
SUMMARY OF ENVIRONMENTAL IMPACT ASSESSMENT(EIA)

1.0 PROJECT DESCRIPTION

Due to increase demand of power grade coal by thermal power stations, the Ministry of Coal has given target to NCL of 58.0 MTY for the year 2007-08. So to increase the coal production from Jayant OC, it is proposed to enhance coal production from existing 10 MTY to 12.5 MTY in future. As per the MoEF Circular No.J-21011/8/98-I(A)II (I) dated 14th May, 2002, all the mines producing more than its approved rated capacity has to take prior Environmental Clearance from the MoEF In accordance with this requirement, the EIA-EMP Report for Jayant OC Project has been prepared.

This is an expansion project for existing Jayant opencast coal mine of Northern Coalfields Limited. The proposed production capacity is to be enhanced to 12.5 Mtpa of coal with a corresponding peak OB removal of 30.27 Mm³ per year. Ensuing the projected demand of coal for Thermal Power Plants in the country, it is necessary to expand the capacity of the present Jayant Opencast project. The present demand on coal on NCL for the year 2007-08 is 59.62 Mt which will increase to 78.88 Mt by the terminal year of XI Plan period i.e. in 2011-12 as per revised target in Sept.,07.

- 1.1 Location :** The Jayant Opencast Project of Northern Coalfields Limited (NCL) is located in Singrauli Coalfields which is situated in Sidhi district of Madhya Pradesh. It falls within the latitudes 24° 05' 45" to 24° 11' 25" N and Longitude 82° 38' 21" to 82° 40' 45" E (Survey of India toposheet no 63 L/12 of GSI). The nearest railway station is Shaktinagar at a distance of about 5 kms. from project on Chopan-Katni (KBJ Line) railway line of East-Central Railway.
- 1.2 Description of the Minefield :** Jayant Block having an area of 11.10 sq. kms. is located in the north-east part of Singrauli Coalfield. The terrain of the opencast minefield represents plain on hilly plateau with RL varying from 390-500m. The top level of escarpment is about 500 m and lower one varies from 390-410m.
- 1.3 Mineable Reserves :**The total mineable reserves are estimated as 348.93 MT and the total volume of OB is estimated as 907.20 Mm³ with average stripping ratio of 2.60 m³/t. There are Turra Seam Purewa Bottom Seam Purewa Top Seam. Jayant Opencast Project has produced 193.40 Mt. Of coal till March, 2007.
- 1.4 Geology of Jayant Block :** The geological data given in this report are as per "Geological Report on Jayant Block prepared by CMPDI in 1975. There are

five coal seams, i.e. Kota, Turra 'A', Turra, purewa Bottom and Purewa Top. Kota and Turra 'A' seams are thin (0.2-1.9m) and not viable for commercial exploitation by opencast mining. The seam thickness of Turra varies from 13 to 19m. The thickness of Purewa bottom and Purewa Top varies from 9 to 12m and 5 to 9m respectively. There are number of dirt bands in Turra Seam, some of which are more than 1m in thickness.

The strike of the coal seam is from east to west and the dip varies from 1° to 4° in northern direction.. The Turra seam has C & D grade whereas Purewa Bottom seam has D, E grade and Purewa Top seam has E & F grade of coal.

- 1.5 Mining Technology & Process Description :** Considering the mining and geological condition, the combined system of mining with the deployment of Draglines and Shovel-Dumper combination is being implemented at this Project. The OB removal will be done by dragline side-casting and shovel-dumper combination. The blasted material will be transported to internal dumps through dumper transport. The coal after blasting will be loaded and hauled to CHP by dumpers from where after crushing the ROM coal, it will be transported to silo point connected to MGR track through conveyor belts for loading into the wagon. There is no change in mining technology and infrastructure of the project for present enhancement.
- 1.6 Programme of excavation :** Jayant Expansion OCP has been planned to produce total 150.88 Mt coal & 361.61 Cu,m O.B from 2007-08 to 2020-21. The calendar Plan of excavation is given in CH-II (as per approved Mining Plan).
- 1.7 Mining Details :** Stripping ratio (mineral in tonnes to over burden in m³)- 2.39 m³/t (for balance life). Ultimate working depth - 165m, Present working depth existing mine- 125m, Thickness of top soil 7m (3 -12m), Thickness of overburden 125 m (110 – 140m).
- 1.8 Mining Plan & Mine Life :** Height & width of the bench in ore body/coal seam: 7-18m. Height and width of the O.B bench for Dragline varies from 42-55m and cut width varies from 70-80m. In case of Shovel-Dumper O.B height is 15m and width is 35-55m. Proposed over all slope of the operating the mine is 18-20° and 35-40° at the time of closure of the mine. The estimated life of the project for balance mineable coal reserves works out to 14 years with the enhanced coal production target of 12.5 Mtpa.
- 1.9 Drilling & Blasting Operations :** The blasting is required in all coal & OB benches for loosening the strata. Drills of 311 mm (3 Nos.), 250 mm (12 Nos.) and 160 mm (5 Nos.) have been provided.
- 1.10 Waste Disposal Techniques :** The total volume of OB to be handled is 907.20 Mm³. Out of which 847.20 Mm³ of OB(93.39%) will be dumped internally and 60.00 Mm³ (6.61%) has already been dumped in external

