

PRE-FEASIBILITY REPORT OF North Urimari OCP

1.1 BACKGROUND OF THE PROJECT

North Urimari OCP is situated in the north part of South Karanpura Coalfield of Central Coalfields Limited at Hazaribagh district of Jharkhand State. The block owes its name to the adjacent Urimari village in district Hazaribagh of state Jharkhand and is situated at the Northern bank of Damodar River with its northern boundary demarcated by the faulted metamorphic contact along the Aswa hills. The Urimari Block was explored by MECL in search of superior/intermediate grade coal and the block occupies an area of about 6.5 km. The block is bounded between the latitude 23°41'04" N to 23°42'52" N and longitude 85°16'06" E to 85°19'36" E respectively. It forms part of topo-sheet 73 E/6.

The block based on exploration have been structurally divided into two sectors- northern sector falling in the up thrown side of southerly dipping fault F8 (throw 120-200m) has been designated as Sector I while the down thrown side of Fault F8(south eastern part) up to surface trace of Fault F3 in the west has been designated as Sector II. 24 no. of seams/splits from Hathidhari to Argada D have been encountered and proved in the block. Sector I having seam Argada D to Hathidhari seams possesses very good opencast potentiality. Opencast potentiality of sector II is very limited due to the fact that major Argada group of seams (Argada Top to Argada B) are extensively affected by mica-peridotite intrusion in over bulk of the area in sector II.

North Urimari OCP (3.0 MTY) was planned to exploit Hathidhari to Argada B seams in sector-I of Urimari Block. Based on the geological report prepared by MECL on 83 boreholes drilled in Urimari block, a Project Report (PR) for North Urimari OCP (3.0 MTY) was prepared in Dec.1989 with initial capital investment of Rs. 233.12 Crs. The cost of the project was updated in Dec.2000 for Rs. 512.45 Crs.

The same project Report was re-cast considering geological report on Urimari Block prepared by MECL in 1994. The capacity of the project was 3.0 MTY of grade 'G8' non-coking coal. The opencast project was divided in two quarries by Potanga nallah flowing across the project. The report was approved by CCL Board on 31/12/2007 with outsourcing of both coal and OB.

1.2 LOCATION

North Urimari OCP is located in South Karanpura Coalfields of CCL in Hazaribagh District of Jharkhand State. The Latitude & Longitude of the geological block for the proposed project are 23°41'04"N to 23°42'52"N and 85°16'06E to 85°19'36"E respectively in Survey of India Toposheet no. 73 E/6 (in 1:50,000 scale).

1.3 PRESENT STATUS OF THE MINE / PROJECT

PR for North Urimari (3.0 MTY) was approved by Board of Directors, CCL on 31/12/2007 for an initial capital outlay of Rs. 179.87 crores with outsourcing of both coal and OB. The project has obtained environmental clearance for a rated capacity of 3.0 MTPA within the project area of 535.82 Ha (including 18.92 Ha of colony/residential area outside the leasehold boundary) vide MoEFCC OM no: J-11015/307/2005-IA.II(M) dt: 08.02.2006. The present mine working is in both eastern and western part with departmental operation and small outsourcing in West Quarry. The production details of north Urimari OCP in the previous years is as given below.

Year	Coal (Mte)	OBR (MCum)
2009-10	0.27	0.92
2010-11	0.32	0.72
2011-12	0.34	0.78
2012-13	0.37	0.85
2013-14	0.15	1.31
2014-15	0.5	1.49
2015-16	0.78	2.13
2016-17	0.81	1.29
2017-18	1.73	

At present, the coal from this project is being transported to Saunda D railway siding which is at a distance of 12 kms from the face of the quarry by tipping trucks. Also, a proposal for construction of 'North Urimari Railway siding is under process. Rites has started the work of Railway Siding

1.4 PRESENT PROPOSAL (OBJECTIVE)

The project has obtained environmental clearance for 3.0 MTY and 535.82 Ha project area as per the EIA notification 1994. However, as per the Hon'ble supreme court judgement dated 2nd August 2017 regarding the validity of EC granted for mining projects under EIA notification 1994, the MoEF&CC has issued a notification vide no: S.O 1530 (E) dt. 16.04.2018 in which it was said that "The mining projects which were granted EC under EIA notification 1994 and but not obtained EC for expansion/ modernization/ amendment under the EIA notification 2006 shall make an application in Form I within six months from the date of issue of this notification for grant of EC under the provisions of the EIA notification, 2006".

