

**COST BENEFIT ANALYSIS REPORT**  
**BINA KAKRI AMALGAMATION OPEN CAST PROJECT**  
**NORTHERN COALFIELDS LTD., SINGRAULI**

**INTRODUCTION**

Bina Extension Project is one mine of the Northern Coalfields Limited, Singrauli (A subsidiary of Coal India Limited) which is operating in Singrauli District of Madhya Pradesh & Sonbhadra District of Uttar Pradesh State having production capacity of 7.5 MTPA. Bina-Kakri Amalgamation Open Cast coal mining Project is expansion of the existing Bina Extn. Project for 10 MTPA (peak Production 12.5 MTPA) coal production.

The project report of Bina-Kakri Amalgamation project was approved by NCL board in Nov. 2011 for a targeted capacity of 10 MT per annum of Coal. The total estimated mineable reserve is 241.45 million tonne.

**Table 1(a) : Breakup of Land**

Name of Project	Area as per Mine Plan (Ha)	Total Area as per forest Application	Forest Land as per Application		Notified Forest land in M.P. as per Application	GMK JJ/Revenue Forest land as per Application	Non Forest Land as per Application	Life of mine in Yrs
			M.P.	U.P.				
Bina-Kakri Amalgamation	2348	390.264	390.264	30.50	370.142	20.112	NIL	26

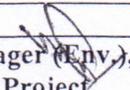
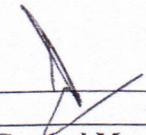
\*Existing Bina Extn. Project having 1798 Ha. lease hold & total 420.764 Ha. forest land (390.264 ha. in MP & 30.50 U.P.) as mentioned above have been applied for diversion. Earlier diverted forest land =(687 ha. & 21.61 ha. (UP), 378.935 ha. (MP) & Kakri project 185.84 (UP) = Total 1273.385 ha.

**COMMUNICATION:**

Name of Project Officer	:	Shri Bipin Kumar
Address	:	O/o General Manager, Bina Project, PO-Bina Project, Dist-Sonbhadra, U.P.- 231220
Mobile no.	:	8004945701
Email Address	:	cgmbin.ncl@coalindia.in

**PURPOSE FOR COST BENEFIT ANALYSIS :**

Cost benefit report is required for making on line application in Part- 1of FORM-B. The report has been prepared on the basis of cost benefit analysis guidelines for forest diversion -2017 issued by MoEF&CC vide circular no. 7-69/2011-FC (Pt.) dated 01.08. 2017.

 <b>Sr. Manager (Env.), Bina Project</b>	 <b>Staff Officer (Mining), Bina Project</b>	 <b>Area General Manager , Bina Project</b>
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## IMPACT ON LOCAL POPULATION AND R&R ACTION PLAN

Four Villages (Churideh, Dudhichua, Karuwari & Jhingurdah) were lying within the proposed mining area in which none of the population is required to be rehabilitate. compensation for tree & land for plot no. 12 area 3.20 Ha. In Churideh village is required to be paid to tenants which is a Revenue Forest land.

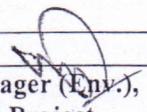
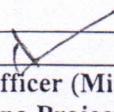
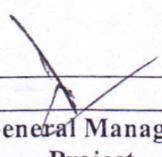
### OTHER DETAILS

1.	Manpower as per EPR/ Mine Plan	1992
2.	Cost of Production in Rs. / te	770.01
3.	Mineable Reserves-	223.95
4.	Life of the mine-	26 years
5.	Grade of coal	G11,G12
6.	Wage cost as per PR	Rs. 93.32 per ton
7.	Capital Investment as per PR	12198 Lakhs
8.	Wt. Avg. Sell price of coal per tone	821.00
9.	Tenancy land (Revenue forest land) in Churideh village	3.20 Ha.

Name of Project	No. of PAFs
Bina-Kakri Amalgamation Project	No PAF shall be shifted.

The nature of forest land for which application for diversion of forest land is applied at Bina-Kakri Amalgamation OCP (390.264ha.) falls in Class III medium dense Forest. As such Rate of NPV comes out as Rs. 8.03 lakhs per ha.