dump. In future years, it is proposed to remove balance 361.61 Mm³ of OBR which will be dumped internally only.

1.11 Proposed Schedule for Approval & Implementation : The mining plan for Jayant OCP (12.5 Mtpa) has been approved by NCL Board on October, 2005. The proposed enhanced target of 12.5 Mtpa is likely to be achieved by 2008-09 as per approved Mining Plan. The present proposal is for environmental clearance for a coal production from 9 Mtpa to 12.5 Mtpa. The calendar programme for coal production and OB removal is given in Table No.2.1. of Chapter –II.

1.12 Infrastructure :

1) Coal Handling Plant (CHP): Jayant OCP has a CHP of 10 MTY capacity. CHP has three receiving pits, three gyratory crushers each of 1200 TPH capacity, two surge hoppers each of 2400 te capacity 2x30000 te. ground bunker, one 2400 te. capacity silo and a PR loading system with two hauling points on separate tracks

2) Workshop : The unit workshop of Jayant OCP exists in two parts i.e. i) Field Workshop and ii) Base Workshop. Besides, Dozer workshop and light vehicle workshop also exists in separate location

3) Railway Siding : Rapid Loading System silo is working on NTPC owned MGR track. A Public Railway system with two loading points is also working.

4) Power supply arrangement : At present, Jayant project is receiving power at 33 KV by two single circuit transmission lines from the 2 x 40 MVA 132/33 KV Madhuli Substation of NCL. There are three numbers of main substations in the project namely - east OB substation (Central substation of 4x10 MVA jointly feeding to east OB section of Jayant & west OB section of Dudhichua Projects), west OB substation and coal substation.

5) Other facilities : There are adequate numbers of parking spaces, rest shelters, canteens in the project. Effluents and pollution load from these activities are managed as per ISO 14001 Standards.

1.13 Risk of Technological Failure : Considering the geo-mining conditions of the block, the combined system of mining with dragline and shovel-dumper combination is being used for exploitation of coal. This technology is a proven and tested technology. Hence, the technologies used for opencast mining at Jayant OCP (12.50 Mtpa) is very safe and suitable.

2.0 DESCRIPTION OF THE ENVIRONMENT

2.1 Topography, drainage & Climate:

Project is situated on plateau with elevations varying from 375 m. to 425 m. above Mean Sea Level (MSL) except one hill in the north west corner having an altitude of 500 m above MSL.

Drainage : Drainage of the area on the south is controlled by various seasonal streams. On the western side these seasonal streams drain into Motwani nalla which is the main nalla. On the eastern side the seasonal streams drain into Ballia nalla. Both these nallas ultimately join Govind Ballav Pant (GBP) Sagar in south. Towards north the drainage is through seasonal streams which discharge into Bijul nalla.

Climate : The area receives mostly south western monsoon and average annual rainfall is about 1105 mm. The lowest temperature recorded is 4^o C and the highest temperature 48^o C during last 15 years.

2.2 Description of Study Area :

Core Zone : The core zone of the project comprising of excavation zone, OB dump site, infrastructure area and safety zone for blasting covers partly and /or fully the land from 7 villages. In the Jayant Project area 8 villages are likely to be directly affected by mining operations namely Madwani, Garda, Saraswah Rajatola, Saraswah Laitola, Jaitpur, Nigahi, Madhauri and Chandauri, which constitute the core zone.