Therefore, this pre-feasibility report is being prepared for the rated capacity of 03 MTPA and within the revised project area of 523.06 Ha (including 18.92 Ha of colony/residential area outside the leasehold boundary).

1.5 BRIEF GEOLOGY

The geological and mining characteristics of North Urimari western and eastern quarries are summarized in Table below.

Sl. No.	Particulars	Unit	West Quarry	East Quarry
A	Seam Thickness			
1	Argada 'B'	M	-	6.1-8.6
2	Argada A+B	M	9.0-19.1	13.4-22.6
3	Argada 'A'	M	-	5.7-13.2
4	Argada Bottom Lower Split	M	0.5-1.3	-
5	Argada Bottom Combined	M	3.5-6.5	4.3-6.6
6	Argada Bottom Upper split	M	0.7-3.2	-
7	Argada Middle + Bottom	M	10.0-18.4	12.7-21.1
8	Argada Middle	M	6.5-11.9	9.8-15.9
9	Argada Top Lower Split	M	0.9-2.3	1.0-2.6
10	Argada Top, Combined	M	1.2-5.6	2.0-4.3
11	Argada Top, Upper Split	M	0.9-3.7	0.6-2.9
12	Upper sirka (Bottom)	M	0.44-1.61	0.44-1.15
13	Bansgarha (C+D)	M	0.27-1.51	
14	Bansgarha	M	2.26-3.45	
15	Hathidhari	M	2.50-4.11	
B	Seam Gradient	Degrees	8-20	8-35
C.	Specific Gravity of Seams			
1	Argada 'B'	t/cum	1.60	1.06

2	Argada A+B	t/cum	1.59	1.59
3	Argada'A'	t/cum	1.57	1.57
4	Argada Bottom Lower Split	t/cum	1.54	1.54
5	Argada Bottom Combined	t/cum	1.52	1.52
6	Argada Bottom Upper split	t/cum	1.56	1.56
7	Argada Middle + Bottom	t/cum	1.55	1.55
8	Argada Middle	t/cum	1.55	1.55
9	Argada Top Lower Split	t/cum	1.55	1.55
10	Argada Top, Combined	t/cum	1.58	1.58
11	Argada Top, Upper Split	t/cum	1.59	1.59
12	Upper sirka (Bottom)	t/cum	1.55	1.55
13	Bansgarha (C+D)	t/cum	1.57	
14	Bansgarha	t/cum	1.57	
15	Hathidhari	t/cum	1.57	
D	Excavation Category (assumed)	Unit	50%III, 50% IV	50%III,50% IV
II	OVERBURDEN			
1	Parting between Argada'A' & 'B' Seams	M	0	0-2
2	Parting between Argada Bottom & Argasda'A' seams	M	5-30	5-26
3	Parting between Argada Bottom Upper & Lower Splits	M	0-4	0
4	Parting between Argada Middle & Bottom	M	0-25	0-4
5	Parting between Argada Top & Middle	M	2-12	2-4
6	Parting between Argada Top & Upper & Lower Split	M	0-4	0-3
7	Top OB	M	15-90	12-100
Sl. No.	Particulars	Unit	West Quarry	East Quarry
III	QUARRY PARAMETERS			
1.1	Maximum strike length along Quarry floor	Km	1.80	1.68
1.2	Maximum strike length along Quarry surface	Km	1.96	1.72
2.1	Maximum length of the quarry along dip along Quarry floor	Km	0.8	0.76
2.2	Maximum length of the quarry along dip along Quarry surface.	Km	1.08	1.04
3	Maximum depth of Quarry	M	140	140
4	Quarry area at surface	Sq.Km	1.6	0.94

1.6 MINE BOUNDARY

- **Northern Boundary**

The northern floor boundary is fixed along incrop of Argada (A+B) seam and fault F1-F1 , a major fault separating barakars and metamorphics.

- **Southern Boundary**

Southern floor boundary is fixed along fault F8-F8

- **Eastern Boundary**

Eastern Floor Boundary is fixed along the incrop of seam Argada'B'

- **Western Boundary**

Western surface boundary is fixed at a distance of about 60m from the Tillaiya Nallah. Aswa north block existing in the west of proposed quarry is separated by Tillaiya Nalla. Hence a safe barrier of 60m has been left from the nalla while formulating the proposed project report.

