

**SUMMARY INITIAL ENVIRONMENTAL EXAMINATION**

**BANSPANI-TOMKA NEW RAILWAY LINE**

**IN**

**INDIA**

**August 1998**

**CURRENCY EQUIVALENTS**

(as of 1 August 1998)

Currency Unit	-	Rupee(s) (Re/Rs)
Rs1.00	=	\$0.0236
\$1.00	=	Rs42.46

**ABBREVIATIONS**

NO <sub>x</sub>	-	Nitrogen Oxides
PAP	-	Project-affected persons
SO <sub>2</sub>	-	Sulfur Dioxide
SPM	-	Suspended Particulate Matter

**WEIGHTS AND MEASURES**

°C	-	degree Celsius
dB(A)	-	decibel
ha	-	hectare
hp	-	horsepower
kV	-	kilovolts
m	-	meter
km	-	kilometer
MW	-	megawatt
t	-	ton

**NOTES**

- (i) The Fiscal year of the Government ends on March 31.
- (ii) In this Report, "\$" refers to US dollars.

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## I. INTRODUCTION

1. The proposed new railway line from Banspani to Tomka lies in the State of Orissa. The total length of the proposed route is 155 kilometers (km). Initially, Banspani was proposed to be connected to Daitari, a total length of 147 km. On the advice of the Ministry of Environment and Forests of the Government of India, the line was realigned between km 123 to 155 and the line will now join Tomka of the Daitari-Jakhpura line so that deep forest areas are avoided.

2. The primary objective of the proposed Project is to connect the mineral producing belt of Orissa such as Banspani-Barajamda section, Daitari-Tomka section and Gandhamardhan-Malangtoli section to Paradeep Port. South Eastern Railway has prepared the technical and financial appraisal report on the proposed line. It is reported that about 3.5 million tons (t) of ore will be transported per year from the region starting from the year 2000/01. The map gives the location and the alignment of the proposed Banspani to Tomka railway line.

## II. DESCRIPTION OF THE PROJECT

3. At present, South Eastern Railway transfers ore to Paradeep via the circuitous of Banspani-Raj Kharswan-Kharagpur route, which is 335 km longer than the proposed line. The construction of the Project line will shorten the transportation distance, and make the price of the ore internationally competitive. The proposed line will also provide a shorter transportation route from the east coast to New Delhi and Bombay. In addition, the proposed line will transfer about 13.58 million t of coal per year to meet the requirements of proposed power plants of about 1,500 megawatts (MW) in the region. A total of 15 stations are planned. The ruling gradient will be 1 in 110 meters (m). There will be 77 curves with a total length of about 40 km. To cross the rivers, nallas and streams, 28 major and 345 minor bridges are planned. There will be 58 level crossings. The construction of the line involves about 10.9 million cubic meters (m<sup>3</sup>) of earthwork, with completion in four years. Land acquisition and forest clearance will take place in the first year. Wagons with capacity of 69.45 t with pneumatically operated door and axle load of 25 t will be used. The traction system of 2 x 25 kilovolts (kV), 50 hertz (Hz) is planned. Electric locomotives of 6,000 horsepowers (hp) will be in operation on this route.

## III. ENVIRONMENTAL BASELINE DATA

4. The proposed railway line between Banspani and Tomka passes through rugged terrain, steep hills and dense forest area. The elevation at Banspani is 481 m while that at Tomka is 87 m. The area is generally open and occupied by large villages and numerous hamlets. The average change in gradient is 1 in 387 m. There is wide variation in the climate of the Project area. The highest temperature recorded is 46°C and the lowest is 3°C. Relative humidity varies from 35 to 80 percent. Winds are light to moderate. The Project area falls in Seismic Zone II.

5. The alignment mostly runs over rocky terrain; formations are generally strong and are not likely to cause any serious foundation problem. However, minor problems of landslips/water percolation might occur in the phyllitic shales in the north and the thin shear zones in the central sector. On the way Quartzite, sandstone with bands of shale, metamorphic

rocks, and pockets of pyrophyllitic and dolerite dikes are noticed. Four types of soils are encountered, namely, red and yellow soil, laterite soils, reddish brown loamy soils, and red sandy soils. Soil thickness varies from 3 to 6 m. The soil varies from acidic to alkaline and loam to sandy clay loam with high porosity.

6. Baitarani River is the largest river in the area. Almost every year in rainy season the rivers are charged with floods. Water samples from the river, nallas and wells are high in total suspended solids, indicating a high rate of soil erosion. Iron (Fe) content and total coliform count are high, which could have resulted from an unsanitary environment and mining activities in the area. Water samples collected from groundwater and hand pumps have indicated that water is hard, otherwise, all other parameters are within the limits of drinking water standards.

