Pre-feasibility Report of Konar Expansion OCP (Nominal / Peak capacity 8.00/ 11.00 MTPA) & Integrated Konar Non-coking Coal Washery (7 MTPA)

1.0 INTRODUCTION

Konar Expansion OCP (8/11 MTPA normative/peak capacity & 729.40 Ha Project Area) & integrated non-coking coal Konar Washery (7 MTPA) falls under B&K Area, Central Coalfields Limited. The project is situated in the north western part of East Bokaro coalfield and covered on Survey of India Topo-sheet no- 73E/13 (1:50000 RF).

The project is proposed by amalgamation as single mine the existing Konar OCP (3.50 MTPA capacity & 301.37 Ha Project Area) and Khasmahal OCP (0.60/1.50 MTPA normative/peak capacity & 219.56 Ha Project Area). The Karo Special underground mine workings partly overlap with proposed opencast mine workings, however this is almost exhausted/ not to be worked further due to thinning of seams and produced only 0.015 MT coal in 2014-15. As such, this has not been included in proposed opencast mine.

Seams X, VIII & VI/VII combined are proposed to be extracted. Seam X is proposed to be worked by Shovel Dumper method and the coal from Seam VIII and Seam VI/VII combined is proposed to be extracted by Surface Miner. The base seam of Quarry has been considered as Seam-VI/VII combined. Coal from Seam X is Washery Grade-IV and Seam VI/VIII combined along with Seam VIII is E & F (G-10).

The proposed Konar Expansion OCP has new Leasehold area of 729.40 Ha after including the area in the dip side and eastern part of Konar Block.

Seven MTPA non-coking coal Konar washery has been proposed to wash non-coking coal produced from Konar OCP and despatch through Konar Railway siding to the powerhouses of NCR. Coking Coal form this mine will be sent to nearby Kargali Washery which is at a distance of 9-10km, by surface transport.

2.0 LOCATION & COMMUNICATION

Proposed Konar Expansion OCP is located in the East Bokaro Coalfield, Bokaro District, Jharkhand State. The Konar block is bounded by latitudes 23°46'0" and 23°48'38" N and longitudes 85°44'0" and 85°56'0" E in the Spherical Grid. The block is covered in Survey of India toposheet no. 73E/13 (RF 1:50,000). The Konar block is located in the north-western part of East Bokaro Coalfield on the up thrown side of the Govindpur-Pichri fault.

Nearby railway stations are BTPS at about 5 km & Jarangdih RS at about 0.5 km on Gomoh-Barkakana loop line of Eastern Railway The Hazaribagh-Bermo road passes through the northern part of the block.

3.0 JUSTIFICATION OF PREPARATION OF EXPANSION PR

Opening of this project is proposed with a view to fulfill the growth in demand of coal. In proposed mining area of the project, lower Seams III & V seams have not been included due to the following reasons:

1. They have already been worked out by UG method.
2. They are not further workable (thickness ≤1m).
3. In borehole No-CMEK-30, Seam V (1.6m thickness) is at a parting 39.13m from Seam VI/VII combined. Seam III (1.70m thickness) lies at parting of 22.21m from Seam V. However in Borehole No-CMEK-32, Seam V (2.15m thickness) is at a parting of 36.65m from Seam VI/VII combined .These two boreholes are among the few boreholes near the mine entry.

4.0 DIFFICULTIES AND CONSTRAINTS IN MINING WITH ASSOCIATED RISK

The following issues need to be dealt with in regard to the difficulties associated with mining in Konar block:

(i) Presently strike length of the mine is around 660m due to the existing Hazaribagh-Bermo Road and CCL colony. This road needs to be diverted as soon as possible. Tentative length of diversion is around 2km.

(ii) The terrain is hilly and very undulating.

