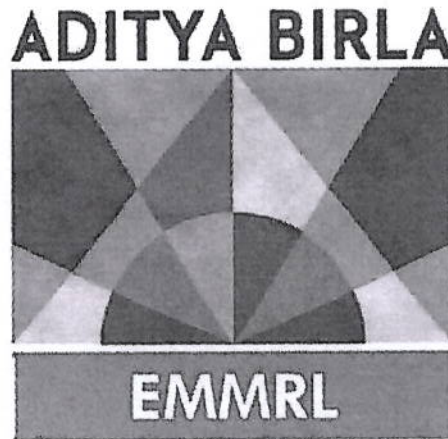


EMIL Mines And Mineral Resources Ltd



Project at a Glance for Bandha Coal Mine, Dist.- Singrauli MP Madhya Pradesh

June 2021

For EMIL Mines And Mineral Resources Limited

Bacha Prasad

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Project Head
Bandha Coal Mine

A. Preamble :-

In June' 20, Government of India launched the auction process of Commercial Coal Mining through MMDR Act, 1957. Total 19 commercial coal blocks were successfully auctioned from 2nd to 9th November'20; including Bandha Coal Block. The Block was auctioned under partially explored category.

Bandha Coal Block, covering an area of 1850.94 hectare, is located in Singrauli Coalfields, Madhya Pradesh having Geological Reserve of 452 Million Tonne (MT) Proved Reserve and 108 Million MT Indicated Reserve. The Extractable Reserve through Open Cast Mining is around 161 MT and Peak Production Capacity envisaged is 5.0 MT with a Strip Ratio of 8.5. Based on Mineable reserve, mine life is assumed to be 36 years excluding development period of 4 years.

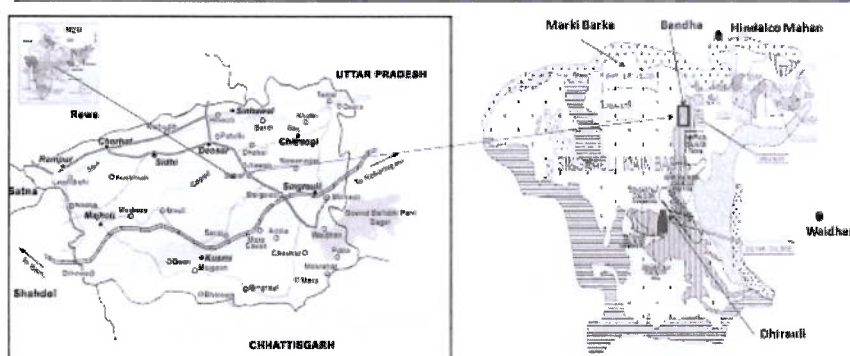
Essel Mining & Industries Limited (EMIL) through its wholly owned subsidiary EMIL Mines And Mineral Resources Limited (EMMRL) had participated in the auction of the Block and emerged as a "Preferred Bidder" on 3rd Nov'20 of revenue sharing. Nominated Authority vide its letter dated 28th December' 20 had declared EMMRL as successful bidder for Bandha Coal Mine.

B. Introduction :-

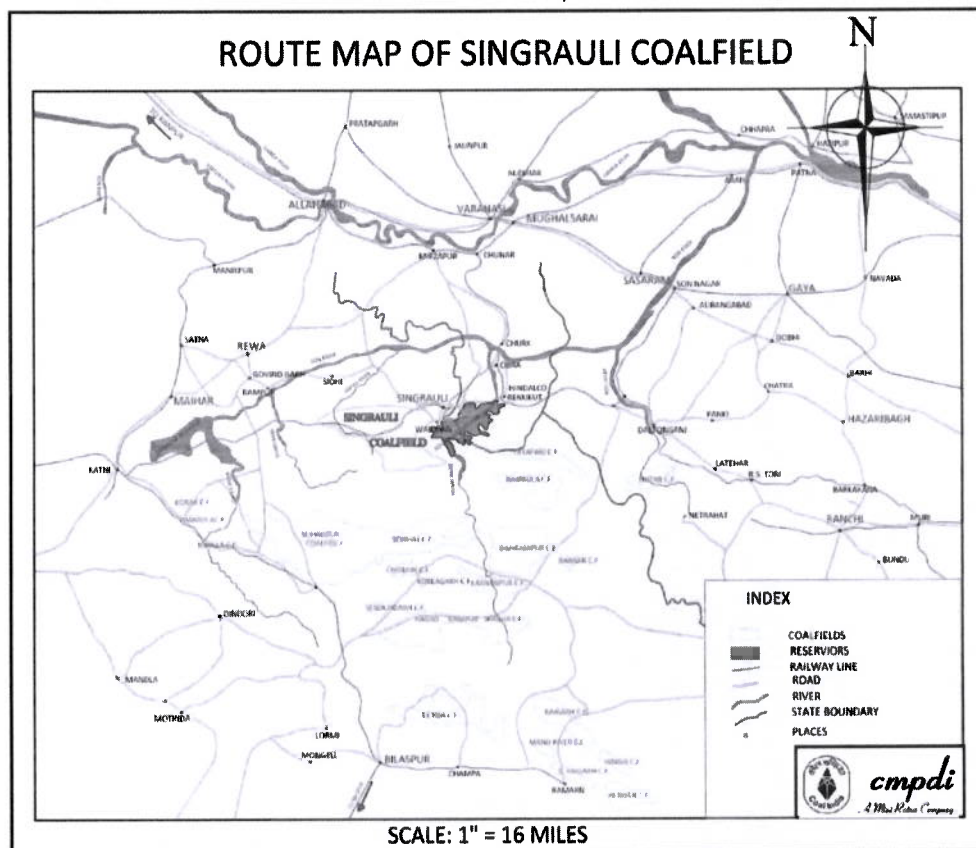
The Singrauli Coalfield lies in between Lat. $23^{\circ}46'37''$ N & $24^{\circ}13'17''$ N and Long. $81^{\circ}45'24''$ E & $82^{\circ}47'50''$ E, covering an area of 2375 sq.km, is centrally located in India. It constitutes the northern most part of the Son-Mahanadi master Gondwana basin. Singrauli Coalfield is divided in two parts on the basis of geological setup, namely (i) Moher sub-basin (300 sq.km, eastern part) and (ii) Main basin (2075 sq.km, western part), separated by a basement high almost parallel to the Kachan River. Administratively, 65 sq. km (3%) area of Singrauli Coalfield in the north-eastern part is in Sonbhadra district of Uttar Pradesh and the remaining 2310 sq. km (97%) is in Singrauli & Sidhi districts of Madhya Pradesh as well as in Surguja and Koriya districts of Chhattisgarh states. The Bandha Block is located on the North eastern part of Main basin surrounded by Southern boundary of coal conveyor corridor of Amelia Block on the North, unblock area on the West, Part of Northern boundary of Chhatrasal block on the South, and western boundary of Amelia Block on the East.