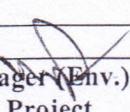
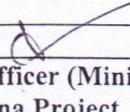
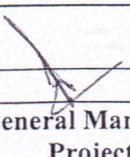
Description	Amount in Rs.	Amount in Rs. Lakhs
Total NPV for (390.264 Ha. forest land)	31,33,81,992.00	3133.81
10% NPV Value	31,33,81,99.20	313.38
30% NPV Value	9,40,14,597.90	940.14
50% NPV Value	15,66,90,996.00	1566.90

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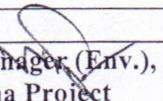
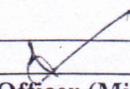
## ESTIMATION OF COST OF FOREST DIVERSION

SN	Parameters	Guidelines	Calculations	Cost (in Lakhs)
1	Ecosystem services losses due to proposed forest diversion	Economic value of loss of eco-system services due to diversion of forests shall be net present value (NPV) of the forest land being diverted as Prescribed by Central Government (MoEf& CC)	Net present value (NPV) of the forest land being diverted = 8.03 Lakhs /Ha. X 390.264 Ha = Rs. 3133.81 Lakhs (Ref: Table 2E)	3133.81
2	Loss of animal husbandry productivity, including loss of fodder	To be quantified and expressed in monetary terms or 10 % of NPV applicable whichever is maximum.	10% of NPV is taken which is Rs. 313.38 Lakhs (10% of 3133.81) (Ref: Table 2E).	313.38
3	Cost of human resettlement	To be Quantified and expressed in monetary terms as per approved R & R plan.	Actual Cost of human resettlement as per R&R Plan = 33.25 (Ref:Table 4)	33.25
4	Loss of public facilities and administrative infrastructure(Roads, buildings, schools, dispensaries, electric line, railways, etc.) on forest land, which would require forest land if these facilities were diverted due to the project.	To be Quantified and expressed in monetary terms on actual cost basis at the time of diversion.	Actual cost - NIL	0.00
5	Possession value of forest land diverted	30% of environmental cost (NPV) due to loss of forest or Circle rate of adjoining area in the district should be added as a cost component as Possession value of forest land whichever is maximum.	Circle rate of adjoining area@Rs. 8.83 lakhs/ha.= <b>Rs. 3446.03 lakhs</b> or 30% of NPV of forest land (3133.81) = Rs. 940.14 Lakhs (Ref <b>Table 2E</b> ), <u>whichever is higher</u>	3446.03

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6	Cost of suffering to oustees	The social cost of rehabilitation of oustees (in addition to the cost likely to be incurred in providing residence, occupation and social services as per R & R plan) be worked out as 1.5 times of what oustees should have earned in two years had be not been shifted.	No. of Ousteas = Nil	0
7	Habitat Fragmentation cost	While the relationship between Fragmentation and forest goods and services is complex, for the sake of simplicity the cost due to fragmentation has been pegged at 50% of NPV applicable as a thumb rule.	50 % of NPV of forest land (3133.81) = Rs. 1566.90 lakhs (Ref Table 2E)	1566.90
8	Compensatory afforestation and soil & moisture conservation cost	The actual cost of Compensatory afforestation and soil & moisture conservation and its maintenance in future at present discounted value.	The calculated cost of Compensatory afforestation and soil & moisture conservation = Rs. 2312.97 lakhs	4609.22
<b>Total cost of forest diversion(in lakhs Rs.)</b>				<b>13102.01</b>

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**ESTIMATING BENEFITS OF FOREST – DIVERSION IN CBA**

SN	Parameters	Guidelines	Calculations	Cost (in Lakhs)
1	Increase in productively attribute to the specific project	To Be quantified & expressed in monetary terms avoiding double counting.	223.95 Mt (coal reserve) X 50.99 ( profit/te) X 10 =Rs. 114192.10 lakhs	1144192.10
2	Benefits to economy due to specific project	The incremental economic benefit in monetary terms due to the activities attributed to the specific project.	Page no 5 point no II (2)	1319793.64
3	No of population benefited due to specific project	As per detailed project Report	Page no 5 point no II (3)	19920 (Nos.)
4	Economic benefits due to direct and indirect employment due to project	As per detailed project Report	Page no 5 point no II(4)	46164.49
5	Economic benefits due to compensatory afforestation	Benefits from such compensatory afforestation accruing over next 50 years monetized and discounted to the present value should be included as benefits of compensatory afforestation.	Page no 6 point no II(5)	0
<b>TOTAL (1+2+4+5)</b>				<b>2510450.23</b>