(iii) A large settlement of human populationis there which needs to be rehabilitated elsewhere during mining operation. Four villages namely Barwabera, Kurpaniabasti, Lodharbera village and Bermobasti are to be rehabilitated. Out of these villages two villages namely Lodharabera and Bermobasti lie in Phase-II area. Provision for rehabilitation of around 1060 PAF (including 660 for Phase-II) is considered in this Recast EPR. CCL colony namely Kurpania west, Khasmahal, Lambi line Colony & 4 No colony is also to be relocated elsewhere. Sunday bazar and Friday bazar needs to be vacated.

(iv) There are four cemeteries/masna within the leasehold of the project boundary.

(v) An embankment is proposed along the Quarry to safeguard against potential inundation of water from Godo Nala (HFL - 237.64m). Safety measures have been taken to extenuate the dangers of inundation.

(vi) The present report envisages extraction of coal up to the lowermost quarriable seams i.e. Seam VI/VII combined.

(vii) 7 Mty non-coking coal Konar washery has been proposed to wash non-coking coal produced by Konar OCP and proposed to be loaded into Wagons on Konar Railway siding. However, alignment of Railway siding is under finalization with Railway authority. Any modification in the proposed alignment may change some aspect of evacuation system of washed non coking coal, land requirement and limit of quarry edge.

5.0 MINE BOUNDARY

The mine boundary of Quarry has been fixed as follows:

Eastern Boundary

The quarry surface has been fixed leaving a safe distance of 50- 100 m from the existing Sunday Bazar and Lambiline colony. This area is very thickly populated due to bazar and human settlements. In the northern zone, Quarry Surface has been kept 60m distance from proposed diverted route of Godonala (for Godo OCP working).

Western Boundary

The quarry surface has been fixed along river Konar leaving a safety barrier of 150m from the edge of Konar River which is corresponding to a safe distance of 80m to 100m from existing Gomoh-Dehri-On-Sone Loop line. The gap between this railway line and proposed Quarry edge has been planned for laying Rly. Siding from Jarangdih station for washed non coking coal transportation, Conveyor transport arrangement from Washery to Silo and construction of a Coal transport route for Coking Coal transportation from Konar OCP to KargaliWashery.

Northern Boundary

The Quarry surface edge has been fixed keeping a safe distance of 60m from Godonala between fault F5 and F3.Quarry floor has been fixed along the in crop of Seam VI/VII combined between faults F3 & F1.Amalgamation of boundary of Konar Expansion OCP with workings of Khasmahal OCP has been considered. The gap between Quarry surface and Godo nala has been proposed for construction of diverted road (from BTPS to Bermo).

Southern Boundary

The quarry floor has been fixed along the FRL of 110m on the floor of Seam-VI / VII. This has been fixed considering the extent of exploration carried out in this area i.e. till the proved limit. More coal reserves are expected on the dip-side of the Southern Boundary, which can be exploited in future (Phase-II) after further drilling and getting detailed geological information. Lodharberavillageand Bokaro magazine lies to the south of this quarry.

6.0 MINEABLE RESERVES AND COAL QUALITY

The balance cumulative mineable reserve is estimated to be as 115.65 MT with corresponding volume of O.B estimated as 109.72 Mm^3 with an average stripping ratio of 0.95 cum/t.

There are four nos. of coal seams within the quarriable block of Konar OCP. They are seam VI/VII combined, Seam VIII, Seam-IX and Seam X. Seam IX is thin (thickness$\leq$ 1m in major part of the area); so this seam has not been considered in estimating Coal reserves.

Mineable Reserve

Name of seam	Thickness range (m)	Mineable Reserves (MT)
Seam X	11.45-15.79	17.92
Seam VIII	22.97-34.71	61.17
Seam VI/VII combined	8.65-20.47	36.55
Total		115.65

The average quality of seams Seam-VI/VII C &VIII are of G-10 and Seam-X is Washery-IV grade.

