EXECUTIVE SUMMARY

1.0 INTRODUCTION:

M/S JINDAL POWER LIMITED (JPL) commenced mining operations in its IV/2 & IV/3 sub blocks in Gare Pelma area, Chhattisgarh State, in May 2006, after obtaining all statutory clearances including environmental clearance from MOEF for its 5.25 MTPA opencast mine. The entire coal produced from this mine will feed the 1000MW (4 x 250MW) Thermal Power Plant which is located about 9.0 km away from this mine.

To meet the increased coal demand due to higher ash content in coal Seam VII & VIII and also to mine the lower seams by underground method, in the same mine lease area as per the directive of Ministry Of Coal, JPL, proposes to scale up the total production from this block to 6.25 MTPA consisting 5.50 MTPA from the existing 5.25 MTPA opencast mine and 0.75 MTPA from a proposed underground mine for lower seams. Besides, a coal washery of 800 TPH was also proposed for washing the high ash VII & VIII Seam Coal within this mine lease area.

All the changes are confined to the existing mining lease area of 964.65 hectares and no additional land is involved.

As per statutory stipulations of Ministry Of Environment & Forests (MOEF), EIA/EMP report is prepared for the Integrated Opencast and underground mine having a total enhanced production capacity of 6.25 MTPA from 5.25 MTPA sanctioned opencast mining capacity and a coal washery of 800TPH capacity located within the same mine lease area in line with the approved TOR of MOEF vide their letter noJ-11015/288/2007-IA.II(M) & No. J- 11015/253/2007 – IA.II(M) dated 22-8-2007 respectively. Salient aspects are given in this report.

1.1 PROJECT SETTINGS:

a)	Location	Mand Raigarh coal fields, Raigarh district, Chhattisgarh State latitude $22^0$09'15" N and $22^0$05'44"N and Longitude $83^0$29'46"E and $83^0$32'32" E
b)	Climate	Tropical
c)	Total mine lease area	964.65 Ha. This area has already been obtained for opencast mine and no additional area is involved.
d)	Type of land	Mostly private (Land is already in possession)
e)	Forest land	48.20 Ha. (forestry clearance already obtained)
f)	Vegetation	Bushes and shrubs
g)	Habitation	Nil
h)	Nearest habitated village	Kosumpali and Sarasmal
i)	Water courses in the area	Kelo River on the western part of the block. Bendra nala partly within the block which discharge its water into Kelo River.
j)	Sensitive zones like National parks, Bio reserves, Tourist spots, historical monuments etc. nearby	Nil
k)	Other industries in the area	Existing Gare IV/I opencast mine of Jindal Steel and Power and Gare IV/5 underground mine of Monnet Ispat.

2.0 PROJECT DESCRIPTION:

Name of the project	Gare IV/2 & IV/3 Integrated Opencast and Underground Coal mines for enhancement of mine capacity from 5.25 MTPA to 6.25 MTPA and setting up of 800 TPH coal washery
Production	6.25 M.tes/year (Initially fully from Opencast mine till complete development of underground mine. From fifth year onwards 5.5 M.tes/year from opencast and 0.75 M.tes/year from underground mine) A coal washery of 800TPH for washing coal from seams VII and VIII.
Method of Mining	Mechanized Opencast and Underground mine
Equipment deployed Opencast Mine Underground Mine Coal washery	3.5 cum Hydraulic Shovel with 14 Tonne Rear Discharge Dumpers for OB. Subsequently, higher capacity machinery will be deployed in high stripping ratio areas. Side Discharge Loader (SDL)/Load Haul Dumpers (LHD) with chain conveyors. Belt transport in gate roadways and trunk roadways, ventilator fan. Heavy Media Cyclone
Water requirement & Source	1790 M3/day. water for industrial purpose will be from mine sump water and ground water will be drawn only for domestic use.

2.1 OPENCAST MINE:

The opencast mining details are summarized below:

Gradient of Seams	2^o to 3^o
Number of faults	1
Geological Sectors	6
Net Geological reserves (Mt)	217.747 (O.C.) & 67.97 (U.G.)
Extractable Coal reserves (Mt)	195.0 (O.C.) & 27.19 (U.G.)
Quality of Seams (Grade)	Seam X- G Seam X A- F Seam IX - F Seam VIII-G Seam VII – G - UG Seam IV-F Seam III -E Seam II-D
Initial quarry depth (m). Maximum quarry depth (m).	10 155 (East quarry) : 115 (West quarry)
Annual Coal target (Mt.)	5.50 (O.C.) & 0.75 (U.G.)
Annual O.B. target (Mm^3)	19.31
Manpower	700 (O.C) & 1200 (U.G.)
Average Stripping Ratio (m^3/t)	2.88
Total Volume of overburden including access trenches (Mm^3) Volume of External Dumping (Mm^3) Volume of Internal Dumping (Mm^3)	564.80 20.00 (3.56%) including embankment etc. 541.00(96.44%)
Quarry Area (Ha) at Surface	866.25
Backfilled Area (Ha)	836.25
Void (Ha)	30
External OB Dumps Area (Ha)	48.40
Top soil Dumps Area (Ha)	10.00
Life of the Project	35 years including development and closure

