

ENVIRONMENTAL IMPACT ASSESSMENT

FOR

THE PROPOSED PARSA OPENCAST COAL MINE PROJECT OF 5 MTPA
AND PIT HEAD COAL WASHERY OF 5 MTPA IN A TOTAL AREA OF
1252.447 HA AT HASDEO-ARAND COAL FIELD IN DISTRICTS
SURGUJA & SURAJPUR (CHHATTISGARH)

EXECUTIVE SUMMARY

Project Proponent :



Rajasthan Rajya Vidyut Utpadan Nigam Limited (RVUNL)

Jaipur, Rajasthan

Environmental Consultant:

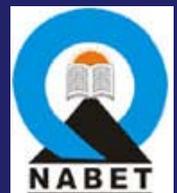


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(Approved Consultant)

July, 2017



0.0 EXECUTIVE SUMMARY

1.0 INTRODUCTION

Parsa opencast coal mine is located in northern fringe of Hasdeo-Arand coalfield of Surguja & Surajpur district, Chhattisgarh state which area about 290 km from Raipur and 150 km from Bilaspur on SH-2A.

Parsa coal block was allotted to Chhattisgarh State Power Generation Company Ltd. (CSPGCL) (erstwhile chhattisgarh state electricity board) by the Ministry of Coal vide F.No-13016/23/2006-CA-I dated 2nd August, 2006 for coal mining. The mine plan and mine closure plan (5 MTPA) was approved by Ministry of Coal vide letter no.- 13016/90/2006-CA-I (Part) on dated 19th May, 2014.

Meanwhile, Hon'ble Supreme Court of India through its Judgment dated 25th August 2014 & 24th September 2014 had cancelled the allotment of 204 coal blocks including Parsa Coal block.

Subsequently, block was allotted to Rajasthan Rajya Vidyut Utpadan Nigam Limited (RVUNL) vide vesting order No-103/24/2015/NA dated 8th September, 2015 to meet the coal requirement of their three thermal power projects in Rajasthan state.

Approval of Mine Plan and Mine Closure Plan issued to CSPGCL was transferred to RVUNL from the date of allotment.

RVUNL requested MoEF&CC for transfer of ToR dated 14th May 2013 issued to CSPGCL through several communications. In reply to the request, MoEF&CC vide its letter dated 06th September 2016, suggested to apply for fresh ToR.

Application for fresh ToR was submitted online (Proposal No. IA/CG/CMIN/59215/2016) on 27th September 2016.

Mine Plan & Mine Closure Plan (1st Revision) was approved by Ministry of Coal vide letter File No. 34011/24/2016-CPAM dated 10th November 2016.

ToR proposal was considered by the EAC in its 4th meeting held on 30-31 January, 2017, wherein proposal was recommended for ToR. Terms of References for EIA/EMP was issued by MoEF&CC vide letter no. No. J-11015/76/2016-IA.11 (M) dated 23rd March 2017.

1.1 Type of Project

The proposed project is a mechanised opencast coal mine having proposed capacity of 5 MTPA with a pit head coal washery of 5 MTPA throughput capacities. The washed clean coal will be supplied to RVUNL's thermal power plants by rail through pit head railway siding with silo & rapid loading system.

The opencast mining method will be adopted because of the following reasons:



- Out of the six established regional coal seams, there are three potential coal seams, namely Seam-IV (Dhajag seam), Seam-V (Morga seam) and Seam-VI (Ketma seam) in ascending order, persistent and occurring at a shallow depth in the northern part of the Parsa block;
- The average stripping ratio for opencast mining is 6.12 m³/t;
- The opencast mining operations ensure higher recovery of coal resource; and
- The mining by opencast method will be highly productive & economical as compared to underground method.

1.2 Justification for Implementation of the Project

The total installed power capacity available with Rajasthan Rajya Vidyut Utpadan Nigam Limited power stations is 5954.35 MW. RVUNL owns and operates thermal/gas/hydel power stations in the state sector as listed in **Table-1**.