7.0 MINE PARAMETERS

Important mine parameters are as under:

Parameters	Unit	Min.	Max.
Mineable reserves	(MT)	115.65	
Total OB	(Mcum)	109.72	
Average Stripping Ratio	(Cum/T)	0.95	
Capacity (Nominal)	(MTY)	8.0	
Length along strike at floor	Km	1.42	2.08
Length along strike at surface	Km	1.56	2.30
Width along dip at floor	Km	1.29	1.82
Width along dip at surface	Km	1.47	2.0
Depth of quarry(maximum)	m	180	
Area of Excavation at floor	Sqkm	2.72	
Area of Excavation at surface	Sqkm	3.32	

However, mine parameters in extreme east and southeast will be finalised after detailed exploration.

8.0 FUTURE EXPANSION POTENTIAL

Substantial coal reserve lies between the proposed quarry surface and 60m barrier from Godonala in the east and 100m barrier from Rly. Line in the South- western part.

Sunday bazar,Friday bazaar,Lambiline colony,Bermobasti, No. 4 colony of CCL and a cemetery/Masna lies to the east and Lodharbera village,Bokaro magazine and M M Bose magazine lies to the south of EPR boundary which falls within project boundary. Around 660 Project affected families are to be rehabilitated from this zone. A tentative quarry area has been identified. Out of total Quarry area (188.44Ha) in this part, 122.87Ha is acquired and 65.56Ha is to be acquired. Total project affected families in this zone are 660. Tentative estimate of in situ geological reserve is 106MT keeping in view of existing mine and geological information. However, reserve may increase or decrease depending upon the geological information after detail exploration in this area. Mining in this part can be started as soon as detail exploration, R&R, Godo nala straightening and other activities are completed. It may add to additional 13-14 years life to this project with the proposed rated capacity of 8.0/11.0 MTY.

9.0 MINE SCHEDULING & CALENDAR PROGRAMME OF EXCAVATION

Based on the annual targeted Capacity of 8.00 MTY with peak production of 11.0 MTY, the proposed mining schedule is generated for 17 years of project life.
The summarized mining schedule for coal extraction and corresponding overburden load for the project has been provided in the table given below:

Year	Coal (Mt)			OB (Mcum.)	SR (cum/t)
	Coking	Non-coking	Total		
1	0.19	1.51	1.70	1.40	0.82
2	0.39	3.11	3.50	2.89	0.82
3	0.61	4.88	5.50	4.54	0.82
4	0.89	7.11	8.00	6.60	0.82
5	0.89	7.11	8.00	6.60	0.82
6	1.03	6.97	8.00	6.74	0.84
7	1.04	6.96	8.00	6.75	0.84
8	1.04	6.96	8.00	6.75	0.84
9	1.04	6.96	8.00	6.75	0.84
10	1.04	6.96	8.00	6.75	0.84
11	1.04	6.96	8.00	6.75	0.84
12	1.53	6.47	8.00	8.92	1.12
13	1.65	6.35	8.00	9.47	1.18
14	1.65	6.35	8.00	9.47	1.18
15	1.65	6.35	8.00	9.47	1.18
16	1.44	5.56	7.00	8.29	1.18
17	0.79	1.16	1.95	1.59	0.82
Total	**17.92**	**97.72**	**115.65**	**109.72**	**0.95**

10.0 MINING STRATEGY / MINING SEQUENCE

Following points were considered while designing the pit boundaries:

1. Pit is designed within the area earmarked for opencast mining operation.

2. Godo Nala flows in the East and North-East region along the boundary of the block. Konar River flows to the South of this block.
3. There is a railway line named Gomoh-Barkakana loop line at a distance of about 80-100m from the proposed Quarry surface in the dip side. Jarangdih station is at a distance of about 0.5 km from the Quarry surface boundary in the dip side and at a distance of about 2.5km from the proposed Rly. Siding. However, exact distance is to be ascertained after detailed survey of the area.
4. Area to the east of proposed quarry surface and upto Godo nala is very thickly populated with bazars and settlements.