2.2 UNDERGROUND MINING :

Seams IV, III and II, located about 80 m. to 112 m. below the floor of the opencast mine, will be worked by underground mining. The proposed underground mine will be worked below active working of mechanized opencast quarries with a parting of 80 to 112 m. between floor of opencast mine and roof of topmost coal seam below ground. The proposed mine will be designed for a production capacity of 0.75 MTY.

For extraction of reserves, semi mechanized Bord and Pillar system in preference to longwall system will be adopted considering lower capital requirements and other techno-economic considerations. Side discharge loaders/load haul dumpers with chain conveyors, belt transport in gate roadways and trunk ways, etc will be the configuration of machinery proposed. Continuous miners with shuttle cars in lieu of SDL/LHD could be considered by way of full mechanization, after complete study of floor and roof conditions and if it is warranted, for greater production, better supervision and improved safety standards.

2.3 COAL WASHERY :

Coal from Seam VII and VIII need washing to bring ash content below 40%. Capacity of the washery is 800 TPH. Major plant and machineries will be desliming screens, heavy media cyclones, thicknening cyclones, etc. The washery rejects will be backfilled into the de-coaled areas of the mine. The washery has been designed for close circuit washing system having zero discharge.

3.0 EXISTING ENVIORNMENTAL SCENARIO :

The environmental scenario with regard to various environmental components like socio-economic status, ambient air quality, noise levels, water quality, flora/fauna status, land use pattern, etc. have been assessed in detail. For the purpose of the study

the area is divided in to 2 zones namely core zone covering the total mine lease area and the buffer zone covering 10kms from the periphery of the core zone.

The brief details are as below:

3.1 SOCIO ECONOMIC STUDY:

The proposed enhancement will be done in the already sanctioned mine lease area of 964.65 Ha. This land is in JPL' s possession. No additional land is required and as such no rehabilitation or resettlement is involved.

Socio-economic data of buffer zone within 10 kms around core zone Mining lease area, are summarized below :

Total population	-	67170 (Male-49. 97% and Female -50.03%)
Schedules caste population	-	6401 (9.53% of total)
Schedules Tribes	-	32738 (48.83% of total)
Literacy rate	-	59.86%
		Males (34.56%)
		Females (25.30)
Main workers	-	35.72%
Marginal workers	-	14.60%
Non-workers	-	49.68%

Elaborate details for above are given in PARA-3.2, etc.

3.2 AMBIENT AIR QUALITY :

Eight ambient air quality-monitoring stations were selected based on the site selection criteria and monitored during summer 2007 season. Besides, regular monitoring in 3 core zone and 5 buffer zone locations are also being carried out. The results of the Ambient Air Quality data for SO_2, NO_x TSPM & RPM show that, the all the existing Ambient Air Quality monitoring results for SO_2, NO_X, TSPM, RPM & CO are within the prescribed CPCB limits.The CO values were Below detectable limit.

On critical evaluation of the latest monitored data of summer 2009 vis –a vis full summer season 2007 data it was observed that there is only marginal increment in the values of air quality parameters in spite of full fledged mining operations being carried out for the last couple of years. Even with this slight increase, the values are within the permissible limits which is achieved by implementation of various mitigative measures in the mines.

3.3 WATER QUALITY:

Five water-sampling locations were selected for collection and analysis in Summer 2007. Being a working mine, as a part of regular monitoring, 6 water samples comprising 4 ground water and 2 surface water samples are collected and monitored periodically. Analysis of all the water samples show that they are found in conformity with the IS:10500 standards.

3.4 NOISE LEVEL:

Seven locations were selected for measuring the noise levels during summer 2007 season . As a part of regular monitoring noise measurement were done at 8 locations within the mine lease area. The noise levels in all the observed locations are within the limits prescribed under Environment protection rules 1986 and also Guidelines for permissible noise for industrial workers laid down by CPCB.

