent authority.
- ii) A proper record of repair and maintenance along with inspection done by competent authority and defect pointed out shall be maintained and signed by authorized person.

- iii) All the equipment shall be provided with audiovisual alarms, proper light for use at night and period.
- iv) When natural light is not sufficient an audio-visual alarms for reversing on trucks shall be provided.
- v) Machine manufacturers should be asked to give risk analysis details in respective machines deployed.
- vi) Suitable type of the fire extinguishers shall be provided in every machine

C) General:

- i) No person/vehicle shall be deployed at any place other than authorized place.
- ii) All workers should obey lawful instruction of mine management.
- iii) Risk Management Plan of tipper/pay loader shall be made and implemented.
- iv) All drivers shall obey systematic traffics rules prepared by management
- v) Before deploying workers they must be trained and briefed about safety aspects in opencast mine. However during course of execution of the work, if any accident occurs whether major or minor, the matter shall have to be immediately informed to mine management i.e. Colliery Manager/Agent/GM of Area so that Notices of accidents in a accordance of (Reg.9 of CMR 1957) and Section 23 of The Mines Act 1952 may be given and other necessary steps may be taken in accordance with the Mines Act 1952.
- vi) Mine authority shall operate transport system in such a way so as to minimize pollution in the mine.

1.11.2 STABILITY OF BENCHES, QUARRY HIGHWALLS AND SPOIL DUMPS

During quarry operations, it is necessary to adopt required mining parameters for the stability of benches, highwalls and spoil dumps. It is also mandatory to examine systematically the fencing of mine workings, land slides and cracks between benches. It is required to maintain well-graded and wide roads on benches keeping the width of working areas sufficient for spreading of blasted rock and movement of the mining and transport equipment.

During actual mining operation, systematic observations of the condition of benches, high wall slopes and spoil dumps should be carried out and the dimensions be modified if necessary to suit the local conditions.

1.11.3 PRECAUTIONS AGAINST DANGER OF INUNDATION FROM WATER

Danger of inundation from surface water body: The following precautions need to be taken to prevent danger from surface water body:

- 1) The proposed quarry comprises a number of old quarries. Few of them have water accumulation. Water from these quarries should be pumped out before the proposed quarry approaches them. Provision of additional pump has been made to deal with it.
- 2) A careful assessment is to be made against the danger from surface water before the onset of rainy season. The necessary precautions should be clearly laid down and implemented. A garland drain needs to be provided to drain away the surface rainwater from coming into the mine.
- 3) Standing order for withdrawal of working persons should be made in case of apprehended danger.
- 4) During heavy rain inspection of vulnerable points is essential. In case of any danger persons are to be withdrawn to safer places.
- 5) Nallah or water inlets may be diverted or isolated by embankments if so required.

Danger of inundation from underground water body

Within the proposed quarry, there exists old underground workings standing on pillars having accumulation of water. Adequate precaution has to be taken while approaching these workings. When the underground workings are within 60m of the quarry face, advance drill holes should be made as laid down in the Coal Mines regulations 1957 and relevant circulars issued by DGMS time to time. The accumulated water should be pumped out. Additional provision for pump has been made in the Project report. However, the pumping rate should match with that of the quarry advance so as to keep the advancing quarry face dry and also to prevent spontaneous heating of the exposed underground workings.

GIRIDIH OC

1.1 INTRODUCTION:

A working plan of Giridih OCP has been supplied to RI-3, CMPDI along with the above letter for estimation of the quantity of coal and OB within the earmarked J.B. outsourcing patch. The furnished plan shows the position of proposed Quarry/Patch Surface and mined out area.