- C. **Location :-** Bandha Block is covered in Survey of India Toposheet No.63 L/8 (R.F. 1:50000) and Open series Toposheet Nos. G-44W8 (M2, M4, N2, S1, S2, R1, R3, R4) (R.F. 1:5,000). The area is bounded by Latitude $24^{\circ}6'51.064''$ N to $24^{\circ}4'17.375''$ N and Longitude $82^{\circ}24'56.668''$ E to $82^{\circ}21'39.764''$ E. The block area under study for report falls in the Sarai Tehsil of Singrauli district of Madhya Pradesh State

Bandha Coal Block – Location Map



- D. Communication & Accessibility:** The accessibility to the area is through NH75 Rewa-Ranchi National highway via Bargawan traverses in the east and runs almost along the boundary of Moher SubBasin & Main Basin. The block is located about 60 km west of Singrauli Township via Bargawan. Bargawan is located at a distance of about 25 km from the block. The block is connected with Rajmelan by metalled road and the distance is about 25 km. The nearest railway station for Bandha Block is Deoragram (between Bargawan & Sarai stations), on Chopan - Singrauli – Katni - Jabalpur section of East-Central Railway at a distance of 6 km from the block. The nearest big Township is Waidhan located at a distance of 50 km from the block which is also the District Headquarter with the facility of market, post and telecommunication, health center workshop, petrol pump, road transport etc. number of Thermal Power Stations and large-sized Opencast Coal Mines are located near to Waidhan Township. Singrauli Railway station is 27 km from Waidhan. The distances of important places from Waidhan are - Varanasi (nearest Airport) 250 km, Renukoot, an industrial township and important railway station on Chopan-Garhwa Road Section of Eastern Railway is at a distance of 70 km. whereas Ambikapur via Renukoot Wadrafnagar is at a distance of 240 km. Renukoot Township is well connected with Howrah, Tatanagar, Delhi etc. by direct train.



- E. Area of the Block:** The block extends over an area of about 18.50 Sq.km, in which forest cover is extended over an area of about 7.90 Sq.km. The block is covered by Mohanban Reserve Forest and Pidarwah Protected Forest in many patches. The block is located on the North-Eastern part of Main basin of Singrauli Coalfield. Limits of Bandha Block are as follows:
 Northern: Southern boundary of Coal conveyor corridor for Amelia block which is 25 meters away from the southern boundary of Bandha North block.
 Eastern: Western boundary of Amelia block.
 Southern: Part of northern boundary of Chhatrasal block and part unblocked.