Buffer zone_ : Total 48 villages of Sidhi District of Madhya Pradesh state and 14 villages of Sonbhadra District of Uttar Pradesh, lie in the buffer zone. Ten coal mines & two thermal power station lies in the Buffer Zone. The whole of core zone and buffer zone combined, constitute the study area for EIA- EMP study.

2.3 Environmental Base Line Study : The present environmental quality assessment, impacts, and mitigation measures has been carried out by generating the baseline data of environmental quality parameters such as air, water, Noise levels, flora & fauna study, socio-economic study, land use survey by remote sensing, hydro-geological data, water levels, etc. Environmental Baseline study for the project has already been completed in June-05.

2.4 Existing Environmental Scenario :

Socio-Economic Profile : NCL entrusted Socio-economic study for Jayant Project to M/S Richardson & Cruddas (1972) Ltd. The expert visited the site and collected data.

Micro-meteorology : The site specific data are recorded for three months period (From 15.03.05 to 12.06.05) by installing a meteorological station in Core zone at Coal Section Office of Jayant Project.

Ambient air quality : The Base line Ambient air quality data were recorded for three months period (From 15.03.05 to 12.06.05) by selecting one core zone & four Buffer zone stations. The Buffer Zone AAQ monitoring stations were selected in the village area considering upwind and downwind direction as well as to represent the cross sectional scenario of the project site Based on the production activities the parameter chosen for assessment of ambient air quality are Suspended Particulate Matter (SPM), Respirable Particulate Matter (RPM), Sulphur di-oxide (SO₂), Oxides of Nitrogen (NO_x) and Carbon Mono-oxide (CO). The results reveal that the SPM concentrations are within the permissible limit.

- 2.5 Water Quality Scenario :** Water samples were collected from different locations in and around the area representing ground and surface water sources. Water sampling stations are selected to assess the effect of mining activities on the water quality in surrounding area as well as in the township. The analysis results reveals that all the parameters were within the prescribed standards.
- 2.6 Noise Levels :** To assess the present noise level in the study area sampling locations as given below. Ambient noise levels were recorded during day and night time and the observed values were compared with standards prescribed by MOEF. The results are found to be within permissible limits.
- 2.7 Soil quality :** In order to assess the soil quality of study area of Jayant Project, the soil quality analysis report generated by M/S Richardson & Cruddas (1972) Ltd., a Government of India undertaking has been taken. Soil samples were collected in disturbed and undisturbed condition in Summer season and analysed in the laboratory. The physio-chemical characteristics of the soil samples indicate it is neutral to slightly alkaline. N,P,K and Organic Carbon is found in adequate quantity in soil for vegetative growth:
- 2.8 Flora & Fauna :** The Survey was carried out by Botany Department of Sevadal Mahila M.V. (Nagpur University Affiliated), Nagpur. visited and observed 10 km range of Jayant Project for study. In the study all type of flora from natural as well as artificial plantation and fauna have been surveyed. The study report reveals that there is no endangered or endemic floral species in the core & buffer zone of study area. Also, there is no endangered faunal species or migratory birds in the core as well as in buffer zone of study area
- 2.9 Land use pattern :** Out of total 2704 ha land requirement, 1162 ha is forest land, 1075 ha Tenancy land and 467 ha are Govt. land.

2.10 Hydrology & Hydro-geology : A comprehensive hydro-geological assessment report has been prepared by CMPDI. The report is based on latest pre-monsoon and post-monsoon baseline data covering information on ground water situation, aquifer characteristics, water level, estimate of ground water resources, predicted impact of the project on ground water regime and detailed remedial / conservation measures such as artificial recharge of ground water etc.

3.0 ANTICIPATED ENVIRONMENTAL IMPACTS & MITIGATION MEASURES

The impacts of mining and its control measures have been assessed and presented in respect of air, water, noise, blasting vibration, socio-economic profile, flora & fauna, land resource, traffic movement and visual / aesthetic aspect.

3.1 Impact Assessment & Pollution Control Measures for Air : The pollution sources are obvious and to assess the impact, the project life is divided into operational & post operational phase. Appropriate mitigative measures to control the air pollution due to different activities like drilling, blasting, loading & transportation, coal handling etc have been suggested in the above chapter

3.2 Impact Assessment & Pollution Control Measures for Water : Sanitary (domestic) waste water, Industrial wastewater from workshop, Wastewater from mine, Surface run-off passing through coal stockpiles, Storm water from leasehold area and built-up area are likely sources of water pollution from this project . Impact of above sources on Hydrology & ground water have been assessed & appropriate mitigative measures have been suggested.