The pit formulation strategy adopted is typically suitable for maximising extraction of the coal reserve keeping in view the economics as well as the safety of the mine workings. The final depth of the quarry will be around 180 m at the end of the mining operation.
The quarry will start from the incrop of the base seam-VI/VII combined and will gradually progress towards the dip side of the mine. The quarry floor will follow the seam-VI/VII combined till the end of the quarry.
Total area proposed for opencast working is 3.32Sqkm (including the working of Khasmahal OCP). Due to moderate gradient (6^0 - 10^0) in major part of the property concurrent back filling is possible. It has been proposed to workout Quarry near the borehole NCBK-1 & CMEK-14 to open up the entire strike as soon as possible. Haul road (1 in 16) on the floor of the Quarry is proposed to the western side of the Quarry to accommodate maximum internal dump. Conveyor alignment for coal transportation has been designed in between west of this road and east of Quarry batter floor. Sump is designed to the eastern part of the quarry. Mine will produce coal from first year (1.70MTY) itself as this is running mine. It will last up to 17^{th} year. The mine will achieve its target production in 4^{th} year after attaining its full strike length. As this mine will produce Coking and Non Coking coal both so separate transport for both types of coal are proposed. Dump is proposed to be accommodated externally and internally both as an integrated dump to reduce the requirement of land for external dump. From 3^{rd} year (approx.) onwards internal dump within the quarry will start .Dump is designed in an integral way to accommodate maximum dump with minimum lead distance. The top RL of integral dump in Quarry is +340m.

11.0 EQUIPMENT CONFIGURATION

The requirement of mining equipment e.g., shovels, dumpers, drills and dozers etc. have been estimated as per annual productivity based on adopted design criteria and workload determined by the calendar plan considering the physical location of equipment within the operating mine. For calculating the number of dumpers, year wise leads have been taken into account for OB and Coal transportation separately.

The envisaged requirement of main mining equipment is given below:

Equipment Configuration		**No.**
OB	**Capacity**	
Electric Hydraulic Shovel*	5.5-6.5 Cum	6
Rear Dumper	60 T	50
Diesel Drill	160 mm	6
Wheel Dozer	460 HP	2
Dozer with ripper	410 HP	7
Coal		
Surface Miner	3800mm	4
FE Loader	5.5-6.5cum	6
Rear Dumper	60 T	23
Wheel Dozer	460 HP	5
Dozer with ripper	410HP	7
Common		
Diesel Hydraulic Backhoe	1.2-1.8 Cum	1
FE Loader	5-6 Cum	1
Dump Truck	10T	2
Wagon Drill	100-120 mm	1
Grader	280 HP	2
Wheel Dozer	460 HP	2
Water Sprinkler	28KL	3
R T Crane	20T	1
Mobile Crane	8-10T	1
Dump truck	10T	2
Tyre handler	35KN	1
Fuel truck	16KL	1
Vibratory compactor	30T	1
Fire Truck		1
Water Sprinkler	28KL	3
Reclamation		
FE Loader	5-6cum	1
Water Sprinkler (wide spray sys.)	28KL	1
Dozer	410 HP	2
Dumper	35T	2

*Note- One Electric Hyd. Shovel from OB will cater to Seam X (keeping in view of coal quantity and thickness) and OB both as and when required.

12.0 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 OB 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:

Out of 109.72Mcum, 23.21Mcum is accommodated in external dump and 86.51 Mcum is to be accommodated internally in the void Quarry itself. Garland drain and retention wall where ever required around external dump have been provided from safety point of view. As it is integrated dump so highest dump level is same as internal i.e. +340m.No rehandling is involved in this mine.

Particulars	External (Mcum)	Internal (Mcum)	Total(Mcum)
OB Dump Capacity	23.21	86.51	109.72
% of dump (approx.)	21%	79%	100%

13.0 LAND REQUIREMENT

Total requirement of land for Konar Opencast Project has been estimated as 729.40Ha. The total requirement of land includes 579.73Ha. of forest land and 149.67Ha. non forest land. The break-up of land under different heads is shown in the following table:

Details of Land-use

Area in Ha.