Western: Unblocked Area

- F. Physiography & Drainage:** About 43% part of the block area is covered by forest land. The remaining approx. 57% part of the block area is used either as agriculture land or village land (as in habitat). The surface exhibits a moderately undulating topography with reddish soil and sporadic occurrences of sandstone exposures. The general ground elevation of the block varies between 405.00 m in the north western part to 475.00m above M.S.L. towards southern part of the block. The drainages of the block are controlled by Bandha Nala and Kachanmuda Nala. Bandha Nala flows from south to north inside the block and then east to west near Ujjaini village north of the block. Finally, Bandha nala discharges into Mahan River near Tingudi village north-west of the block. Kachanmuda nala flows south to north inside the block and meet Kachan Dam in the north-east of the block. Bandha Nala and Kachanmuda Nala drains the entire area surrounding the exploration block. The drainage pattern exhibited in the area is mainly dendritic to sub-dendritic.
- G. Climate :-** The area exhibits tropical to semi-tropical climate. The minimum temperature during December to January is around 4°C or less whereas maximum temperature is recorded during May to June when the temperature shoots to around 45°C or even higher. The normal annual rainfall of Singaruli District is 1132.7 mm (as per CGWB, Bhopal), while the bulk precipitation occurs during June to October. The relative humidity varies from 19% in the month of May to 85% during July to August.
- H. Important Features :-**
- The block is connected to National Highway No. NH 75 at approx. 30km through Bargawan road.
 - Bargawan, a small town & railway station on NH-75, is 30 km away from the block, while Waidhan, the district Head Quarter town is about 60 km away through Bargawan-waidhan state highway.
 - The nearest railway station from Bandha block is Deoragram (between Bargawan & Sarai stations), on Chopan - Singrauli – Katni - Jabalpur section of East-Central Railway at a distance of 6 km from the block.
 - Approximately 43% of the block area is covered by forest land. The block is covered by Mohanban Reserve Forest and Pidarwah Protected Forest in many patches.
 - Bandha, Tenduha, Jignahawa, Badijharua and Pidarwah villages exist in the block.
 - The drainages of the block are controlled by Bandha Nala and Kachanmuda Nala. Bandha Nala flows from south to north inside the block and then east to west near Ujheni village north of the block. Finally, Bandha nala discharges into Mahan River near Tingudi village north-west of the block.
 - Chopan - Singrauli – Katni Rail line passes through North Western Corner of the Block.
- I. Cardinal Points:** The block boundary used in the report is approved by block boundary committee of CMPDI HQ, Ranchi. The Block is designated by cardinal points P1 to P73. Co-ordinates as well as coal grid co-ordinates of each cardinal point of geological boundary (Copy of the Cardinal Points enclosed)
- J. General Geology of the Block:** - Bandha block is covered in Survey of India Topo-sheet No.63 L/8, RF 1:50000.
- Geological Succession: The area under report is in the North Eastern part of the Main Basin. During the course of drilling, formations from Raniganj to Barakar Formations have been intersected in the boreholes. The rocks on surface are usually of Barren Measures/ Barakar/ Raniganj formations.

Description of Formations:

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- a) **Metamorphics:** The metamorphic rocks have not been encountered in any boreholes. The lithology of metamorphic rocks is represented by buff colored quartzite and gneiss occasionally having garnet crystal.
- b) **Talchir:** The rocks are not exposed in the block. The lithology of Talchir rocks are represented by ash grey to greenish grey mudstone with well sorted polished, well rounded to fragmentary rock fragments with thin dark grey shale inter-bands.
- c) **Barakar:** The Barakar rocks have been encountered in all the boreholes. The lithology of Barakar rocks are represented by greyish white, fine to coarse grained, sometimes pebbly, laminated, micaceous, feldspathic, cross bedded sandstone, grey shale to black shale, clay, intercalations of shale & sandstone, carbonaceous shale, shaly coal and coal. All major coal seams are occurring in this formation.
- d) **Barren Measures:** The Barren Measures rocks have been encountered in all the boreholes. The lithology of Barren Measures rocks are represented by greenish white to milky white, fine to coarse grained, laminated to massive, moderately to well sorted, micaceous, feldspathic, cross bedded sandstone, dark grey to greenish thin shale bands, clay, intercalations of shale & sandstone.
- e) **Raniganj:** The Raniganj rocks have been encountered in 05 boreholes only. The lithology of Raniganj rocks are represented by greyish white, fine to coarse grained sandstone, grey shale to black shale, clay, intercalations of shale & sandstone, carbonaceous shale, shaly coal and coal.
- f) **Soil / Alluvium:** The recent formation mainly consists of brown to black sandy soil. The thickness of soil varies from 0.15m to 3.00m.

Geological Structure :-

General:- Raniganj Formation occurs in the Northwestern part of the block and Barren Measures cover the entire block except southeastern corner of the block. Barakar Formations cover the entire block.

Strike and Dip :- The strike of the coal seam is generally NE-SW in the block. Dip of the bed varies from 20 to 80 NW in most part of the block.

Pattern of Faulting :- The structure of the block is simple. The block is traversed by only one fault i.e F1-F1. F1 – F1 fault is entering from northwestern boundary of the block with throw amount of 30m and as the fault moves easterly the throw gradually reduce to 0m. Roof of Seam VII and parting above is faulted , on the basis of that fault is marked. Position of fault on the floor of seams are shown in floor contour plans and seam folio plans.

Coal Reserves and Over Burden :-

The basic norms for opencast (OC) mining have been followed by delineation of coal seams and reserve estimation. The effective thickness of coal seams has been taken into account while calculating the reserves. This is done by omitting the thickness of obvious dirt bands of >0.05m occurring within the seam from the total thickness. Seam thickness and quality variation between the control points have been depicted by isochore and isograde lines. Vertical cut off has been considered along the boundary lines.

