

COST BENEFIT ANALYSIS REPORT
NIGAHİ OPEN CAST PROJECT
NORTHERN COALFIELDS LTD., SINGRAULI

INTRODUCTION

Nigahi Opencast Project, the largest Opencast Mine of NORTHERN COALFIELDS LIMITED, is situated in Singrauli district of Madhya Pradesh. Nigahi Opencast Project is located to the west of Jayant Project and to the east of Amlori Project.

Table 1(a) : Breakup of Land

| Name of Project | Area as per Mine Plan | Total Area as per forest Application | Forest Land as per Application | Notified Forest as per Application | GMK JJ/Revenue Forest as per Application | Non Forest Land as per Application | Life of mine in Yrs |
|-----------------|-----------------------|--------------------------------------|--------------------------------|------------------------------------|--|------------------------------------|--|
| Nigahi Project | 2583.880 | 2583.880 | 874.146 | 874.146 | Nil | 1709.734 | 46 (Balance life As on Apr 2017, 20 yrs.) |

COMMUNICATION:

| | | |
|-------------------------|---|--|
| Name of Project Officer | : | Shri Chanchal Goswami |
| Address | : | O/o General Manager, Nigahi Project, PO-Nigahi, Dist-Singrauli, MP- 486884 |
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PURPOSE FOR COST BENEFIT ANALYSIS :

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

IMPACT ON LOCAL POPULATION AND R&R ACTION PLAN

Fourteen Villages were lying within the proposed mining area. A part of this settlement was proposed to be shifted for mining activity. Resettlement of 1056 PAFs have been done. Name of villages are Ghorauli kala, Ghorauli khurd, Purewa, Chanpathar, Jaitpur, Itma, Garda, Binauli, Piparalal, Nigahi, Nawanagar, Muher, Amjhar, Mudwani.

Table 1(b) Details of PAFs (Project affected families)

| Name of Project | No. of PAFs |
|-----------------|-------------|
| Nigahi Project | 1056 |

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 | LTF |
| III | Tropical dry deciduous forest | 300064 | 270040 | 95721 | 95721 |
| Table 2 (C) : Rate of moisture conservation cost Rs./ Ha./Year | | | | | |
| Eco class Value | VDF | MDF | OF | LTF | |
| Class III | 1951 | 1269 | 527 | 103 | |
| Table 2 (D) : Rate of soil conservation cost Rs./ Ha./Year | | | | | |
| Eco class Value | VDF | MDF | OF | LTF | |
| Class III | 13947 | 9024 | 4101 | 823 | |
| 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 | | | | | |

The nature of forest land for which renewal of application for diversion of forest land is applied at Nigahi OCP (874.146 ha.) falls in Class III Open Forest. As such Rate of NPV comes out as Rs. 6.26 lakhs per ha.

| Table 2(E): Calculation of NPV in respect to Nigahi Project (Rate of NPV 6.26 Lakh Rs per Ha.) | | |
|---|-----------------|---------------------|
| Description | Amount in Rs. | Amount in Rs. Lakhs |
| Total NPV for (874.146 Ha. forest land) | 54,72,15,396.00 | 5472.15 |
| 10% NPV Value | 5,47,21,540.00 | 547.21 |
| 30% NPV Value | 16,41,64,619.00 | 1641.64 |
| 50% NPV Value | 27,36,07,698.00 | 2736.07 |

Possession Value of Forest Land Diverted CIRCLE RATE OF LAND

| Table 3 : Rate of land as per Circle Rate | | | | | |
|---|--|---------------------------------|------------------|----------------------|--------------------------|
| 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 Rs |
| Agricultural | | 91.24 | 874.146 | 22546 | 197.08 |

REHABILITATION COST:

| Table 4: Compensation for Land as per R&R Policy | |
|---|----------------------------|
| Description | Amount in Rs. Lakhs |
| Monetary compensation paid for land | 773.44 |
| Monetary compensation for house, tree, well etc | 335.88 |
| *Subsistence allowance to each affected family @ 25 days Minimum Agricultural Wages per month for one year. | 0 |
| *Affected landless tribal families will be provided one time financial assistance equivalent to 500 days MAWs as a compensation for loss of customary rights. | 0 |
| Total | 1109.32 |

*Note: As it is a renewal case, the above compliances were not required as per R&R policy at that time.