Sl. no	Particulars	Forest land	Non Forest land	Total
1	Quarry	225.70	106.26	331.96
2	External OB dump	55.78	5.66	61.44
3	FBC Plant	30.00	0.00	30.00
4	Site for Rejects	20.71	0.00	20.71
5	Infrastructures (W/S, CHP, S/S, Washery, Offices etc.)	41.90	0.00	41.90
6	Rly Siding	0.53	1.73	2.26
7	Approach to Washery/Coal Transportation Road	5.34	2.39	7.73
8	Safety Zone & Vacant Land	29.47	15.49	44.96
9	Land Requirement for future use	170.30	18.14	188.44

10	Total Land Requirement(including future use)	579.73	149.67	729.40

14.0 MAIN FACILITIES:

WORKSHOP & STORE

The existing workshop is not sufficient for the maintenance and repair of increased number of HEMM. So, a new unit workshop and store have been proposed. This Unit workshop will have two parts- Excavation and E&M workshop. Apart from this, Project store and other common facilities like- canteen, fuelling station, washing station, security post, firefighting etc. have been provided.

Any major overhaul of equipment and manufacturing of spares on large scale are beyond the scope of this workshop. These works will be carried out in nearby Regional workshop or Central workshop, Barkakana.

POWER SUPPLY

At present Konar OCP is receiving power from 33 KVA main Sub-station of Khasmahal Project of CCL which is receiving power at 33 kV from Bokaro Thermal Power station of DVC through a single circuit 33kV OH line feeder. Current maximum demand of main Sub-station of Khasmahal is 1.6 MVA. A 2X6.3 MVA 33/6.6kV main substation has been envisaged for the project.

The 2X6.3 MVA 33/6.6kV main substation will have provision for receiving power at 33kV through 2 nos. 33 kV incoming feeders and arrangement for feeding the same to the different load centers of the project at 6.6 kV through 12 nos. outgoing 6.6 kV feeders.

Proposed main substation will receive power at 33 kV from Bokaro Thermal Power Station (BTPS) of DVC. Two independent 33kV Overhead lines with WOLF or equivalent AAA conductor will be constructed from Bokaro Thermal Power Station (BTPS) of DVC to the proposed main substation of Konar expansion OCP for receiving power. These 33kV overhead line feeders will be farther extended up to proposed Konar Washery for feeding power to Washery substation. Approximate length of proposed 33kV OH line from BTPS to propose project substation is 3.5 km.

Existing 33kV overhead line feeder through which main substation of Khasmahal OCP is receiving power from BTPS is passing through the working area of proposed Konar Expansion Project. Provision for diversion of the said overhead line has been made in this report.

COAL HANDLING PLANT AND TRANSPORT OF COAL:

Coking and non-coking coal will be produced from the mine. The peak production of coking coal from seam X and non-coking coal from seam VI/VII & VIII will be 1.65 Mty and 7.11 Mty respectively. Non-coking coal will be produced through surface miner and coking coal will be produced through shovel dumper. However during initial period of mine operation the entire coal will be transported upto surface receiving pit near quarry mouth for crushing and conveying to CHP system till the installation of inpit receiving and conveying system. Coking and non-coking coal will be crushed separately. The Coal Handling Plant (CHP) has been proposed near quarry mouth to handle total coal production of this project.

Coal mined through surface miner will be of (-) 100 mm size and it will be fed directly into proposed CHP system for storage, reclamation and feeding to washery. A pit top washery has been proposed for washing of entire non-coking grade coal before final despatch to customer.

Non-coking coal produced through surface miner will be transported by rear discharge dumpers of 60Te capacity to receiving pit for conveying and storage in bunker.Coking coal produced through shovel dumper will be transported by rear discharge dumpers of 60Te capacity to receiving pit of 500 tph two stage twin shaft primary & secondary sizer to crush ROM coal from 1200 mm to (-)100 mm size, conveying, storage in overhead hoppers and ground for onward truck transportation to Kargali washery.