Coal reserves: Seam folio plans showing the block boundary, seam incrops, isochores and iso-GCV lines on 1100 samples with data of effective thickness and GCV were generated and plotted through MINEX 6.5.3 software and have been used as the base for the estimation of coal reserves. The intersections of all the grids such as effective thickness grids, GCV grids more than 2200 kcal/kg and specific gravity grids within the limit, seam of effective thickness

1m and above, fault and block boundary were taken as input data and put in database for MINEX. Each grid measures an area of 625m² (25mX25m). The gross geological reserve for each grid has been obtained by multiplying the effective coal thickness with specific gravity of the grid. The coal reserves have been estimated within vertical walls of the block boundary. By deducting 10% from the gross reserves, net geological reserves have been obtained. Area occupied by heave zones of the faults have been excluded while calculating the area for reserve estimation. Minimum thickness of coal for reserves estimation has been taken as 1m. Isochores of coal Seams have been drawn at an interval of 0.5m.

Geological coal reserves have been estimated Category-wise (proved & indicated), Grade-wise (G4 to G17 for proved reserve), Depth wise and Thickness wise. Statements of reserves under seam wise, grade wise and depth wise are given in Annexure – VIIIA & VIIIB. A total of 560.3814 MT of total reserves (Net Proved+ Indicated) has been estimated, out of this total reserves 452.0587 MT comes under proved category and 108.3227MT in indicated category.

Overburden: In the Bandha Block, the Barakar rocks are overlain by Barren measure rocks, except in the north western patch where Raniganj formations are predominantly lying over the Barakar formations. The overburden in Bandha Block generally comprises of fine to coarse grained sandstone, arenaceous shale, carb shale and minor impersistant coal seams.

Depth of Excavation: Seam II COMB/II BOT is the bottom most seam of the block. The minimum and maximum depth of the excavation varies from 270.00 m to 455.00 m as per drilled borehole data. However as per projected borehole data the maximum depth of excavation is about 560.00m to 600.00m.

The total net proved reserve estimated is 452.0587 MT out of which 41.7362 MT is of VIII Seam, 265.3710 MT is of VII Seam, 41.2178 MT is of VI Seam and 39.2341MT is V TOP seam are major contributor.

- K. **Coal Utilization:** - The grade of Barakar coal seams varies between G4 to G17 grade, but more than 97% of net proved reserve lies between G5 to G12. This non-coking coal is suitable for power generation and also for cement / Steel / Aluminum / brick industry etc.
- L. **Mode of Coal Transportation:** Initially, it was proposed to transport coal by road to the nearest railway siding near Deoragram station on Chopan - Singrauli – Katni - Jabalpur section of East-Central Railway at a distance of 6 km from the block. Subsequently, It is proposed to develop a railway siding within the block
- M. **Land Details:** - Bandha Coal Mine area is spread over 1850.94 Ha in the villages Tenduha, Pidarwah, Deori, Bandha & Pachaur under Sarai Tahasil of Singrauli District.
The existing land use details in the applied ML area are given below:

Bandha Coal Block: Summary of the Land inside the Coal Block						
District	Tehsil	Village Name	Government Land (Area in Ha.)	Private Land (Area in Ha)	Revenue Forest (Jungle/Van) Area in Ha	Total (Area in Ha)
Singrauli	Sarai	Tenduha	31.64	108.23	0.00	139.87
	Sarai	Pidarwah	43.41	119.03	2.01	164.46
	Sarai	Deori	13.54	35.46	0.00	49.00
	Sarai	Bandha	199.92	510.45	1.54	711.91
	Sarai	Pachaur	1.92	1.85	0.00	3.76
Total			290.44	775.01	3.55	1069.00
Total Revenue Area in Hectares (A)						1069.00
Protected Forest						95.90
Reserved Forest						686.04
Protected and Reserved Forest Compartment Area in Hectares (B)						781.94
Total Area in Hectares (A+B)						1850.94

N. Purpose-wise break-up of the total land required :- The purpose-wise break-up of the total leasehold area along with the Forest Land required for diversion is furnished in the table below:

Sl. No.	Purpose	Forest Land – Ha	Non Forest Land – Ha	Total
1	Mining/Excavation	555.74	740.38	1296.12
2	Magazine with Safety Zone	0.00	17.60	17.60
3	OB Dumps along the periphery	125.10	135.10	260.20
4	Coal Handling Plan, Coal Stack Yard, Settling Pond etc	54.77	33.45	88.22
5	Conveyor belt & Proposed diversion road	12.00	20.50	32.50
6	Temp. labour Shed, Temp. Sites, etc	0.00	29.53	29.53
7	Top soil Dump	0.00	28.20	28.20
8	Green belt(Indirectly affected)	2.11	30.63	32.74
	Subtotal(I)	749.72	1035.39	1785.11
9	Safety zone			
	a) 7.5 m along the lease area	8.41	5.83	14.24
	b) 10m along the Road	17.75	10.05	27.80
	c) 50 m along the Nala	9.61	14.18	23.79
	Sub Total(II)	35.77	30.06	65.83
	Grand Total	785.49	1065.45	1850.94

O. Overburden Management:

Initially, the topsoil and overburden (OB) existing above coal seams have to be removed to facilitate extraction of coal seams. The topsoil is proposed to be stored separately within mine lease area for subsequent use in reclamation. The total overburden generated during initial 4 to 6-years will have to be located in two / three surface dumps located on the Western / Northern side of the property. For OB dumps patches have been selected because of non-existence of continuous non-forest & non-coal bearing patch within the lease area. The OB generated, 4th / 5th year onwards of mining operations will be partially backfilled in the excavated area and partially kept in the temporary surface dump over the Eastern portion of the unexcavated quarry area up to 7th / 8th year. The concurrent backfilling with mining will be possible only after 7th / 8th th year and with the advancement of mining benches. The temporary OB dump of the Mine will be re handled and accommodated over the excavated and de coaled area. The mine is expected to be worked out by the end of 27th year .