**Ratio of COST :BENEFIT =Rs. 13102.01 lakhs / Rs. 2510450.23 lakhs= 1:191.608**

**Calculation As Per MOEF&CC Circular No. 7-69/2011-FC(PT.) Dated, 01 August, 2017.**

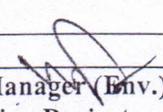
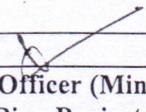
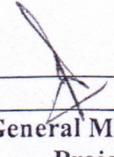
**I. Estimation of cost of forest diversion**

**1. Ecosystem services losses due to proposed forest diversion**

Economic value of loss of ecosystem services due to diversion of forest = Net present value (NPV) of the forest land being diverted = **Rs. 3133.81 Lakhs** (Ref: Table2E)

**2. Loss of animal husbandry productivity, including loss of fodder = Actual cost**

cannot be quantified at present as this is a extension and amalgamation of projects. However, as per MOEF&CC Circular No. 7-69/2011-FC(PT.) Dated, 01 August, 2017,10% of NPV is taken which is **Rs. 313.38 Lakhs** (Ref: Table2E).

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### 3. Cost of human resettlement

Cost of human resettlement as per R&R Plan = 33.25 lakhs (Ref. Table 4)

4. Loss of public facilities and administrative infrastructure (Roads, buildings, schools, dispensaries, electric line, railways, etc.) on forest land, which would require forest land if these facilities were diverted due to the project – NIL.

### 5. Circle rate of adjoining area or Possession value of forest land diverted

Circle rate of adjoining area =Rs. 8.83 lakhs/Ha. =Rs. 3446.03 lakhs  
OR

30% NPV of Forest land = Rs. 940.14Lakhs (Ref: Table2E),  
whichever is higher means Rs. 3446.03 Lakhs

### 6. Cost of suffering of oustees :

No. of Outsees = No. of PAFs = 0

No. of Days Worked per year = 300 Days (Assumed)

Minimum wages of unskilled labour= Nil

Thus Cost of Suffering of oustees= NIL

### 7. Habitat Fragmentation cost :

Cost due to fragmentation has been pegged at 50% of NPV applicable as a thumb rule.  
(Ref Circular MoEF) 50 % NPV = Rs. 1566.90 (Ref: Table2E)

8. Compensatory afforestation (5.9 lakhs/ha.) and soil & moisture conservation cost (Rs. 527/ha. for OF) =Rs. 390.264 x 2 x 5.9) + Rs. 390.264 x 2 x 527/100000 = Rs. 4605.11 lakhs  
+ Rs. 4.11 lakhs = Rs. 4609.22 lakhs

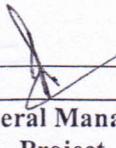
## II. Estimating benefits of forest – diversion in CBA

### 1. Increase in productively attribute to the specific project- productively attribute

P = Rs. 223.95 X 50.99 X 10=Rs.114192.10 lakhs

### 2. Benefits to economy due to specific project :

Different Benefits	In Rs. Lakh	Ref Table
BE (CSR)	2283.45	Table 6
BE(Royalty)	247408.13	Table 5(a)
BE(DMF)	77222.43	Table 5(a)
BE(NMF)	5148.16	Table 5(a)
BE(GST) 5%	91931.47	(223.95*821*0.05*10)
BE(CESS)	895800	Table 5(b)
Total	1319793.64	

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3. No of population benefitted due to specific project

Direct employment = 1992

Indirect Employment = Direct Employment x 5 = 9960

Considering avg. family size 5, then no. of Population benefitted = (1992 x 5)+9960  
= 19920

4. Economic benefits due to of direct and indirect employment due to project:

Economic benefits	In Rs. Lakh
Direct Employment Benefit (coal Reserve X wage cost/te x income tax(20%))	(223.95 X 93.32 X 10 X 0.2)=41798.02
Indirect employment benefit (Total manpower X 4 X 200(Avg. working day/yr) X wages/day)	(1992X4X200X274)/100000=4366.464
<b>Total</b>	<b>46164.49</b>