Coal handling plants have also been provided with suitable repair, communication and other auxiliary facilities to meet the day to day requirement in the plant operation. It is proposed that entire non-coking coal produced from Konar Expansion OCP will be washed in proposed 7 Mty Konar washery. A new railway siding for Konar Expansion OCP has been proposed which is at a distance of about 2.5 km from proposed Konar washery. The railway siding will take off from Jarangdih railway station on Gomoh–Barkakana rail loop line. One Silo of 4000te capacity between two separate rail lines have been provided to load washed non-coking coal of about 5-6Mty from Konar washery. The total length of the rail line including yard provisions will be about 4.5 Kms.

Provision to accommodate two parallel full rake of 58'N box rake loading has been envisaged at this siding. The total length of siding will consist of link portion and yard portion along with empty & loaded lines. Provision has been made considering various crossovers from one track to another as & where required.

Empty rake would be brought by railway loco near the loading point of the project railway siding and wagons will be placed on the receiving line below Silo. After loading the wagons, the pilot will move attached wagons as per requirement to reach the terminal station without decoupling of locomotive.

In motion rail weigh bridges has also been provided at suitable places for weighment of empty as well as loaded wagons.

EXECUTIVE SUMMARY OF KONAR WASHERY

1.0 Expansion Project Report (EPR) of Konar OCP, B&K Area, East Bokaro Coalfield has been planned for targeted output of 8.0 Mty capacity. Both coking and non-coking coal will be produced from this mine. Out of this 8.0 Mty, about 7.0 Mty is non-coking coal and about 1.0 Mty is coking coal. It has been envisaged by CCL that coking coal produced from this mine will be transported to nearby proposed Kargali washery with the help of tipping trucks. CCL intends to wash the entire non-coking coal produced from Konar OCP in proposed non-coking coal washery on Build Operate & Maintain (BOM) concept having raw coal throughput capacity of 7.0 Mty.

2.0 Projection of yield has been done on the basis of the test results of Seam VI/VII & Seam VIII carried out by CMP Laboratory, CMPDI. The composite raw coal ash of Seam VI/ VII (combined) & Seam VIII, contribution of which are 36.94% & 63.06% respectively, works out to 40.6%. Hence, the average ash of raw coal feed to washery has been considered as 40.6%.

3.0 Selection of process is based on study of the test results. The washing scheme is briefly given below:

- Receiving raw coal of (-)100 mm from proposed Konar CHP by belt conveyors.
- Screening at 50 mm to get two size fractions viz. 100-50 mm & -50 mm.
- Crushing of 100-50 mm fraction down to 50 mm.
- Screening of entire -50 mm fraction at 13 mm to get two size fractions viz. 50-13 mm & -13 mm.
- Deshaling of 50-13 mm fraction in two product improved type jigs to produce deshaled coal (float) and rejects (sinks).
- Direct mixing of untreated -13mm coal with deshaled coal from jig to obtain washed coal of desired quality.
- Transportation of rejects to Temporary Reject Storage Site by belt conveyor.

Provision of closed water circuit with zero effluent discharge and rain water harvesting has been envisaged.

4.0 Infrastructure facilities:

a)	Washery site	An area of about 25 Ha has been identified by CCL, which is the portion of land earmarked for proposed OB dumping of Konar OCP, for construction of proposed Konar Washery. This site is in place of CHP and Workshop of Konar OCP. Most part of the identified site is above the developed pillars of Seam-V of KSP, Ph-II underground mine.
b)	Water	The quantity of water required for operation & maintenance of the proposed washery is about 0.35 MGD. CCL has proposed a check dam i.e. a reservoir for collection of water from the overflow of BTPS ash