After the 27th year, the surface dumps of the Mine as also the crown dumps lying over the backfilled area will be re handled during the Post Mine Closure Plan period and backfilled in to the void to form a small water body of 100 Ha having 30m depth .

P. Total Cost of the project: Total cost of the project is around Rs. 2300/- Cr. Which includes cost of Infrastructures, Land Acquisition and R&R Cost and Development & Other cost.

Q. Employment likely to be generated: This proposal will generate employment for about 400 persons directly. In addition 5000 people will be benefited indirectly.

R. Details of displacement of people due to the project :- Minimal displacement of people is envisaged as required for mining operations to extract coal seams within Bandha coal Mine. R & R plan will be prepared by the user agency has been submitted to District Administration, for its approval.

- I. No. of families: **650 Approx.**
- II. Scheduled Caste and Scheduled Tribe persons: The total population going to be displaced due to the project is about **300 families (Approx.)** to fill up.
- III. The demographic pattern (Source: Census 2011) of nearby villages are as follows: -

Sl. No.	Village Name	Location Code	Total Population	No. of Households	Range of SC Population	Range of ST Population
1.	Deori	503890	861	182	Less than 5%	51-75%
2.	Bandha	503891	2377	499	11-20%	41-50%
3.	Tenduha	503892	1405	239	Less than 5%	51-75%
4.	Pachaur	503893	10	3	Nil	Nil
5.	Pidarwah	503894	1397	258	5-10%	51-75%

Rehabilitation & Resettlement Plan :-

- Resettlement site is in close vicinity from the site of displacement.
- Homestead land (0.10 Ac./Family) and pukka house (520 Sq.Ft plinth area/Family) with electrical fittings & connection based on opinion of DPs with the approval of RPDAC.
- DPs opting for self-relocation outside R & R colony to get necessary HBA plus cash grant for 0.10 Ac. of land. (As per decision of Collector, Singrauli)
- Adequate compensation for land & immovable property.
- Skill development Support & Training to provide employment. (Direct or Indirect)

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- Assistance for self-employment & training.
- One-time financial assistance in lieu of employment.
- Allowances for transportation & maintenance, cash grant for cow shed, incentive for early shifting and kitchen garden grant.
- Periphery Development

S. Environment: -

- a. **Climate:-** The climate of Singrauli district characterized by hot summer & well distributed rainfall during south west monsoon. The year can be divided into four seasons. The winter starts from end of November and lasts till first week of March. The period for March to middle of June conditions hot weather. May is the hottest month of the year. The south west monsoon starts from middle of June and continues till end of September. October & November are the months of post monsoon/retreating of monsoon. The temperature starts rising from beginning of February and reaches maximum during the month of May. The daily mean maximum temperature in May is 42.00 C and daily mean minimum is 25.80C. The day temperature on individual days during the period April to first week June gets up to 44.0 C to 45.0 C. Monsoon generally arrives in the middle of June and there is an appreciable drop in temperature and the weather becomes pleasant. After withdrawal of monsoon in the first week of October there is slight increase in day's temperature, hot nights become progressively cooler. January is generally the coldest month of the year. The maximum daily mean temperature in January is 24.30C and minimum daily temperature about 8.10C.

The summer season is the driest period of the year. The humidity is the lowest in April i.e. about 35%. During south west monsoon the humidity is the highest due to heavy rains, attaining its maximum of about 85% in August. The humidity again decreases in October due to high temperature and retreating of monsoon. The daily mean annual relative humidity of Singrauli is 66%.

- b. **Rainfall :-** The normal rainfall of the district is 1035.68 mm (Average of Rainfall data from the year 2006 taken from Jhingurdah rain Gauge Station). The maximum rainfall takes place during south west monsoon period. 89% of the annual rainfall takes place during monsoon period i.e. June to September. July is the wettest month of the year. Only 11% of the annual rainfall takes place between October to May period
- c. **Wind Speed and Direction :-** The annual wind rose diagram as recorded at CAAQMS of Block-B Project, at a distance of 22 kms from Bandha Block, shows that 80% of the time there is calm condition with average wind speed of 0.18 m/s. The predominant direction of wind is from NW to SE
- d. **Air Quality :-** The routine environmental quality monitoring is being regularly carried out by CMPDI in Moher basin of Singrauli Coalfields (for Northern Coalfields Limited). The Moher basin is around 25 Km away from Bandha Block.
- As per monitoring reports the PM 10 and PM 2.5 values do not meet the National Ambient Air Quality Standards (NAAQS) at some observed locations, except in monsoon season. SO₂ and NO_x values are within NAAQS limits.
- The air quality is reflective of the complex industrial setup of the area comprising of Coal Mines (more than 10 projects), Thermal Power Plants (more than 5), numerous brick kilns and stone quarries. Unchecked and ubiquitous burning of coal by local populace for domestic use is also a major source of pollution.