1.7 MINING STRATEGY

Considering the geo-mining conditions, proposed mining strategy is:-

- Steep Gradient, 10 to 20° of the coal seams inclination in the quarry area between CS 1-1' to 4-4' and between cross-sections 6-6' to 9-9'.
- Multiple small strike length along quarry floor in the quarriable area between cross-sections 9-9' to 11-11' due to presence of fault F₃F₃, F₄F₄ & F₅F₅.
- Presence of thick seams viz. Argada (A+B) and Argada (M+B) shovel dumper mining system with horizontal slicing is proposed in North Urimari Opencast.

1.8 MINEABLE RESERVES

The total balance mineable reserves are estimated as **80.81** Mte. Within the quarry area of 254.40 Ha. The total volume of overburden is estimated as **136.60** M.cum, with an average stripping ratio of **1.69** Cum per tonne. The breakup of sectorwise coal reserves and volume of OB between different seams is given in following table. Seams

having thickness less than 1metre have not been considered for estimation of total reserves. To work these seams by horizontal slicing method, running stripping ratio becomes very high.

	Coal (Mte)	OB (Mm ³)	Average Stripping Ratio (m ³ /te)
Western Quarry	47.14	90.35	1.92
Eastern Quarry	33.67	46.25	1.37
Total	80.81	136.60	1.69

1.10 CALENDAR PROGRAMME OF EXCAVATION

	West		East		Total	
	Coal	OB	Coal	OB		
Y1	2.00	6.59			2.00	6.59
Y2	3.00	6.12			3.00	6.12
Y3	3.00	6.47			3.00	6.47
Y4	3.00	6.37			3.00	6.37
Y5	3.00	6.35			3.00	6.35
Y6	3.00	6.35			3.00	6.35
Y7	3.00	6.35			3.00	6.35
Y8	3.00	6.35			3.00	6.35
Y9	3.00	6.29			3.00	6.29
Y10	3.00	6.00			3.00	6.00
Y11	3.00	5.70			3.00	5.70
Y12	3.00	5.70			3.00	5.70
Y13	2.00	3.80	1.00	1.42	3.00	5.22
Y14	2.00	3.76	1.00	1.42	3.00	5.18
Y15	2.00	3.53	1.00	1.42	3.00	4.95
Y16	2.00	2.90	1.00	1.42	3.00	4.32
Y17	1.50	0.80	1.50	3.32	3.00	4.11
Y18	1.50	0.52	1.50	3.59	3.00	4.11
Y19	1.14	0.40	1.86	3.72	3.00	4.11
Y20			3.00	4.11	3.00	4.11
Y21			3.00	4.11	3.00	4.11
Y22			3.00	4.11	3.00	4.11
Y23			3.00	4.11	3.00	4.11

Y24			3.00	4.11	3.00	4.11
Y25			3.00	3.75	3.00	3.75
Y26			3.00	2.48	3.00	2.48
Y27			3.00	2.48	3.00	2.48
Y28			0.81	0.67	0.81	0.67
Total	47.14	90.35	33.67	46.25	80.81	136.60

1.11 DUMPING STRATEGY

Total over burden generated will be 136.60 Mm³. It is proposed to store 59.60 M.m³ OB in the external dump and remaining 77.00 M.m³ OB will be backfilled in the mine void. An external has been proposed in the northern side of leasehold. The proposed area of external dump is 168.95 Ha.

1.12 LAND DETAILS

The proposed land use for quarry, OB dump, infrastructure, haul road, safety zone etc. are as under:-

Sl.	Item	Total
1	Quarry	254.4
2	External OB dump	168.95
3	Safety Zone	44.28
4	Haul road	4.5
5	Nalla diversion and garland drain	10.59
6	Space for industrial construction	21.42
7	Total leasehold boundary area	504.14
8	* Colony area	18.92
9	Total Land	523.06

* Colony area is outside the leasehold boundary.

Total Forest land involved in project area, 226.51 Ha. has been acquired (Stage II) vide letter no: F. No. 8-54/2008-FC Dt. 03.08.2011.