| Table 5 (a) Royalty on coal | | | |
|------------------------------------|-----------------------|---|------------------------|
| Sl No | Royalty | Rate | Amount in lakhs |
| 1 | Basic royalty | 14% of sale price = $0.14 \times 696.60 \text{ (Rs./te)} \times 395.5 \text{ (MT)}$ | 38570.742 |
| 2 | District Mining Fund | 30% of royalty = $0.3 \times \text{royalty}$ | 11571.223 |
| 3 | National Mineral fund | 2% of royalty = $0.02 \times \text{Royalty}$ | 771.415 |

| Table 5 (b): Levy and collection of Cess | |
|--|---|
| Rate of Coal Cess | Amount in lakhs |
| @Rs 400 per tonne | $\text{Rs. } 400 \times 1721700000/100000 = \text{Rs. } 688680 \text{ lakhs}$ |
| Reference :Extraordinary gazette , part II – Sec 1, Ministry of law and justice Notification New Delhi , the 12th April 2017 | |

| Table 6 :CSR cost | | |
|--------------------------|-----------------------|--|
| CSR cost | 2% of retained profit | $243.52 \text{ MT (balance coal left from } 395.5 \text{ MT up to 2012)} \times 190.33 \text{ Rs/t (profit)} \times 0.02 = 9269.83 \text{ Lakhs Rs}$ |
| Ref: Company Act 2012 | | |

OTHER DETAILS

| Table 7 : Other Details | | |
|--------------------------------|--|---------------------------------------|
| 1. | Manpower as per EPR/ Mine Plan | 2827 |
| 2. | Cost of Production in Rs. / te | 506.27 |
| 3. | Mineable Reserves- | 395.5 |
| 4. | Life of the mine- | 46 yrs., Balance life 20 years(Apr17) |
| 5. | Grade of coal | G7,G11,G12 |
| 6. | Wage cost as per PR | 45 Rs per ton |
| 7. | Capital Investment as per PR | 207801 Lakhs |
| 8. | Wt Avg Sell price of coal per tonne | 696.60 |
| 9 | Tenancy land in (Ghorauli kala,Ghorauli khurd, Purewa, Chanpathar, Jaitpur, Itma, Garda, Binauli, Piparalal,Nigahi, Nawanagar, Muher, Amjhar) villages | 1562.722 Ha |

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. 5472.15 Lakhs** (Ref: Table 2E)

2. Loss of animal husbandry productivity, including loss of fodder = As it is renewal case after 30 years of lapse of lease, actual cost cannot be quantified at present. However, as per MOEF&CC Circular No. 7-69/2011-FC(PT.) Dated, 01 August, 2017, 10% of NPV is taken which is **Rs. 547.21 Lakhs** (Ref: Table 2E).

3. Cost of human resettlement

Cost of human resettlement as per R&R Plan = **Rs 1109.32 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. 197.08 lakhs=Rs. 197.08 lakhs

OR

30% NPV of Forest land = **Rs. 1641.64 Lakhs** (Ref: Table2E),

whichever is higher means Rs. 1641.64 Lakhs

6. Cost of suffering of oustees :

No. Of Outsees = No. Of PAFs = 1056

No. of Days Worked = 300 Days (Assumed)

Minimum wages of unskilled labour= Rs. 274

Thus Cost of Suffering of oustees (1056X300X274X2X1.5)= **Rs. 2604.09 Lakhs**

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. 2736.07** (Ref: Table2E)

8. Compensatory afforestation and soil & moisture conservation cost (paid during FC clearance)

Actual cost = **Rs. 262.34 lakhs**

II. Estimating benefits of forest – diversion in CBA

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

$$P = \text{Rs. } 395.5 \times 190.33 \times 10 = \text{Rs } 752755.15 \text{ lakhs}$$

2. Benefits to economy due to specific project :

| Different Benefits | In Rs. Lakh | Ref Table |
|--------------------|-------------|-----------------------|
| BE (CSR) | 9269.83 | Table 6 |
| BE(Royalty) | 38570.742 | Table 5(a) |
| BE(DMF) | 11571.223 | Table 5(a) |
| BE(NMF) | 771.415 | Table 5(a) |
| BE(GST) 5% | 137752.65 | (395.5*696.6*0.05*10) |
| BE(CESS) | 688680 | Table 5(b) |
| Total | 886615.86 | |