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Summarized AAQ Report (March'21-May'21)

NAME OF THE STATION		PM10			PM2.5			NO2			SO2			CO		
		Max	Min	Avg	Max	Min	Avg	Max	Min	Avg	Max	Min	Avg	Max	Min	Avg
Project Site (Tenduha)	A1	74.4	60.1	66.9	51.4	28.4	35.1	25.9	18.1	22.4	14.9	10.5	13.1	0.85	0.5	0.68
Project Site (Bandha)	A2	73.4	60.1	65.6	37.5	24.1	30.3	25.7	18.5	22.2	14.8	10.3	13.0	1.4	0.5	0.82
Badanmara	A3	80.9	68.1	73.5	43.5	31.7	39.8	26.8	18.9	22.7	15.1	10.1	13.0	0.92	0.5	0.74
Tendudol	A4	79.3	65.3	72.7	52.3	31.3	37.8	26.5	18.2	31.7	14.6	10.1	12.8	0.9	0.5	0.72
Jamgari	A5	77.8	60.2	70.2	40.8	32.1	36.3	26.2	18.2	22.5	15.1	10.4	13.0	0.96	0.5	0.79
Chopahijhariya	A6	89.6	66.5	78.5	53.7	32.5	44.6	27.5	19.6	23.4	15.3	10.5	13.1	0.98	0.5	0.79
Mohanban RF	A7	85	70.4	78.2	53.5	32.2	44.4	27.3	19.4	23.2	15.2	10.3	13.0	1.00	0.59	0.84
Amilla	A8	80	71.2	76.4	51.9	31.9	42.8	27.1	19.2	23.0	15.2	10.2	13.0	0.94	0.52	0.78
Ujaini	A9	78.6	65.2	72.29	41.2	32.1	36.5	26.3	18.40	10.50	15.2	10.6	13.09	0.87	0.5	0.70
Budheri	A10	73.4	60.1	65.21	37.5	24.1	29.1	25.5	18.30	22.01	14.6	10.1	12.90	0.83	0.5	0.66
NAAQ Standard		100µg/m³			60 µg/m³			80 µg/m³			80 µg/m³			2mg/m³		

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 Bandha Coal Area

e. Ground Water/Drinking water Quality:

- i. Ground water quality is within the BIS's IS 10500/2012 limits.

Ground Water Quality(March'21-May'21)

Parameter	GW1	GW2	GW3	GW4	GW5	GW6	GW7	GW8	GW9	GW10	Min	Max	Limits of IS:10500 -2012	
	Project Site (Tenduha)	Project Site (Tenduha)	Badanmara	Tendudol	Mohanban RF	Amilia	Jamgarl	Budheri	Chophailjhariva	Ujalni			(Acceptable) Limit	Permissible limit
pH (at 25 °C)	7.48	7.58	7.63	7.53	7.3	7.71	7.67	7.37	7.42	7.31	7.3	7.71	6.5 to 8.5	No Relaxation
Odour	Agreeable	Agreeable	Agreeable	Agreeable	Agreeable	Agreeable	Agreeable	Agreeable	Agreeable	Agreeable	0	0	Agreeable	Agreeable
Taste	Agreeable	Agreeable	Agreeable	Agreeable	Agreeable	Agreeable	Agreeable	Agreeable	Agreeable	Agreeable	0	0	Agreeable	Agreeable
Total Hardness as CaCO ₃	348.78	396.63	437.26	347.23	264.53	364.56	273.62	352.64	227	238	227	437.26	200	600
Calcium as Ca	75.61	98.54	118.36	82.62	58.3	87.38	63.25	92.45	67.38	62.08	58.3	118.36	75	200
Alkalinity as CaCO ₃	274.47	305.63	402.51	308.85	212.44	296.75	217.61	293.63	209.61	184	184	402.51	200	600
Chloride as Cl	127.36	138.55	145.63	86.77	64.61	108.37	77.2	85.3	40.38	46.18	40.38	145.63	250	1000
Magnesium as Mg	38.91	36.64	34.49	34.29	28.93	35.61	28.14	29.64	14.31	20.19	14.31	38.91	30	100
Total Dissolved Solids	608	732	760	582	460	590	440	534	327	350	327	760	500	2000