1.13 SAFETY MEASURES

1.13.1 SAFETY ASPECT OF WORKMEN & HEMM

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 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

Provisions of Coal Mines Regulation and DGMS Cir. (Tech.) 1 of 1999 should be strictly adhered to along with the following:

- i) All machinery and plant used in connection with working of a mine shall be of good design, sound construction, and suitable material, adequate strength, free from patent defect and properly maintained.
- ii) The owner, agent and manager shall provide adequate training facilities and ensure proper training of persons employed for operation and maintenance of machinery and plant.
- iii) No person except an engineer or other competent person under his supervision shall undertake any work on machinery and plant in which technical knowledge or experience is required.
- iv) All the machineries to be deployed in mines shall be so designed as to afford the operator clear and uninterrupted vision all around.
- v) Every heavy earth moving machineries, including trucks and tippers, used in mine shall be fitted with adequate safety features or devices as specified by DGMS. All

equipment shall be provided with audiovisual alarms, proper light for use at night and fitted with suitable type of the fire extinguishers.

- vi) Truck mounted drill machines designed for tube well drilling for sources of water shall not be used and only proper type of blast hole drill machine, especially designed for mining purpose, shall be used in the mine.
- vii) Every heavy earth moving machinery shall be under the charge of a competent person (Operator or Driver), authorized in writing by the Manager.
- viii) All persons employed or to be employed to operate heavy earth moving machinery shall be trained and their competency shall be evaluated by a Board constituted by the management, who shall be persons who are not connected with imparting of training.
- ix) 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.
- x) Only such fitters or mechanics possessing driver's or operator's license, shall be allowed to carry out test-run of heavy earth moving machineries.
- xi) No person other than the operator or the driver or any person so authorized in writing by the manager shall be allowed to ride on a heavy earth moving machinery

1.13.2 STABILITY OF BENCHES, QUARRY HIGHWALLS & 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, landslides 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. To ascertain the optimum slope angles for stability of quarry benches, highwalls and spoil dumps, scientific study of slope stability along with hydro-geological study of the area needs to be undertaken. Provisions laid down under Coal

Mines regulation shall be strictly adhered to for the safety of quarry and OB/ spoil dumps. In addition to this, the following precaution should be considered:

- i) The spoil dump height should not exceed 90m from immediate surface level with an overall slope of 28° or less. In the event of encountering steep floor gradient, floor blasting should be done and the area properly levelled by dozer before spoil dumping.
- ii) No working or construction should be allowed within the 60m toe of the OB dump.
- iii) Before dumping the OB on the floor of seam, at least 10m length all along the strike length should be made horizontal at every 50 meter by floor dinting/blasting.
- iv) Dump should be created in such a way that there is no chance of accumulation of water in and around the base of dump as it will adversely affect the shear strength of the base material of dump. It must be ensured that there is no stagnant water at the toe of dump and the top of the dump.
- v) The toe and face of the dump should not be eroded or cut at any point of time to avoid slope failure.
- vi) Formation of dumping should be done in square or circular or any regular shape as far as possible.
- vii) Proper drainage system should be provided to bring down rain water by construction of inclined drain on dump face and catch drain on all benches.
- viii) During active period of dump, all rain water should be diverted away from mining site as far as possible.
- ix) Sump and pumping capacity should be sufficient to accommodate peak surface run-off and seepage of water.
- x) Gabion wall and garland drain should be constructed and maintained to trap the surface run-off and sludge coming from dump.
- xi) Plantation and grassing should be done on top and slope of the dump respectively.
- xii) Regular monitoring is required for development of tension crack, gullies, movement of soil mass, stagnation of water and any other unusual occurrence.

In case of dump movement, rate of movement of dump should be monitored. Special attention should be given at curve area/turning area of the dump.

1.13.3 OTHER PRECAUTIONS AND SAFETY MEASURES IN SPOIL DUMPING

With increasing size of opencast mine, the quantity of OB removal is also increasing. The dumping of OB can be external, internal or both. The stability of spoil dump is the main concern for an opencast mine. Poor management of overburden dump results the instability of dump slope in opencast mine. In few decades destabilizations especially internal dumps have taken place in coal mines, therefore, it has become necessary to adopt the scientific methodology for spoil dumping along with the following statutory steps / measures.

- a) The width of any bench in waste dumps shall not be less than its height and a scientific study is to be made, in case the planned height of the dump is beyond 30m.
- b) In case of any existence of any road nearby, dumping shall be done in such a way that the distance between the toe of the dump and road is not less than twice the overall dump height. If it is inevitable, arrangement shall be made for diversion of road; so that it is away from the stated safe distance.
- c) The top soil and sludge shall not be dumped at the floor to create the base of the dump.
- d) For reducing the ground water pressure in the dump rock above phreatic surface, effective drainage system shall be provided both inside and outside the overburden dump. In this regard, the guidelines provided in DGMS Circular (Tech) No-2 of 2001 in designing pit slope shall be followed.
- e) The dump area shall be substantially fenced, in accordance with the CMR, to prevent inadvertent entry of any person to the dump.
- f) Precautions shall be taken to prevent spontaneous heating and fire in the carbonaceous shale and coal dumped along with overburden.
- g) Gabion walls, wherever required shall be provided round the periphery of dump for prevention of floor heaving and to facilitate the drainage of water accumulated near toe of external dump. It also acts as retaining wall to some extent.