1.2 MINING METHODOLOGY ADOPTED:

1. Based on the data available in the Geological Report on Giridih Block, Giridih Coalfield, a Geological Model of aforesaid Patch was developed using MINEX software.
2. The surface profile in and around the earmarked J.B. outsourcing patch has been generated from the topographical plan of Giridih Geological Block and supplied working plan of Giridih OC (No-GRD. /SUR/O.C. MINE/2014-15/389 dated 30/12/2015) using Minex software. The profile of the existing pit (Jatkutti Seam) was generated considering the quarry surface as marked on the supplied plan.
3. Four correlative Boreholes namely GSK-3, NCGR-63, GSK-4 & NCGR-8 were considered for reserve estimation.
4. An outsourcing Patch namely J.B. outsourcing patch was earmarked by mine authorities in the Northeastern part of Khakho River. Only two seams namely Jatkutti and Balihill were earmarked by mine official for outsourcing. Thus Balihill forms the base seam of the outsourced pit. However Khandia-IV seam (4.0-6.0m) is also there below Balihill seam (parting 10-15m). Possibility of occurrence of further coal seams below Khandia-IV is not ruled out.
5. Jatkutti is partly decoaled by open pit mining as shown in the plan furnished by the mine authority. Due to non-availability of Coal floor, the existing pit profile for this seam has been considered as vertical in the said decoaled area.
6. The specific gravity (as per Geological Report) considered for the various seams are as follows:

Seam	Sp Gr
Jatkutti	1.79
Balihill	1.74

1.3 PIT FORMULATION AND DUMP DESIGN:

1. Haul Road width-20m
2. Height of each tier of Dump-30m
3. Reserve estimation is based on the earmarked patch keeping 90 degree vertical downward from top edge of the patch. In actual mining condition extractable reserve may reduce depending upon the angle of slope of the batter.
4. Decoaled area of Jatkutti seam within the patch is deducted for balance reserve. Extent of Jatkutti seam working has been taken from the supplied plan no GRD. /SUR/O.C. MINE/2014-15/389 dated 30/12/15, however occurrence of illegal mining is rampant there, extent of which is not known.
5. External Dump has been planned on the area earmarked on the plan by mine authorities. Land required for this proposed external OB dump is under physical possession. Two tier dump is proposed upto +330RL for external dump. Approach road to external Dump is shown in plan.

1.4 SAFETY MEASURES:

1. Proper care is to be taken to maintain the stability of the external dump slope to avoid slope failure.
2. Adequate safety measures are to be taken while dealing in fire affected area if any.
3. Suitable precautionary measures are to be taken while quarrying above the Underground workings.

1.5 ASSUMPTIONS FOR RESERVE ESTIMATION:

To arrive at the result, the following assumptions have been made considering the nature of deposit and previous workings.

1. 10 % coal of the proposed patch has been deducted from the reserves obtained from MINEX software for getting the Net Geological Reserve within the proposed patch.
2. To obtain the Mineable reserve within the outsourced pit, a further 10 % deduction has been made from the Net Geological Reserve.
3. Pit formation is based on the Quarry surface indicated in the plan however this may change if the intermediate benches with RL are incorporated.
4. Quarry Floor has been considered as vertical.
5. The reserve may change if quarry parameters are changed such as floor position, strike length, surface position and Sp. gravity.

1.6 RESERVE WITHIN THE J.B. OUTSOURCING PATCH:

The estimated coal (approx.) and corresponding OB (approx.) within the said outsourced Pit (viz. JB outsourcing Patch) are as follows:

Particulars	Unit	Value
Top OB	Lakh cum	5.62
Jatkutti	Lakh T	4.43
Parting	Lakh cum	35.07
Balihill	Lakh T	15.92
TOTAL COAL	Lakh T	20.36
TOTAL OB	Lakh cum	40.69
SR	Cum/te	2.00

PARAMETERS OF THE J.B. OUTSOURCED PATCH:

Particulars	Unit	Value
Patch Area(i.e. Quarry surface area)	Sq m	97884
Jatkutti seam worked out area	Sq m	44090

Max Depth upto Balihill seam	m	66
Min. depth upto Balihill seam	m	32
External Dump area	Ha	13.64
Max height of Dump from Surface	m	60
OB lead on surface	km	1.0
Jatkutti seam Thickness	m	6-8
Balihill seam Thickness	m	10.67-12.23

1.7 LAND REQUIREMENT-

	Landuse details	Area in Ha.
Sl. no	Particulars	Total
1	Quarry	9.80
2	External OB dump	13.70
3	Infrastructures (W/S, coal Stock etc.)	1.60
4	Road	4.00
5	Existing OB Dump	18.40
6	Safety zone & vacant land	75.20
7	Total Land Required	122.70