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Parameter	GW1	GW2	GW3	GW4	GW5	GW6	GW7	GW8	GW9	GW10	Min	Max	Limits of IS:10500 -2012	
	Project Site (Tenduha)	Project Site (Tenduha)	Badanmara	Tendudol	Mohanban RF	Amilia	Jamgarl	Budherl	Chopahaijharlya	Ujainl			(Acceptable) Limit	Permissible limit
Sulphate as SO ₄	38.63	46.78	56.23	46.1	30.21	53.63	38.33	63.27	36.28	27.5	27.5	63.27	200	400
Fluoride as F	0.27	0.52	0.38	0.28	0.24	0.62	0.41	0.52	0.26	0.36	0.24	0.62	1	1.5
Nitrate as NO ₃	19.46	20.61	25.33	21.18	20.36	26.51	22.37	24.36	11.35	13.29	11.35	26.51	45	No Relaxation
Iron as Fe	0.26	0.34	0.35	0.27	0.18	0.28	0.2	0.34	0.31	0.2	0.18	0.35	0.3	No relaxation
Conductivity	1015	1223	1267	970	765	985	734	890	545	583	545	1267	--	--
Zinc as Zn	1.1	1.27	1.56	0.87	0.81	0.93	0.67	0.78	0.65	0.49	0.49	1.56	5	15
Copper as Cu	0.38	0.58	0.64	0.33	0.27	0.44	0.32	0.43	0.28	0.18	0.18	0.64	0.05	1.5
Total Coliform	<2	<2	<2	<2	<2	<2	<2	<2	<2	<2	0	0	Shall not be detectable	
E. Coli	Absent	Absent	Absent	Absent	Absent	Absent	Absent	Absent	Absent	Absent	0	0	Shall not be detectable	

Colour, Turbidity, Cyanide as CN, #Aluminium as Al, Boron, Chromium as Cr, Anionic Detergents as MBAS, Manganese as Mn, Cadmium as Cd, Lead as Pb, Selenium as Se, Arsenic as As, Mercury as Hg all are below the detectable limit on all 10 location

- ii. Surface water quality: Except for few nallahs all surface water bodies comply their inland water quality norms as per their intended use.

Surface Water Quality(March'21-May'21)

Parameters	SW1	SW2	SW3	SW4	SW5	SW6	SW7	SW8	Min	Max
	Kanchan N Near Phulwari	Kanchan N Near Phulwari	Pond Near Suhira	Confluence of Bandha N & Mahan N	Mahan N Near Lamidah	Rampa River Near Karsua	Bandha N Near Ujaini	Pond Near Singahi		
IS:2296 Classification	C	C	B	C	B	B	B	B		
pH (at 25 °C)	7.5	7.3	7.82	7.43	7.44	7.4	7.53	7.82	7.3	7.82
Turbidity	32	37	36	18.6	23.4	20	22	18	18	37
Odour	Agreeable	Agreeable	Agreeable	Agreeable	Agreeable	Agreeable	Agreeable	Agreeable	0	0
Total Hardness as CaCO ₃	460.5	447.53	264.16	243.63	231.45	312.41	278.72	317.42	231.45	460.5
Calcium as Ca	104.4	95.64	66.52	53.58	46.28	86.45	68.45	77.63	46.28	104.4
Alkalinity as CaCO ₃	386.52	405.56	196.47	173.21	169.21	276.35	212.36	254.36	169.21	405.56
Chloride as Cl	124.14	98.66	80.25	78.2	69.33	120	89.77	84.45	69.33	124.14
Magnesium as Mg	48	50.76	23.86	17.72	28.07	23.5	26.22	29.96	17.72	50.76
Total Dissolved Solids	765	795	560	382	408	378	485	435	378	795
Total Suspended solids	58	62	51	48	63	62	65	59	48	65
Dissolved Oxygen	4.8	4.9	5.1	4.9	5.4	5.8	6.4	5.8	4.8	6.4
Sulphate as SO ⁴	45.33	52.61	35.21	53.64	35.24	43.26	47.23	42.72	35.21	53.64
Fluoride as F	0.87	0.71	0.67	0.45	0.69	0.64	0.54	0.65	0.45	0.87

Parameters	SW1	SW2	SW3	SW4	SW5	SW6	SW7	SW8	Min	Max
	Kanchan N Near Phulwari	Kanchan N Near Phulwari	Pond Near Suhra	Confluence of Bandha N & Mahan N	Mahan N Near Lamidah	Rampa River Near Karsua	Bandha N Near Ujaini	Pond Near Singahi		
IS:2296 Classification	C	C	B	C	B	B	B	B		
BOD (3 Days at 27°C)	6.34	10	7.36	9.24	10	8.34	11	10	6.34	11
COD	22	40	22	31	37	29	34	33	22	40
Conductivity	1277	1327	950	637	680	630	808	725	630	1327
Nitrate as NO ₃	16.1	24.52	32.7	20.58	22.47	24.3	17.53	29.36	16.1	32.7
Sodium as Na	55.11	95.3	66.8	52.8	43.2	72	50.1	40.2	40.2	95.3
Potassium as K	12.2	22.4	17.3	14.1	9.6	18.4	12.6	10.4	9.6	22.4
Iron as Fe	0.35	0.35	0.51	0.34	0.36	0.35	0.32	0.28	0.28	0.51
Boron	0.95	0.3	0.27	0.16	0.31	0.67	0.61	0.52	0.16	0.95
Zinc as Zn	1.8	1.44	1.27	0.76	1.2	0.72	0.75	0.58	0.58	1.8
Copper as Cu	0.45	0.37	0.51	0.33	0.51	0.38	0.32	0.29	0.29	0.51
Total Coliform	900	1200	900	700	300	500	900	300	300	1200
Fecal Coliform	500	900	500	300	100	200	300	100	100	900