TABLE-1
RVUNL-THERMAL AND HYDEL POWER STATIONS IN RAJASTHAN

Sr. No.	Power Stations	Installed Capacity (MW)
1	Suratgarh STPS, Suratgarh, District Shriganganagar	1500
2	Kota STPS, Kota	1240
3	Chhabra Thermal Power Station, Chhabra, District Baran (Unit 1, 2, 3 & 4)	1000
4	Kalisindh Thermal Power Station, Kalisindh, District Jhalawar (Unit 1 & 2)	1200
5	Dholpur CCPS, Dholpur	330
6	Giral Lignite TPS, Giral, District Barmer	250
7	Ramgarh Gas Thermal Power Station, District Jaisalmer	270.5
8	Mahi Hydel Power Station, District Banswara	140
9	Mini Micro Hydel Schemes	23.85
Total		5954.35

In order to meet the requirement of the State, RVUNL is making all possible efforts through expeditious construction of new units aggregating to 2640 MW capacity. Construction work of the following projects is in progress and the details are given in **Table-2**.

TABLE-2
RVUNL-UNDER CONSTRUCTION THERMAL POWER STATIONS IN RAJASTHAN

Particulars	Capacity
Suratgarh Supercritical Thermal Power Station Unit#7 & 8	1320 MW
Chhabra Supercritical Thermal Power Station Unit#5 & 6	1320 MW
Total	2640 MW

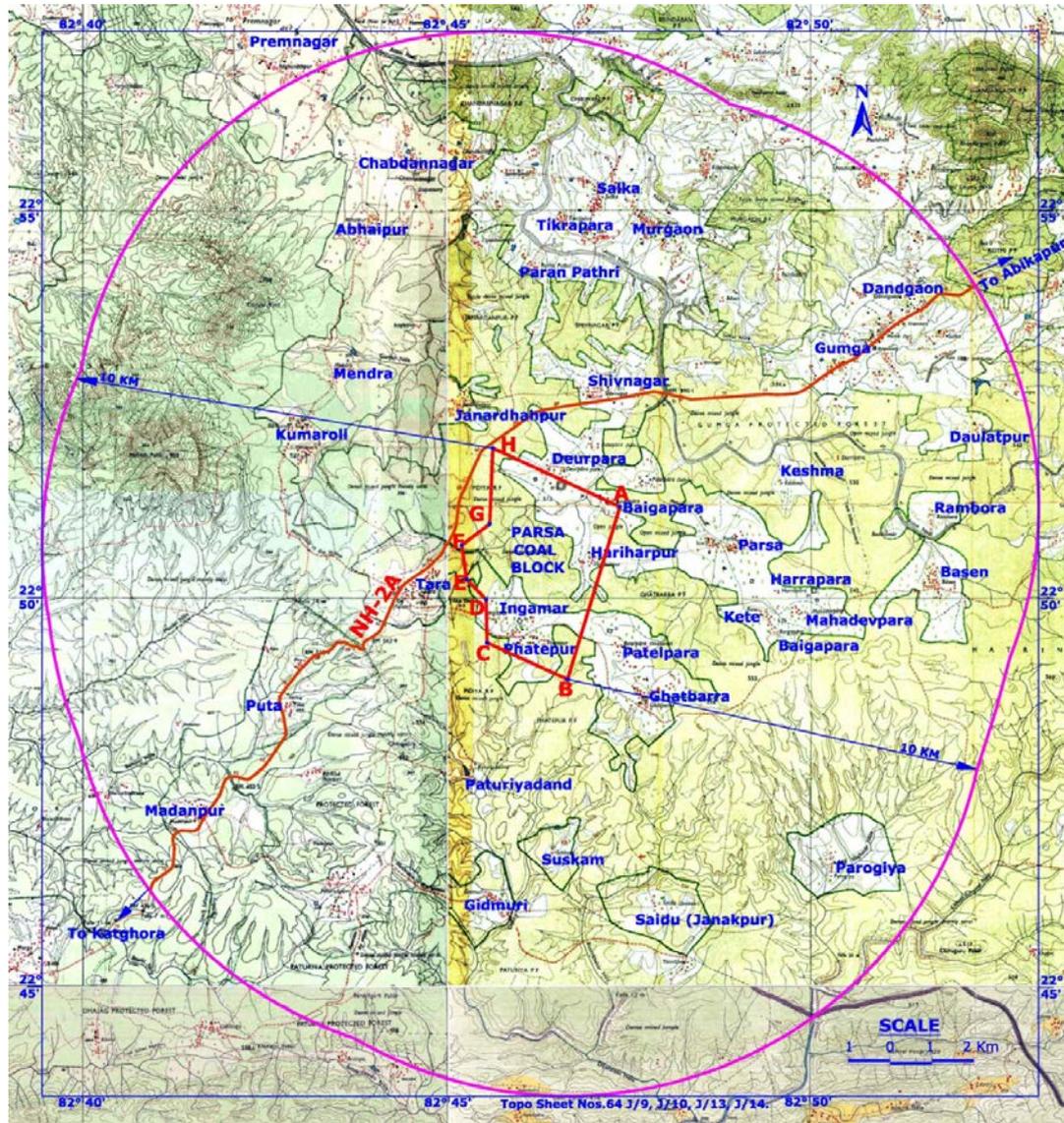
In view of the above, the proposal of augmentation in capacity for coal mine with coal washery project is considered justified from basic raw material requirement considerations.