3.3 Impact Assessment & Control Measures for Noise & Blasting : In Jayant Open cast mine the sources of noise are drilling & blasting operation in coal and OB, operation of HEMMs, operation of equipment in CHP, workshop, etc, . Presently at existing production level Noise levels are within the limits of the prescribed standard. The noise level in and around the project is not likely to increase in future due to expansion of Jayant Mine, as there is no increase in equipment population. In case noise levels exceed the permissible limit , its adverse impacts impact have been assessed & appropriate mitigative measures have been suggested.

3.4 Impact on Land Resource and Its Management : The total land required for the mining & infrastructure etc. of Jayant Project is 2704 ha. The probable causes for land degradation may be as a result of quarry excavation, overburden dumping, civil construction, approach roads etc. Land use pattern of Jayant OCP will be changed during mining operations. This changes has both beneficial & adverse impact. At post mining stage land will be reclaimed to an environmentally acceptable state as pre-mining stage if not better. Forestry is the end objective adopted for final land use.

- 3.5 Impact on flora and fauna :** As per the above study of Botany Department of Sevadal Mahila M.V. (Nagpur University Affiliated), Nagpur, there is no endangered or endemic floral species in the core & buffer zone of study area. Also, there is no endangered faunal species or migratory birds in the core as well as in buffer zone of study area, so separate conservation is not required. The impact on flora & fauna is not that serious.
- 3.6 Impact on meteorology :** The mining operation is a physical operation which involves excavation and material handling. No significant micro-meteorological condition will be affected by the increased mining activities.

4.0 ENVIRONMENTAL MONITORING PROGRAMME

Environmental Monitoring including all aspects has been already implemented by the project for existing production capacity. For expansion project, a time bound action plan for environmental management including all aspects has been prepared by the project .

- 4.1 Parameters to be monitored :** Ambient air quality, water quality (mine discharge , ground water and drinking water samples), ground water level and noise level, will be monitored for standard parameters. Health of the employees , R & R Activities, Overburden to be excavated, backfilled, the plantation schedules etc. will be monitored
- 4.2 Monitoring Frequency :** Following number of stations have been identified for monitoring

i. Ambient Air:- 5 Stations ii. Water:- 9 Stations iii. Noise:- 4 Stations

Ambient air will monitored as per asper MoEF guide line G.S.R 742 (E). Water samples from following nine stations are monitored regularly as per required standard i.e. G.S.R 742 (E),for Effluent,. IS-10500 for drinking water, IS-2296 for Surface Water. The noise level observations is being made as per Environment Protection Act GSR 1063(E) Schedule III at the five Noise monitoring stations.

Plantation in Jayant project is being carried out by M.P. Rajya Van Vikas Nigam, and same are being maintained & monitored by them for continuous up to 5 years so that desired growth of plants and trees is attained Land Reclamation and Plantation is being done as per schedule. Periodic health examination is of the employee is being done to for identifying occupational diseases etc. and initiating remedial measures in case of detection.

- 4.3 Emergency Procedures :** Keeping in view the three basic principles i.e. prevention, preparedness(both pro-active and reactive) and mitigation of effect through rescue, recovery, relief and rehabilitation, a comprehensive

blue print of Mine Emergency Response Plan (MERP) has being prepared & same is being followed.

5.0 ADDITIONAL STUDIES

5.1 Public Consultation : Public Consultation to be finalized by M.P.Pollution Control Board after submission of Draft EMP.

5.2 Risk Assessment and Management : The disaster management is essential to guard against and mitigate the consequences of major accidents. Keeping in view the three basic principles i.e. prevention, preparedness (both proactive and reactive) and mitigation of effect through rescue, recovery, relief and rehabilitation; a comprehensive blue print of Mine Emergency Response Plan (MERP) has been prepared for Jayant OCP incorporating the Identification and assessment of risks and Recommendation of measures to prevent damage to life and property against such risks

5.3 Socio- Economic Measures : Direct employment to local inhabitants from affected villages. Indirect benefit to persons engaged during different construction activities. Benefit to local population through domestic and commercial services in projects like Vehicle repair shop / maintenance garages, Medical shop, Transport agencies i.e. supply of fruits, vegetable, cereals, milk, etc, Consumer goods , Hotel, Restaurants, etc . Provision of residential complex with the shopping complex .