5. Economic benefits due to compensatory afforestation:

Economic benefits	In Rs. Lakh
<b><u>Due to compensatory afforestation</u></b> (2 times of Forest land X Difference of NPV for class III forest(MDF-MDF) X 0.8 (Doubling Factor)) = (2 X 390.264 (803000-803000) x 0.8) /100000 = Rs. 0 lakhs	0
<b><u>Due to compensatory afforestation as Carbon storage</u></b> *= (2 times of Forest land X Diff. of carbon storage)/100000 =(2 X 390.264 (270040-270040) x 0.8/100000) = Rs. 1088.48	0
<b>Total</b>	<b>0</b>

\*Rate for carbon storage for class III forest- MDF-Rs. 270040/ha./yr.

**Revision of Rates of NPV Applicable For Different Class/Category of Forests**

Table 2 (a) : Current NPV Rates – Recommended by CEC (Rs. / Ha)				
Eco- Value Class	VDF(very dense forest)	MDF(moderately dense forest)	OF( open forest)	
Class III	8,87,000	8,03,000	6,26,000	
Table 2 (b): Economic value of carbon storage				
Class	Forest type group/ value of carbon storage(Rs/ Ha)	VDF	MDF	OF
III	Tropical dry deciduous forest	300064	270040	95721
Table 2 (C) : Rate of moisture conservation cost Rs/ Ha/Year				

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Eco class Value	VDF	MDF	OF
Class III	1951	1269	527
Table 2 (D) : Rate of soil conservation cost Rs/ Ha/Year			
Eco class Value	VDF	MDF	OF
Class III	13947	9024	4101
Source: Revision of rates of NPV applicable for different class/category of forests published by centre for ecological services management (CESM), Indian Institute of Forest Management (IIFM)), Bhopal in collaboration with Forest Survey of India (FSI), Dehradun, Nov. 2014			

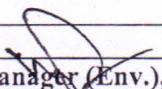
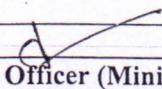
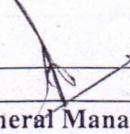
**Possession Value of Forest Land Diverted**  
**CIRCLE RATE OF LAND**

Type of Land nearby Forest Area	Avg. circle rate in Rs./Decimal	Total Area in Ha.	Rate per Ha (in Rs.)	Cost of land in Lakhs
Agricultural	3560.48	390.264	883000	3446.03

**REHABILITATION COST:**

Table 4: Compensation for Land as per R&R Policy	
Description	Amount in Rs. Lakhs
Monetary compensation to be paid for 3.20 Ha revenue forest land (tenancy land)	28.25
Monetary compensation to be paid for tree	5.00 (approx.)
*Subsistence allowance to each affected family @ 25 days Minimum Agricultural Wages per month for one year.	Not applicable
*Affected landless tribal families will be provided one time financial assistance equivalent to 500 days MAWs as a compensation for loss of customary rights.	Not applicable
<b>Total</b>	<b>33.25</b>

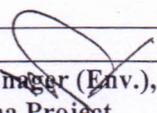
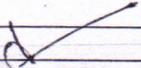
Table 5 (a) Royalty on coal			
Sl No	Royalty	Rate	Amount in lakhs
1	Basic royalty	14% of sale price= 0.14 x 821.00(Rs./te) x 223.95 (MT)	257408.13
2	District Mining Fund	30% of royalty = 0.3 x royalty	77222.43
3	National Mineral fund	2% of royalty= 0.02 x Royalty	5148.16

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Table5 (b): Levy and collection of Cess	
Rate of Coal Cess	Amount in lakhs
@Rs 400 per tonne	Rs. 400 x 223950000/100000= Rs. 895800 lakhs
Reference :Extraordinary gazette , part II – Sec 1, Ministry of law and justice Notification New Delhi , the 12thApril 2017	

Table 6 :CSR cost		
CSR cost	2% of retained profit	223.95 MT x 50.99 Rs./te(profit) x 0.02 = 2283.842 Lakhs
Ref: Company Act 2012		

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