1.3 Environmental Setting

The study area covers 10 km radius around the proposed mine lease area. The study area of proposed mine is shown in **Figure-1**. The environmental setting of the proposed mine site is as follows:

- The proposed mine lease area is located between from Latitude $22^{\circ}48'57.01''N$ & $22^{\circ}51'56.85''N$ and Longitude $82^{\circ}45'10.50''E$ & $82^{\circ}47'22.86''E$;
- The proposed ML area is at a distance of 1.9 km from Atem Nadi. Site elevation is about 505 m to 559 m above MSL;
- Present land use is industrial use;
- There are no ecological sensitive locations, archaeological monuments, places of tourist interests and defence installations within 15 km radius;
- There are 14 protected forests and 1 reserve forest block within 10 km radius.



CO-ORDINATES OF PARSA COAL BLOCK

- A** : 22° 51' 11.58" N, 82° 47' 22.86" E
- B** : 22° 48' 57.01" N, 82° 46' 38.33" E
- C** : 22° 49' 25.25" N, 82° 45' 30.68" E
- D** : 22° 49' 58.92" N, 82° 45' 30.26" E
- E** : 22° 50' 14.70" N, 82° 45' 14.32" E
- F** : 22° 50' 41.58" N, 82° 45' 10.50" E
- G** : 22° 50' 57.73" N, 82° 45' 33.97" E
- H** : 22° 51' 56.85" N, 82° 45' 37.52" E

**FIGURE-1
STUDY AREA MAP**



2.0 PROJECT DESCRIPTION

2.1 Salient Features of Coal Mine

The salient features of coal mine and coal washery are given below in **Table-3** and **Table-4**.

TABLE-3
SALIENT FEATURES OF THE COAL MINING PROJECT

Sr. No.	Description	Details
1	Total project area	1252.447 ha
2	Mine lease area (applied)	1252.447 ha
3	Type of mine	Opencast mechanized
4	Method of mining	Shovel-dumper for over burden removal and Surface miner for coal mining
5	Rated capacity of mine	5.0 MTPA
6	Expected life of mine	45 years including 3 years of construction period
7	Average stripping ratio	6.12 m ³ /Tonne
8	Geological reserves	256.40 Million Tonnes
9	Mineable reserves	200.41 Million Tonnes
10	Thickness of coal seam range	Seam IV – 6.64-9.67 m Seam V - 2.26-7.97 m Seam VI – 0.78-2.70 m
11	Average no. of working days	330 days/year
12	Number of shifts	3 shifts/day
13	Working hours/shift	8 hr
14	No. of benches	3 nos
15	Bench height for OB	6-10 m
16	Bench height for coal	10 m or as the parting thickness
17	Ultimate depth of mine	275 m
18	Overburden to be generated during entire life of mine	1227.19 million m ³
19	Capacity of Washery	5 MTPA washery
20	Hourly Throughput capacity	950 TPH design
21	No. of Annual working Hours	6000 hrs
22	Washing Technology	Wet washing process
23	Modular details	Single module of 5 MTPA
24	Plant Process	Wet process comprising of crushing, screening, washing and material handling
25	No. of waste dumps planned	2 internal and 2 external dumps
26	Area of waste dumps	Total internal dump area: 1059.092 ha Total external dump area: 64.084 ha
27	Coal handling plant (CHP)	1000/1250 TPH capacity
28	No. of crushers	2 Nos.
29	Power requirement	5-7 MVA at 33 kV from nearest sub-station
30	Total Water requirement for mine & washery	2385 m ³ /day
31	Transport of coal from mine face to CHP	By belt conveyors

Source: Mine Plan



TABLE-1.4
SALIENT FEATURES OF THE COAL WASHERY PLANT

Sr. No.	Description	Details
1	Capacity	5 MTPA
2	Hourly Throughput capacity	950 TPH
3	No. of Annual working Hours	6000 hrs
4	Washing Technology	Wet washing process
5	Plant Process	Wet process comprising of crushing, screening, washing and material handling
6	Land Requirement	13.586 ha
7	Water Requirement for washery	1086 m ³ /day
8	Source of Water	Mine discharge.
9	Power Requirement & source	Power requirement (5-7 MVA) will be met from the nearest Substation.

