



**NUMALIGARH  
REFINERY  
LIMITED**




A GOVERNMENT OF INDIA UNDERTAKING

CIN : U11202AS1993GOI003893

**COST BENEFIT ANALYSIS**  
**Paradip Numaligarh Crude Oil Pipeline Project**

**Table-A: Estimation of cost of Forest diversion**

Sl. No.	Parameters	Value	Remarks
1	Ecosystem service losses due to purposes forest diversion	41.580 lakh	Enclosed in Annexure - A
2	Loss of Animal husbandry productivity including loss of fodder	4.158 lakh	10% of NPV value is taken
3	Cost of human resettlement	Nil	
4	Loss of public facilities and administrative infrastructure (Roads, building, schools, dispensaries, electrics lines, railway etc) on forest land, which would require forest land if these facilities were diverted due to the project.	Nil	
5	Possession value of forest land diverted   <b>Indrajit Kaman</b> Chief Manager (Project - Pipeline) Numaligarh Refinery Ltd. 122A, G. S. Road, Christianbasti Guwahati - 781005	252.243 lakh	30% of NPV value is taken or circle rate of adjoining area in the district. Possession value of forest land will be (considering 30% of NPV) = $0.3 \times 41.580 = 12.474$ lakh a) Per hectare land rate in district Dumka is approx. 38.635 lakh. So possession value of forest land (as per average BMV rate) = $6.101 \text{ ha.} \times 38.635 \text{ lakh} = 235.712$ lakh  b) Per hectare land rate in district Godda is approx. 38.635 lakh So possession value of forest land (as per average BMV rate) = $0.105 \text{ ha} \times 38.635 \text{ lakh} = 4.057$ lakh.

Please reply to :

NRL Registered office ,Project Pipeline Division, Numaligarh Refinery Limited, 122A ,Christian Basti, G.S Road Guwahati – 781 005, Phone : 0361 220 3140, Telefax : (0361) 203146

**REFINERY OFFICE**

Pankagranti, P.O : Numaligarh Refinery Complex,  
Dist : Golaghat, Assam, Pin – 785 699,  
Fax : 03776-265755,  
EPABX – 03776-265-593 / 594 / 413

**COORDINATION OFFICE**

Tolstoy House, 6<sup>th</sup> Floor, 15-17, Tolstoy Marg  
New Delhi – 110 001 (India)  
Phone : (011) 23739411, 23739413  
Telefax : (011) 23739412  
E-mail : numaligarh@del2.vsnl.net.in

**KOLKATA OFFICE**

4<sup>th</sup> Floor, Bharat Bhawan, Plot No. 31, KIT Scheme No  
118 Prince Gulam Md. Shah  
Road, Gulf Green, Kolkata – 700 095  
Phone : (033) 24293054 / 3055  
Telefax : (033) 24293079  
E-mail : nrl@caltiger.com





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6	Cost of suffering out trees	Nil	
7	Habitat fragmentation cost	20.79 lakh	50% of NPV value is taken
8	Compensatory afforestation and soil and moisture conservation cost	43.442 lakh	Compensatory afforestation and soil and moisture conservation cost. Rate of Compensatory afforestation Rs.3.5 /ha CA land = 6.206x2= 12.412ha. Total cost= CA land area x rate of Compensatory afforestation = 12.412 ha. x 3.50 lakh =43.442 lakh
	Total cost in monetary terms	362.213 lakh	

Table-B: Existing guidelines for estimating benefits of forest diversion in CBA

Sl. No.	Parameters	Result (Rs.in lakh)	Remarks
1	Increase in productively attribute to the specific project	102000.00lakh	Enclosed in Annexure-A
2	Benefits to economy due to specific project	102.00 lakh	
3	No. of population benefits due to specific project	283	
4	Economy benefits due to direct and indirect employment due to project	9886.95 lakh	
5	Economy benefits due to compensatory afforestation	629.238 lakh	
	Total(2+4+5)	10618.188lakh	

Cost benefit Ratio: Total Benefit / Total Loss = 10618.188: 362.213 = 1:29

*Indrajit Kaman*  
Indrajit Kaman  
Chief Manager (Project - Pipeline)  
Numaligarh Refinery Ltd.  
122A, G. S. Road, Christianbasti  
Guwahati -781005

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Annexure -A

### EVALUATION OF LOSS OF FORESTS

Loss of value of Timber, fuel wood and minor forest produce on an annual basis, including loss of man-hour per annum of people who derived livelihood and wages from the harvest of these commodities.

Only one time loss of vegetation occurs during construction and there is no loss of man hours. Considering the NPV of 6.70 lakh per hectare the total loss of timber, fuel wood and minor forest produce for 6.206 ha of forest may be calculated as  $6.206 \times 6.70 = 41.58$  lakh

### EVALUATION OF BENEFITS-----

#### 1. Increase in productivity attributable in the project

- Increase in productivity attribute in the project for 50 years (To be quantified and expressed in monetary terms)
- To maintain project IRR at 10 % a onetime VGF will be provided, subject to maximum of Rs. 102000 lakh.

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

It is assumed that there will be over all benefit to economy on account of reduction in petroleum product price @ 1 % of the total project IRR will be = 1 % of Rs.102000 lakh = **Rs.102 Lakh**

#### 3. No. of population benefitted due to specific project.

- There will be no direct recruitment for this project.
- Indirect employment may be generated through service providers engaged by NRL for the project.

Possible indirect employment may be considered as follows:

Sl. No.	Department	No. of Indirect employment (a)	No. of days in a year (b)	No. of persons /year {(a x b)/365}
1	Civil & Construction	20	180	10{i.e. 1800/365}
2	Pipeline	40	300	33{i.e. 12000/365}
3	Installation &			40
4	Security			200
Total				283

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#### REFINERY OFFICE

Pankagranti, P.O : Numaligarh Refinery Complex,  
Dist : Golaghat, Assam, Pin – 785 699,  
Fax : 03776-265755 ,  
EPABX – 03776-265-593 / 594 / 413

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**Indrajit Kaman**  
Chief Manager (Project - Pipeline)  
Numaligarh Refinery Ltd.  
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4. Economic benefits due to direct and indirect employment due to project.

a) Indirectly employed manpower in Installation & Operation has a cost of Rs. 180 lakh / year in terms of Salary. Therefore, for 50 years  
=Rs.9000 lakh(i.e.Rs.180 lakh X 50 years)

b) Cost of other indirectly employed manpower (Total 200 nos.) Unskilled/semi unskilled worker in terms of Salary and Wages @ Rs. 500/day (average) for 2 years = Rs 886.95 lakh (i.e. 243.0 X Rs 500 X 365 days X 2 years)

**Total Cost (a+b) = Rs.9886.95 lakh.**

5. Economic benefit due to Compensatory Afforestation.

The Compensatory Afforestation will be done in 6.206 ha. of degraded forest land, which is down the line would be having a density of minimum 0.8. The ecological value for a 50 years period of density of 1.0 is 126.74 lakh per hectare (As per Forest Conservation Act 1980). By considering minimum 0.8 density, the ecological gain for this project would be  
= 126.74lakhX0.8X6.206= **Rs.629.238 Lakh**

Date:

Place:

(Indrajit Kaman)  
Chief General Manager (Project - Pipeline)  
Numaligarh Refinery Limited, Assam

  
Indrajit Kaman  
Chief Manager (Project - Pipeline)  
Numaligarh Refinery Ltd.  
122A, G. S. Road, Christianbasti  
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