5.4 Rehabilitation & Resettlement : A total of 650 families have been affected by mining activities. and they have been rehabilitated in the Nandgaon village near Amlohri at a distance of 5 km. 47 no. of families paid cash in lieu of plot. and about 74 families shifted to the Rehabilitation site and have been rehabilitated in the Nandgaon village near Amlohri at a distance of 5 km. The balance 576 families are residing in the additional area required for safety zone on dip side. These families will be proposed to be shifted in due course

Compensation for the land and other property : The payment of compensation for the land and houses have been made. The details of the compensation package is given below

Employment in NCL :The requirement of the project for unskilled and semiskilled work force is met from the land losers. Special preference is given to the SCs & STs.

Self employment training schemes :This includes short term courses for carpentry, plumbing, carpet weaving, diary and poultry farming, etc. The financial assistance for conducting such course is rendered by the project.

5.5 Community Development :

Under the community development programme the project arranges periodical health camps, immunisation programme and family planning programmes in the nearby villages.

In addition, plantations have also been done in nearby villages to improve the environment and bring awareness to local inhabitants towards the preservation of the same. The main thrust area in Community Development programme is Health care, Drinking water supply, self employment scheme, education.

6.0 PROJECT BENEFITS

The expansion of the Jayant OCP will enhance the socio-economic activities in the adjoining areas. This will result in improvements in Physical Infrastructure, improvements in Social Infrastructure, increase in Employment Potential, contribution to the Exchequer, Post-mining Enhancement of Green Cover

The expansion of the Jayant OCP will improve the physical infrastructure of the adjoining areas. Overall there will be positive impact in socio-economic area due to increased economic activities, creation of new employment opportunities, infra-structural development, better educational and health facilities.

There will be creation of direct and indirect employment opportunities due to expansion of this mine. Overall, this will have positive impact on socio-economic profile of the area. NCL undertake skill development & capacity building programme like vocational training, income generation and entrepreneurship development. Same will be continued for expansion Project.

Other Tangible Benefits : Northern Coalfields Limited is facing increasing demand of power grade coal. Continuing and augmentation of coal production from the mines of NCL will help to bridge the gap of demand and supply power grade coal in India Present (2007-08) demand of coal from NCL is 59.62 M.T and supply is 58 M.T. To meet the growing demand of coal, especially in power sector, NCL has planned to increase its production capacity by the end of XI plan (2011-12) from the present production level of 58 Mt. to 78 Mt.

7.0 ENVIRONMENT MANAGEMENT PLAN

The success of environmental management in an organization not only depends on deep involvement of its personnel at all levels but also on the creation of an effective implementing organizational structure.

- 7.1 Implementing Organisation :** Northern Coalfields Limited, the owner of this project has already set-up an Environmental Cell headed by a General Manager at its H.Q.. The cell provides necessary support that is required for Environmental Management of various projects and mines under the jurisdiction of the company. Further, to carry out Rehabilitation & Resettlement measures, a R&R cell has been already set-up by NCL at its HQs..
- 7.2 Corporate Level :** Northern Coalfields Limited, the owner of this project has already set-up an Environmental Cell headed by a General Manager at its H.Q. The cell provides necessary support that is required for Environmental Management of various projects and mines under the jurisdiction of the company. Further, to carry out Rehabilitation & Resettlement measures, a R&R cell has been already set-up by NCL at its HQs. The above cell is also headed by a General Manager.
- 7.3 Project Level :** The environmental activities of the Project are carried out by Environmental Cell at Project level headed by a SE (Env.), under the overall control of the Chief General Manager of the project. The objective of this Organisation is :
1. To implement environmental control and protection measures.
 2. Subsequent environmental monitoring of the efficacy of various control measures.
 3. Plantation/green belt development.
 4. Land restoration.
- 7.4 Environmental Monitoring and Control :** For effective implementation and mid term corrective measures (if required) monitoring and control of programme implementation is essential. For this purpose a time bound action programme for environmental management has been prepared.

The scope of environmental management includes plantation, surface drainage, industrial complex water treatment plant, air. water and noise pollution check etc.