Source: Project Report, RVUNL

3.0 BASELINE ENVIRONMENTAL STATUS

The baseline data monitoring studies have been carried out for three months covering pre-monsoon season 2017 (1st March 2017 to 31st May 2017).

3.1 Soil Quality

Eight soil samples were collected and analyzed in and around the mine lease area to assess the present soil quality of the region. The pH of the soil indicates that the soil is slightly acidic to slightly alkaline in nature. The nitrogen concentration was observed to be in the range of very less to less category. Phosphorous concentration was observed to be in the range of medium to average sufficient quantities. Potassium concentration was observed to be in the range of very less to less quantities category. Based on the results, it is evident that the soils are not contaminated by any pollution sources.

3.2 Meteorology

Meteorological data at the site was monitored during March to May 2017 representing pre-monsoon season of 2017. It was observed that during study period, temperature ranged from 18.3^oC to 44.8^oC and the relative humidity recorded in the range of 28% to 67%.

3.3 Ambient Air Quality

Ambient Air Quality Monitoring (AAQM) was carried out at 10 locations with a frequency of two days per week for three months during pre-monsoon season of 2017. The minimum and maximum values of PM₁₀ were observed in the range of 31.8-61.5 µg/m³ and values of PM_{2.5} was observed in the range of 20.0-32.3 µg/m³. The results thus obtained indicate that the concentrations of PM₁₀, PM_{2.5}, SO₂, NO_x and CO in the ambient air are well within the National Ambient Air Quality (NAAQ) standards for residential and rural areas.



3.4 Water Quality

To assess the physical and chemical properties of water in the region, water samples seven ground water and five surface water locations were collected and analysed from various water sources around the project site.

Ground Water

- The analysis results indicate that the pH ranges in between 7.1 to 7.4, which is well within the specified standard of 6.5 to 8.5;
- Total hardness was observed to be ranging from 52 mg/l to 94 mg/l;
- Chlorides were found to be in the range of 11.5 mg/l to 38.3 mg/l;
- Sulphates were found to be in the range of 4.3 mg/l to 18.9 mg/l;
- The Total Dissolved Solids (TDS) concentrations were found to be ranging in between 110 mg/l to 210 mg/l); and
- Iron is found in between 0.02 mg/l to 0.30 mg/l and zinc found 0.02 mg/l to 0.16 mg/l.
- The ground water does not indicate any external industrial contaminations.

Surface Water

- The analysis results indicate that the pH values were found to be 7.6 to 7.9;
- DO was observed to be in the range of 5.3 mg/l to 5.9 mg/l. The TDS was observed in the range of 92 mg/l to 120 mg/l;
- The chlorides and sulphates were found to be in the range of 9.4 mg/l to 16.1 mg/l and 4.8 mg/l to 9.3 mg/l, respectively;
- Total hardness expressed as CaCO₃ ranges between 46 mg/l to 64 mg/l; and
- The calcium & magnesium were found to be in the range of 9.8 mg/l to 12.6 mg/l and 5.2 mg/l to 7.8 mg/l, respectively. Iron values are found between 0.02 – 0.12 mg/l and zinc is found between 0.01 – 0.05 mg/l.

3.5 Noise Levels

Ambient noise levels were measured at ten locations around the project site. The daytime and night time noise levels in all locations were observed to be within the permissible limits.

3.6 Ecological Environment

From the primary survey and as per forest department records and review of literature, there are no sanctuaries, national parks, biosphere reserves in the study



area. 5 sampling locations were selected for Terrestrial Ecological Samples & Two Locations for aquatic sampling.

There are no endemic, endangered species having habitat in the core zone of the study area. There are 3 Schedule-I species (one mammals and two avi-fauna) in buffer zone. Rest of the species is recorded in Schedules of II, III, IV and V of Indian Wildlife (Protection) Act, 1972. The wildlife conservation plan has been prepared and approved.