- h) Internal dumping on the seam floor having steeper gradient shall not be carried out unless, it is ensured that the dump stability factor of safety is well within the allowable range. For this a scientific study on slope stability of dump considering the geo-engineering/mining parameters must be carried out and dumping shall be done in accordance with guidelines as suggested in the study report.

In addition to the above precautions and measures, it is also necessary to comply the statutory guidelines issued by DGMS or any statutory/safety bodies from time to time regarding OB dumping in opencast mines.

1.13.4 PRECAUTIONS AGAINST DANGER OF INUNDATION

Following are the precautions required to be taken against danger of inundation from surface water and old waterlogged workings:

- a) Adequate protection against any danger of inrush of surface water into the mine or part shall be provided and maintained to the satisfaction of DGMS, whose decision shall be final.
- b) The entrance into the mine shall be so designed, constructed and maintained that its lowest point (which means the point at which a body of rising water on surface can enter the mine) shall not be less than 3.0 meters above the highest flood level at that point.
- c) Every year, during the rains constant watch shall be kept on the flood levels on the surface of the mine and if at any time the levels cross the highest levels earlier recorded, such levels shall be marked by permanent posts along the edges of water and the new highest levels thus observed shall be recorded with the date as the highest flood level on the plans by an actual survey.
- d) If water dams or reservoirs are built across rivers and water courses on the upstream side of the mine, arrangements shall be made for communication between appropriate authorities for the purpose of ascertaining the quantity and timing of water released from the dams which is likely to endanger safety of the

mine and arrangement for similar communication shall be made when water level rises on the upstream side which is likely to endanger the mine.

- e) The highest flood levels and danger levels at least 1.2 meters below the highest flood level, shall be permanently marked at appropriate places on the surface and whenever water rises towards the danger level at any place, all persons shall be withdrawn from the mine sufficiently in advance and for this purpose adequate arrangements of quick communication to all parts of the mine by effective systems shall be provided and maintained.
- f) No working shall be made in the mine at any spot lying within a horizontal distance of 15 meters from either bank of a river or nala.
- g) A competent person shall, once at least in every fourteen days during the rainy season and once at least in every thirty days during other periods of the year, examine every protective measure provided under Regulations-149, whether in use or not, for their stability, and a report of every such examination shall be recorded. The protective measures and workings shall also be inspected, once at least in every quarter by the Manager personally.
- h) 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.
- k) Standing order for withdrawal of working persons in case of apprehended danger. During heavy rain inspection of vulnerable points is essential. In case of any danger persons are to be withdrawn to safer places.

1.13.5 PROTECTION OF EQUIPMENT DEPLOYED AT BOTTOM HORIZONS FROM FLOODING

During the heavy monsoon period, the mining operation in the lower-most bench may have to be stopped. Therefore, it is proposed to drown the lower-most bench, which would work as a sump. The water will be pumped out and discharged into the nearby Nallah / River.

For ensuring safety of the equipment while working out bottom horizons with no access to surface profile, the following measures should be taken:

- (a) Drivage of initial trenches if any and coal cutting on bottom benches should be done during the dry period of the year.
- (b) Ramps should be made for quick shifting of equipment from bottom horizons, liable to be flooded during monsoon period, to the top horizons.

1.13.6 PRECAUTIONS AGAINST DANGER FROM BLASTING

Following measures should be taken while drilling and blasting operations in the quarry:

- a) Drilling and Blasting in quarry should be done in accordance with the provisions of Mines Safety Act, rules and regulations.
- b) Adequate safety measures have to be taken during blasting operation in the quarry so that men / machine are not affected.
- c) Blasting pattern and area to be blasted should be carefully evolved for best results and the blasted coal should be loaded as early as possible.
- d) Controlled or muffled blasting will be practiced near the important surface infrastructures and also within 100m of the vacant land. Besides this, necessary safety precautions should be clearly laid down and implemented whenever, any important surface features like public roads, rail, civil infrastructures / buildings etc. fall within radius of the blasting zone.