7. Air quality monitoring stations were set up at three sites. The parameters monitored were suspended particulate matter (SPM), sulfur dioxide (SO<sub>2</sub>) and nitrogen oxides (NO<sub>x</sub>). SO<sub>2</sub> and NO<sub>x</sub> are far below the limits of National Ambient Air Quality Standards (NAAQS) proposed by the Central Pollution Control Board (CPCB).

8. Noise levels were measured at different places in the Project area as per standard practice. The minimum noise level observed was 53 decibels [dB(A)] at Haricharanpur while the maximum was 72 dB(A) at Banspani railway station. These values are within the National Noise Level Standards stipulated in the Environmental Protection Act (1996).

9. The state of Orissa has about 30 percent forest cover. The main species observed are *Shorea robusta* (Sal), *Terminalia tomentosa*, *Terminalia chebula*, *Diospyros melanoxylon*, *Anogeissus latifolia*, and *Maduca indica*. Bamboo is also found. The common species of mammals, rodents, fish, and reptiles are found in the area.

10. Landuse along the proposed corridor comprises forest – 22 percent; human settlements – 4 percent; agriculture – 57 percent; wasteland – 16 percent; and water bodies – 1 percent.

11. An initial social assessment carried out in the Keonjhar district of Orissa indicated that 24 villages touch the railway alignment. Seventy-one families are likely to lose their land; their socioeconomic status was surveyed. The initial social assessment indicated that the male-to-female ratio is 50:50. The demographic profile indicated that 67 percent families are nuclear while joint families are 33 percent. Most of the Project-affected families have mud houses. Schedule Tribes are maximum (69 percent) followed by General (8.5 percent) and other backward classes (8.5 percent). The literacy level is 12 percent. About 5.6 percent families have an income of more than Rs50,000 per year. The average income among Project-affected persons (PAP) is Rs20,000/-annum. The average landholding is about 1.0 hectare (ha) and 33 percent of families have land of less than 1.0 ha.

#### **IV. ENVIRONMENTAL IMPACTS AND MITIGATION MEASURES**

##### **A. Checklist of Impacts**

12. The following checklist was used to identify the anticipated environmental impacts.

Parameter	Negative Impact	No Impact	Positive Impact	Short Term	Long Term
<b>A. Impacts due to Project Location</b>					
a) Displacement of people	•			•	
b) Change of land use	•				•
c) Loss of trees/forests	•				•
d) Encroachment into nature reserve		•			
e) Drainage problems	•			•	
f) Risk due to earthquakes		•			
<b>B. Impacts due to Project Construction</b>					
a) Soil erosion and pollution at construction sites	•			•	
b) Health risk & cultural hazards	•			•	
c) Soil disposal problem	•			•	
d) Problems due to geological faults		•			
<b>C. Impacts due to Project Operation</b>					
a) Oil pollution	•				•
b) Accidental hazards	•				•
c) Noise	•				•
<b>D. Positive Impacts</b>					
a) Employment opportunities			•		•
b) Benefits to economy			•		•
c) Quick service and safety			•		•
d) Less fuel consumption			•		•
e) Less air pollution			•		•

Note: • indicates "Yes".

## B. Negative Impacts

13. For assessment of negative environmental impacts, the issues were classified in the following phases of the Project cycle:

- (i) impacts due to Project location and design,
- (ii) impacts due to Project construction, and
- (iii) impacts due to Project operation.

14. Most of the environmental issues are likely to arise during the construction and operation phases. They will be mitigated or reduced by incorporating environmental management plans into the Project cycles.

## C. Impacts Due to Project Location and Design

15. Rehabilitation and resettlement are the main issues. About 240 families will be affected by the Project, and 574 ha of farmland will be converted into railway land. The study of the PAP revealed that the prevalent market rates of the land to be acquired are Rs150,000 to Rs400,000 per ha. The amount of Rs200.90 million will be utilized toward the compensation for land (574 ha).

16. About 824 ha of forestland, which will account for 82,400 trees is likely to be lost due to the proposed development. Provision has been made for the planting of 824 ha of forest area. The amount of Rs23.26 million has been provided in the Project for this purpose.

Indigenous tree species such as eucalyptus, acacia, ashok, and jamun are recommended for planting. A total of 2,190 t (Rs2.19 million) of coal will also be provided to the contractor's camps to prevent the construction workers from encroaching on forest area.

17. Neither the Project area nor its surrounding has nature reserves.

#### **D. Impacts Due to Project Construction**

18. Soil erosion could result at quarry sites and embankments. About 10.90 m<sup>3</sup> of earthwork is involved in construction activity. Each site needs to be treated as soon as construction work there is over. The impacts due to Project construction are of short duration. Improper dumping of construction spoils (concrete, bricks) and waste materials can cause surface and ground water pollution. Construction wastes should be disposed at appropriate places. The soil from cutting will be utilized in filling. Additional soil required will be collected from quarry sites. Such sites will be revegetated. For revegetating the borrow areas, Rs3.27 million has been provided.