Among reptilian in the study area are belongs to Schedule-IV of the Indian Wildlife (Protection), Act, 1972.

The study area is fragmented owing to the anthropogenic pressures and the floristic diversity and faunal diversity of the study area enumerated. There are no rare and endangered species of flora & fauna in the core zone/mine lease area.

3.7 Social Environment

The study area (10 km radius) area has a total population of 35179 according to 2011 census. Total male population is about 50.70% and total female population is around 49.30%.

4.0 ANTICIPATED ENVIRONMENTAL IMPACTS AND MITIGATION MEASURES

The opencast mining operations involve development of benches, approach roads, haul roads, excavation and handling followed by waste materials. The environmental impacts due to the proposed mining and washery project, associated activities like drilling, blasting, overburden, loading, overburden & coal transportation and coal beneficiation have been assessed and adequate management plan has been developed to mitigate the impacts.

4.1 Air Quality

The opencast mining includes drilling, blasting, loading activities, waste dumping, washery and vehicular movement etc. These activities are likely to contribute predominantly additional particulate matter and oxides of nitrogen. The existing baseline concentrations of pollutants are within the limits prescribed by CPCB. Further, the resultant concentrations of opencast mining methods and surface transport will be within the permissible limits.

The air quality management measures, which will be implemented during operation of mine are as follows:

- Wet drilling and controlled blasting;
- Dust suppression on haul roads, stack yard and other open surfaces;
- Stationary water sprinkling on permanent haul roads and workshop;
- Regular maintenance of HEMM; and
- Greenbelt development along the mine lease boundary, OB dump areas and colony.



Regular monitoring for air quality within the lease area and other adjoining areas will be carried out and the monitoring reports will be submitted to SPCB and MoEF&CC, Regional office.

4.2 Noise Levels and Ground Vibrations

With the mining operations, due to machinery, drilling and blasting for OB removal, excavation, transportation and crushing of coal, it is imperative that noise levels would increase. Mathematical modeling has been carried out and it was found that the high noise levels will be confined to the mining areas only and the nearby villages and other community areas will not likely to have any major adverse impact as noise levels will attenuate with distance.

There are no human settlements within the mine lease area. Further, blast vibration studies have been carried out. As per the recommendations, blasting parameters such as burden, spacing, charge per delay, sub-grade drilling is being maintained. Controlled blasting techniques like use of NONEL and Site Mixed Slurry (SMS) is being followed to minimize the noise and vibration. These types of practice will be implemented during the operation of mine. Further, all the operator cabins in HEMMs including dozer and drill will be made air tight and air conditioned. Acoustic enclosures will be provided in the DG sets. All the workers will be provided with ear muffs.

Further, green belt will be developed around the mine lease area, washery, along the OB dump areas and in the colony acts as noise attenuator.

4.3 Water Resources

About 2385 m³/day of water will be required for mine and coal washery and will be sourced from mine dewatering. Adequate drainage systems will be planned in the mining, service center for allowing the water to flow in the pre-determined path. The drainage system will be designed in such a way even to meet excess rainfall. No water will be allowed to flow across the waste dumps. However, few check dams will be constructed to arrest wash out from the waste dumps during rainy season. All along the mine roads drainage will be provided and benches will be properly sloped so as to avoid stagnation of water. Moreover, washery plant is envisaged to adopt water reclamation system with zero discharge to outside water bodies. The requirement of make-up water is greatly reduced due to provision of water re-cycling. Thus there is no scope of any impact on water quality due to the operation of the proposed coal washery.

With the above measures no adverse impact is envisaged on the surface water quality in proposed coal mine & pit head washery.

4.4 Soil Environment

The environmental impacts of the mining activities on topsoil are based on the quantity of removal of topsoil and its dumping. The topsoil will be temporarily store and it will be used for plantation schemes, no impact of dozing of topsoil is envisaged. No waste rock generation will be involved.



4.5 Solid Waste

The total volume of OB has been estimated as 1227.19 M m³. The OB removed during initial years will be placed beyond the incrop of the Seam-IV. The total volume of external dump has been estimated as 21.02 M m³ solid. Rest of the OB will be placed in internal dumps.

The internal dumping will start when about 100 m space is available on quarry floor. By adopting the proposed sequence of mining, as the quarry advances, the amount of internal dump will increase as more space for the internal dumping is created. For external dumps no additional land will be required outside the block boundary. External dump will be accommodated inside the block boundary. Two external dumps, in that west and external dump east has been proposed on the north western and north eastern side of the block boundary respectively. Two internal dumps in that west and external dump east has also been proposed.