		ponds at a distance of around 3 kms. from the washery premises as source of water for the proposed Konar Washery. BOMO shall have to arrange for drawl of water from the proposed check dam. Construction of check dam and power supply arrangement for pumping of water from source is in the scope of CCL.
c)	Power	The requirement of power is about 7.5 MVA for operation & maintenance of the proposed washery and shall be available at 33kV through a separate overhead transmission line (OHTL) to be drawn by BOM operator from proposed main sub-station of Konar OCP adjacent to the proposed washery as shown in the plan. The proposed outdoor sub-station of washery will receive power at 33kV from main sub-station of Konar OCP through double circuit 33kV OHTL. However, CCL shall confirm the above prior to customization of Bid document.
d)	Railway siding for loading & dispatch of washed coal	Washed coal from the washed coal covered storage will be reclaimed and conveyed through 2 nos. of belt conveyors of capacity 2500 tph each to 1 no. Silo of capacity 4000 t located at the proposed Railway siding of Konar OCP. The washed coal will be loaded into Railway wagons through Rapid Loading System (5500tph). The tentative distance from the proposed washery site to the Railway siding is about 2.5 kms. The construction of washed coal conveyors, Silo and Rapid Loading System for Konar washery is under the scope of BOMO whereas construction of Railway siding is under the scope of CCL.
e)	Reject disposal/ utilisation	Rejects will be conveyed by belt conveyor to Temporary Reject Storage Site (about 20 Ha) near to washery site identified by CCL prior to sending the rejects to proposed FBC power plant for power generation. Conveying of rejects to temporary reject site will be done by the BOM Operator.

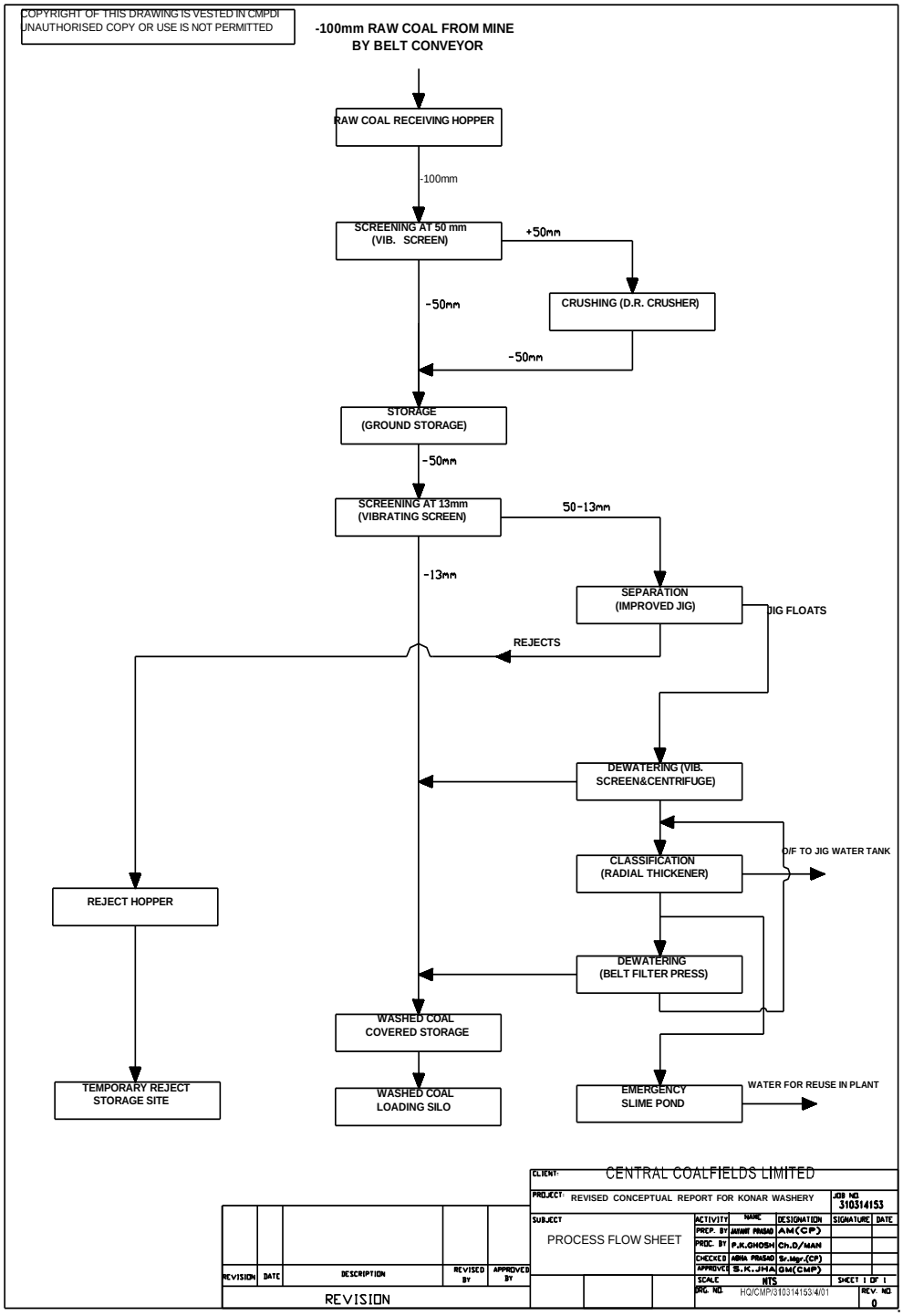
5.0 The summarized data are given hereafter:

SUMMARISED DATA

1. Capacity & Operating conditions
   a) Annual : 7.0 Mty
   b) Daily : 21200
   c) No. of effective working hours per year : 6000
   d) Hourly : 1200 t
2. Raw coal linkage : Expansion Konar OCP
3. Development period in years (including construction period) : 3
4. Life of the washery after commissioning for computation of economics (in years) : 18
5. Quality of raw coal feed (average)
   a) Ash% : 40.6
   b) GCV (kcal/kg) : 4444
   c) Grade : G-10
6. Balance of Products :

Product	Wt%	Ash%	Qty. (Mty)
Washed coal	75.4	33.5	5.3
Rejects	24.6	62.4	1.7
Total	100.0	40.6	7.0

8	Broad initial capital investment (Rs. in Crores)	251.48
9	Estimated Operating cost per tonne of raw coal (Rs.)	121.23
10	Cost of production per tonne (Rs.)	1711.71
11	Desired selling price of washed coal (at avg. RC Ash i.e. 40.6%) at 12% IRR	1780.23
12	Selling price per tonne of washed coal (Rs.)	1877.58
13	Annual profit (Rs. Crores)	87.55
14	Payback Period	2 years 11 months
15	Construction period including trial run, PGT & commissioning	18 months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-100mm RAW COAL FROM MINE
BY BELT CONVEYOR
RAW COAL RECEIVING HOPPER
-100mm
SCREENING AT 50 mm
(VIB. SCREEN)
+50mm
CRUSHING (D.R. CRUSHER)
-50mm
-50mm
STORAGE
(GROUND STORAGE)
-50mm
SCREENING AT 13mm
(VIBRATING SCREEN)
50-13mm
-13mm
SEPARATION
(IMPROVED JIG)
JIG FLOATS
REJECTS
DEWATERING (VIB.
SCREEN&CENTRIFUGE)
O/F TO JIG WATER TANK
CLASSIFICATION
(RADIAL THICKENER)
REJECT HOPPER
DEWATERING
(BELT FILTER PRESS)
WASHED COAL
COVERED STORAGE
TEMPORARY REJECT
STORAGE SITE
WASHED COAL
LOADING SILO
EMERGENCY
SLIME POND
WATER FOR REUSE IN PLANT
CLIENT: CENTRAL COALFIELDS LIMITED
PROJECT: REVISED CONCEPTUAL REPORT FOR KONAR WASHERY
JOB NO. 310314153
SUBJECT
PROCESS FLOW SHEET
ACTIVITY NAME DESIGNATION SIGNATURE DATE
PREP. BY AMAR PRASAD AM(CP)
PROC. BY P.K.GHOSH Ch.O/MAN
CHECKED ASHA PRASAD Sr.Mgr.(CP)
APPROVED S.K.JHA GM(CMP)
SCALE NTS
SHEET 1 OF 1
DRG. NO. HQ/CMP/310314153/4/01
REV. NO. 0
REVISION DATE DESCRIPTION REVISED BY APPROVED BY
REVISION

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