19. SPM levels in the Project area are expected to rise, but the SPM standard will not be violated as the background levels are low. The noise level increase is predicted to be within specific standards. However, construction workers might be exposed to high noise levels of 80-90 dB(A) from machinery operations. Proper personal protective equipment will be provided and job rotation will be implemented to minimize the noise impacts. Migration of labor from one place to another may lead to cultural conflicts; these will be avoided by employing local labor.

#### **E. Impacts Due to Project Operation**

20. The main negative impacts due to Project operation are oil pollution, noise pollution, inadequate water supply, and improper refuse disposal. Maintenance of locomotives at workshops, and cleaning of compartments, platforms, and yards will generate waste oily water and solid waste requiring proper disposal. Oil removal traps will be installed at maintenance depots to collect oil to prevent water pollution problems. The traction motors, wheel rail interaction, electric generators, rolling stocks, etc. will generate noise. It has been calculated that noise at 500 m from the moving rail will be 54 dB(A). With proper measures, the noise level could be reduced.

21. About 120 m<sup>3</sup> of water will be required for personal use of staff at each station. In addition, water will also be required for washing platforms, for fire demands, for handling wastage, etc. Treated water supply will be provided. Septic tanks with the recommended capacity need to be constructed at each station.

22. About 1.8 t of refuse is likely to be generated at each station. Appropriate storage containers will be designed and installed. Maintenance of adequate sanitary facilities for temporary storage of refuse on the premises is considered the responsibility of the Project authorities.

#### **F. Positive Environmental Impacts**

23. On the basis of Project particulars and the baseline environmental condition, potential positive impacts have been identified:

- (i) The Project will provide employment opportunity to 1,500 persons during construction and to 500 during operation.
- (ii) The railway line will help in the speedy and safe movement of goods and passengers. The railway line will provide an alternative mode of transport, and may lead to reduction in the growth of other vehicles, particularly trucks. In addition, it will save fuel and will reduce vehicular emissions.
- (iii) The Project will have beneficial consequences on the trade and transport infrastructure and will result in overall development of the region.

## V. INSTITUTIONAL ARRANGEMENT AND MONITORING

### A. Institutional Arrangement

24. Table 1 shows the institutional arrangement for implementing the environmental management activities of the Project. It is recommended that an Environment Division will be established within South Eastern Railway to carry out most environmental mitigation measures. The Department of Forests of the Government of Orissa will be responsible for reforestation, and an agency appointed by Railway Board will review the management plans prepared.

**Table 1: Implementing Agency**

<b>Environmental Parameters</b>	<b>Implementing Agency</b>
Rehabilitation and Resettlement	South Eastern Railway along with Land and Revenue Department of government of Orissa and voluntary organizations
Reforestation	Department of Forests, government of Orissa
Drainage Problem	South Eastern Railway
Soil Erosion Control	Contractor and South Eastern Railway
Water Pollution Control	South Eastern Railway during operation and contractor during construction
Air Pollution Control	South Eastern Railway during operation and contractor during construction
Monitoring of Plans	South Eastern Railway
Review of Management Plans	Agency appointed by Railway Board

### B. Environmental Monitoring Program

25. Environmental monitoring programs are vital to assess the effectiveness of environmental management plans. During the construction and operational phases, the following will require monitoring:

- (i) Rehabilitation and resettlement program
- (ii) Reforestation
- (iii) Water quality
- (iv) Air quality and noise
- (v) Soil disposal and conservation

(vi) Sanitation and waste disposal

26. An Environment Division will be set up within the Project Implementing Agency to effectively carry out the above activities.

### C. Environmental Costs

27. All costs involved in environmental mitigation management and monitoring to be put on the account of the proposed Project are summarized in the table below:

Item	Amount (Rs m)
1. Rehabilitation and Resettlement Compensation For Agricultural Land	200.90
2. Fuelwood for Contractor's Camp	2.19
3. Compensatory afforestation	23.26
4. Borrow Area Conservation	3.27
5. Training	1.07
6. Establishment of Environmental Division	1.52
<b>Total</b>	<b>232.21</b>

28. The environmental management plan will be implemented in phases so that optimum benefit will be achieved. It will be synchronized with the construction schedules.

## VI. CONCLUSIONS AND RECOMMENDATIONS

29. As discussed, the impacts on natural resources, and terrestrial and aquatic ecology are insignificant, while impacts due to Project operation could be mitigated with available technology. From this assessment, it could be concluded that the Project would bring environmental benefits to the Project area.

30. Keeping in view the nature of the impacts and requirements, no environmental impact assessment (EIA) for the Project is recommended.