There will not be any internal dump till 2nd year of mine operation. It is proposed to start internal dumping from 3rd year of mine operation. As the gradient of the seam is flat, during working of the quarry substantial amount of OB will be accommodated in internal dump. During 3rd year of mine operation, 1.16 M m³ of OB will be accommodated in internal dump and remaining 11.44 Mcum of OB will be accommodated in external dump. From 4th year of mine operation, no external dumping will be required. Hence, OB will be accommodated in internal dump for rest of the mine life.

4.6 Flora and Fauna

As the mining activity is restricted to the core zone, no significant impact on the flora of the buffer zone due to the proposed mining is anticipated. With afforestation on overburden dumps and proper management of forest and development of greenbelt around the mine, the aesthetics will be adopted. There are no endangered flora and fauna species within the core area.

4.7 Socio-Economic Aspects

The development activities needs to be taken up based on the requirements of the people in the area, The basic requirement of the community needs to be strengthened by extending health care, educational facilities developed in the township to the community, providing drinking water to the villages affected, building/strengthening of existing roads in the area.

The preference will be given to the local population for direct and in-direct employment. The proposed mine may create opportunities for indirect employment in the field of vehicle hiring, labours, trading of construction material, carpenters etc. This will be help in improving the socio economic status of the region. Total employment potential of the project is 768 persons after achieving full production capacity.



5.0 **BUDGETARY ALLOCATION FOR ENVIRONMENTAL PROTECTION**

The details of investment for procuring the equipment for efficient control and monitoring of pollution along with annual recurring cost are given in **Table-5**.

TABLE-5
COST OF ENVIRONMENTAL PROTECTION MEASURES

Sr. No.	Particulars	Proposed Cost (Rs. Lakhs)	
		Capital	Recurring
1	Dust suppression	133	17.6
2	Water quality monitoring & management	44.5	4.5
3	Air quality and noise monitoring	8.8	4.4
4	Greenbelt / Plantation	311	620
5	Wildlife conservation	1216	20
6	Reclamation	801.3	0
	Total	2514.60	666.50

6.0 **PROJECT BENEFITS**

The employment of local people in primary and secondary sectors of project will upgrade the prosperity of the region. This will in-turn improve the socio-economic conditions of the area. The total manpower required for the proposed mining under various categories is 768 persons and persons will be mainly sourced from local community in and around mining project and a few technical persons will be employed during operational phase from local and also from outside area. In addition to the above, contractual labour and indirect employment opportunities will also be getting benefited after commissioning of mining project.

Thematic Areas of CSR Activities: With the aforesaid policy on CSR in view, the CSR programs under this project have been developed in the following thematic areas:

- Rural Infrastructure development
- Health & Sanitation;
- Education;
- Skill and entrepreneurship development; and
- Livelihood Development & farmers productivity.

The five year budget break-up of CSR activities is given in **Table-6**.

TABLE-6
FIVE YEAR BUDGET BREAK-UP OF CSR ACTIVITIES

Sr. No.	Head	Budget Year (Rs. in Lakhs)				
		First Year	Second Year	Third Year	Fourth Year	Fifth Year
A)	Recurring	50.70	101.40	169.00	169.00	169.00
B)	Non-Recurring	24.30	48.60	81.00	81.00	81.00
	Grand Total	75.00	150.00	250.00	250.00	250.00



7.0 CONCLUSION

The proposed opencast coal mine project and coal washery will have impacts on the local environment but with proper mitigation measures with the effective implementation of the environment management measures as suggested in the EIA/EMP report and as recommended by MoEF, CPCB and State Pollution Control Board, the negative impacts will be minimized to a great extent. However, development of this project has beneficial impact/effects in terms growth in regional economy, transform the region's economy from predominantly agricultural to significantly industrial, increase Government earnings and revenues and accelerate the pace of industrial development in the region.

The proposed mine will provide direct employment to a large number of personnel. This project will also generate indirect employment to a considerable number of families, who will render their services for the employees of the project.

The project will also encourage ancillary industries in the region, which will not only increase the employment potential but also the economic base of the region will be further strengthened.

Thus, in view of considerable benefits from the project, the proposed mine & pit head coal washery is most advantageous to the region as well as to the nation.