3. No of population benefitted due to specific project

Direct employment = 2827

Indirect Employment = Direct Employment x 5 = 14135

Considering av. family size 5 , then no. of Population benefitted = (2827 x 5) + 14135 = 28270

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%)) | (395.5 X 45 X 10 X 0.2)=3559.5 |
| Indirect employment benefit (Total manpower X 4 X 200 (Av working day/yr)X wages/day | (2827X4X200X274)/100000=6196.784 |
| Total | 9756.284 |

5. Economic benefits due to compensatory afforestation:

| Economic benefits | In Rs. Lakh |
|---|----------------|
| <u>Due to compensatory afforestation</u> (2 times of Forest land X Difference of NPV for class III forest (MDF-OF)X0.8 (Doubling Factor)) + 874.146 ha. non-forest land (874.146 x 438000(NPV for Class IV Open Forest) x 0.8 $= (2 \times 874.146 (803000 - 626000) \times 0.8) / 100000 + 874.146 \times 438000 \times 0.8 / 100000 = 2475.58 + 3063.00$ $= \text{Rs. } 5538.58 \text{ lakhs}$ | 5538.58 |
| <u>Due to compensatory afforestation as Carbon storage</u> *= (2 times of Forest land X Diff. of carbon storage)/100000 + (One time revenue land X Diff. of carbon storage)/100000 $= ((2 \times 874.146 (270040 - 95721) \times 0.8) / 100000) + 874.146 \times (95721 - 0) \times 0.8 / 100000 = 2438.08 + 669.39 = \text{Rs. } 3107.47$ | 3107.47 |
| Total | 8646.05 |

*Rate for carbon storage for class III forest- MDF-Rs. 270040/ha./yr. OF- Rs. 95721/ha./yr.

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 = 6.26 Lakhs Rs/Ha X 874.146 Ha = Rs. 5472.15 Lakhs (Ref: Table 2E) | 5472.15 |
| 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. 547.21 Lakhs (10% of 5472.15) (Ref: Table 2E). | 547.21 |
| 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 = Rs 410.00 lakhs (Ref: Table 4) | 1109.32 |
| 4 | Loss of public facilities and administrative | To be Quantified and expressed in monetary terms on actual cost basis at the | Actual cost - NIL | 0.00 |

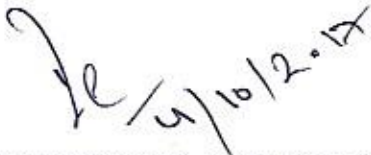
| | | | | |
|--|---|---|--|-----------------|
| | infrastructure (Roads, buildings, schools, dispensaries, electric line, railways, etc.) on forest land, which would require forest land if these facilities were diverted due to the project. | time of diversion. | | |
| 5 | Possession value of forest land 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. 197.08 lakhs or 30% of NPV of forest land (5472.15) = Rs. 1641.64 Lakhs (Ref Table2E), <u>whichever is higher</u> | 1641.64 |
| 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 Outsees = 1056 No. of Days Worked = 300 Days (Assumed) Minimum wages of unskilled labour= Rs. 274 Thus Cost of Suffering of oustees (1056X300X274X2 yearX1.5 times) = Rs. 2604.09 Lakhs | 2604.09 |
| 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 (5472.15) = Rs. 2736.07 lakhs (Ref Table2E) | 2736.07 |
| 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 actual cost of Compensatory afforestation and soil & moisture conservation paid during FC clearance = Rs. 262.34 lakhs | 262.34 |
| Total cost of forest diversion(in lakhs Rs) | | | | 14372.82 |

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. | 395.5 Mt (coal reserve) X190.33(profit/te)X10 =Rs 752755.15 lakhs | 752755.15 |
| 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) | 886615.86 |
| 3 | No of population benefited due to specific project | As per detailed project Report | Page no 5 point no II(3) | 28270 |
| 4 | Economic benefits due to of direct and indirect employment due to project | As per detailed project Report | Page no 5 point no II(4) | 9756.284 |
| 5 | Economic benefits due to compensatory afforestation | Benefits from such compensatory forestation 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) | 8646.05 |
| TOTAL (2+4+5) | | | | 905018.194 |

Ratio of COST : BENEFIT =Rs.14372.82 lakhs / 905018.194 Rs. lakhs = 1: 62.97


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