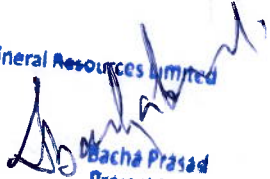
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Water Quality Criteria for Surface Water

Designated-Best-Use	Class	Criteria
Drinking Water Source without conventional treatment but after disinfection	A	Total Coliforms Organism MPN/100ml shall be 50 or less pH between 6.5 and 8.5 Dissolved Oxygen 6 mg/l or more Biochemical Oxygen Demand 5 days 20°C 2 mg/l or less
Outdoor bathing (Organized)	B	Total Coliforms Organism MPN/100ml shall be 500 or less pH between 6.5 and 8.5 Dissolved Oxygen 5 mg/l or more Biochemical Oxygen Demand 5 days 20°C 3 mg/l or less
Drinking water source after conventional treatment and disinfection	C	Total Coliforms Organism MPN/100ml shall be 5000 or less pH between 6 to 9 Dissolved Oxygen 4 mg/l or more Biochemical Oxygen Demand 5 days 20°C 3 mg/l or less
Propagation of Wild life and Fisheries	D	pH between 6.5 to 8.5 Dissolved Oxygen 4 mg/l or more Free Ammonia (as N) 1.2 mg/l or less
Irrigation, Industrial Cooling, Controlled Waste disposal	E	pH between 6.0 to 8.5 Electrical Conductivity at 25°C micro mhos/cm Max.2250 Sodium absorption Ratio Max. 26 Boron Max. 2 mg/l
	Below-E	Not Meeting A, B, C, D & E Criteria

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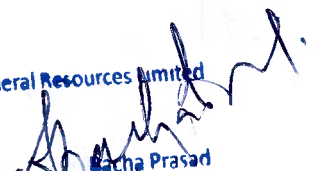

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- f. **Noise Level** :- Noise level is being monitored regularly in Moher basin and is found within permissible limits.

Ambient Noise Report (March'21-May'21)

Locations		Lmax		Lmin		Leq		Noise Standards as per Regulation (Pollution Control) Rules, 2000Leq in dB(A)
		Day	Night	Day	Night	Leq Day	Leq Night	
Project Site (Tenduha)	N1	58.4	50.2	44.6	35.5	49.51	40.35	75
Project Site (Bandha)	N2	60.6	53.8	45.2	37.4	51.85	41.93	75
Badanmara	N3	56.9	49.7	40.8	34.2	48.15	40.88	55
Tendudol	N4	62.8	53.6	46.9	38.7	52.85	42.15	55
Budheri	N5	55.8	47.2	42.8	33.2	49.77	39.89	55
Jamgari	N6	61.8	52.3	43.2	36.2	50.15	41.65	55
Amilia	N7	64.8	55.7	48.8	38.9	53.24	42.38	55
Chopahijhariya	N8	59.4	49.8	43.6	34.8	43.6	34.8	55
Ujaini	N9	53.2	51.5	42.8	33.8	48.72	38.81	55
Mohanban RF	N10	48.2	40.5	37.4	33.2	42.5	38.34	55

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g. Flora & Fauna :-

Flora :- A Baseline Study of Flora and Fauna was carried out for Jayant OCP (at a distance of approximately 25 kms) EIA-EMP report in 2016. The salient features of floral study are:

- There are a total of 4 no. of protected forests (PF) viz. Gorbi PF, Dudhichua PF, Mehrauli PF and Parari PF; and 2 no. of reserved forests viz. Muher RF and Charki RF.
- In core zone tree species such as Chloroxylon sweitenia, Madhuca Latifolia and Acacia Auriculiformis were recorded dominating.
- In core zone Shrub Layer was dominated by Holarrhena pubescens and Euphorbia rouleana.
- In core zone Herb layer was dominated by Eragrostis viscose and Cyperus kyllingia.
- In buffer zone Chloroxylon sweitenia and Bauhinia Malabarica in the tree layer; Lantana camara and Holarrhena pubescens among shrubs, Oplismenus burmannii and Cyperus iria among herbs dominated the region
- There are no rare and endangered species as per IUCN Red list in this region

Fauna:-

- Most of the mammals are general in nature and domesticated. The prominent among the domestic animals are cow, buffaloes, sheep, goat, fowls etc.
- 16 species of Butterflies are also found among which Terrius hecable (Common Grass Yellow) is very common.
- 40 species of birds were sighted during the study which lie under Schedule IV of the Wildlife (Protection) Act, 1972
- Besides above 13 species of fishes, Jackal, Langur etc. are found.
- None of the fauna come under endangered species of IUCN

T. Conclusion :-

- The Bandha block has been explored in detail, keeping in view of the future expansion of Main basin Singrauli coalfield. The coal reserves have been computed in the proved as well as indicated category. The area in general exhibits an undulating terrain & the surface elevation ranges from 405.00 m to 475.00m above mean sea level
- The block is free from any mining activity. The nearest mining activity is in Amelia North block (first in Main basin) situated north east of this block by a joint venture of Jay Pee industries & M.P. Govt
- Adequate safeguards shall be taken for protecting / shifting surface features during mine planning in the block
- For Mining and coal evacuation, shifting of the road, bridges, culverts, railway station, railways line, power lines and other infrastructural set up etc. shall be taken care of.

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