3.5 SOIL QUALITY:

Results of the soil samples show that in all the 3 locations the pH of the soil is normal. Soil samples are generally sand clayey and loamy type. The organic matter of the collected soil samples vary from very low to high in nature. The micro nutrient status of all the samples are on the higher side

3.6 BIOLOGICAL ENVIRONMENT:

The premining biological environment in the core zone area depicted mostly un irrigated dry cultivated land with many barren patches, with forest lands amounting to 48.20 Ha. Main tree species in the area consists of Sal, Tendu, Mahua, Palas, Neem, etc. The dominating species area Mahua and Sal. Paddy and Tur Dal are main crops. Besides, trees like Mangifera indica, acacia, Teak, Silver ok, Gulmohar etc

However, this scenario has changed with extensive greenery due to intensive plantation programme of JPL, to the tune of more than 1,66,000 trees with dominant species like Mango,Acacia,silver oak,Aejun,Gulmohar etc.

About 45% of the buffer zone area is under forest cover. The forest of the study area as per revised classification of India Forest types belongs to sub group 5B/C1 (Northern Tropical Dry Deciduous Sal Bearing Forests) and 5B/C2 (Northern Tropical Dry Mixed Deciduous Forest). Within the buffer area, there are plenty of trees because of good soil, partly flat land and sufficient rainfall. The forest is humid and always full of green grass. Because of the cultivation done by local farmers, thinning of forest has been observed. Protected forests are having medium dense vegetation but the Tolge Reserved Forest is comparatively denser.The main species existing in the forest are Sal, Tendu, Mahua, Palas, Neem etc. The height of the dominant trees ranges from 6m to 12m.

3.7 HYDROGEOLOGY:

The pumping tests have shown a low value of transmissivity of aquifer present in the area (16.24 m2/day) resulting in moderate radius of influence (448.66 m). The annual seepage of ground water at the end of 30 years of mining has been worked out

as 1.778 MCM which is hardly 4% of annual ground water resource. No adverse impact on ground water is anticipated on account of mining activity. Besides, there exist good prospects of artificial recharge to ground water through rain water impounding in the void.

The quantum of rain water accmulated in the mine sump, will alone be sufficient to fulfill the need of entire mining activity.The diversion of Bendra nala is planned in such a way that there will be proper flow without causing any hindrance to the users and as such there will not be any impact due to diversion.

3.8 LAND USE:

Out of 964.65 hectares of mine lease area, 859.498 hec, are tenency lands, 56.944 hec. are government land and the remaining 48.208 hec. are Forest land. No additional lease area is involved other than the existing 964.65 hectares of land already under lease for the existing opencast mining operation, as the underground mining operation and the coal washery is proposed within this area itself.

In the buffer zone, the Reserve forest covers 140.87 sq.km i.e. about 30% of the total area of the buffer zone. This forest is categorized under group 5 (Tropical Dry Deciduous Forests) as per the Indian forest classification of Champion and Seth.The above mentioned forests is mainly of sal type, Where the soil is derived from the parent rock. Soil is invariably deep sandy loam, brownish in colour and conductive to excellent growth of sal.

4.0 IMPACT PREDICTION AND MITIGATION MEASURES :

As already mentioned, Opencast mining operations in Gare IV/2 &IV/3 sub

blocks are in progress since May 2006 smoothly & efficiently and has been catering to the fuel needs of the captive power plant.

Due to multifarious environmental control and mitigative measures which have been planned meticulously and being implemented during the present opencast mining operations in this block, specifically, application of dry fogging system to suppress dust near CHP, prevention of fine dust getting air borne by spraying water on the dust generation points, creation of extensive green barriers along the roads, around mines, waste dumps and around buildings, Pipe conveyor system for transportation of coal from mine to the TPS etc, the existing environmental status is so far devoid of any adverse impacts. This is amply supported by the fact that the latest observed/ measured values of all the environmental components are within the permissible / acceptable limits. Further it is relevant to mention here that in appreciation of adopting good environment and safety management , JPL has received the following awards in the Mega mining category in the annual safety celebrations of 2008.

- First prize in dust suppression
- First prize in safety management
- Special prize in coal haul road maintenance and transportation of coal.

This is a testimony of the laudable corporate policy of JPL in the sustainable development of the region.

However, it is relevant to mention here that this Integrated Opencast and underground mine with the enhanced production capacity of 6.25 MTPA from 5.25 MTPA sanctioned opencast mining capacity and a coal washery of 800TPH capacity to be located within the same mine lease area is not likely to cause any significant impact on the environment due to the following factors:

- No additional mine lease area is involved or further land degradation will be caused.
- Increase in opencast mining production is only very marginal. (i.e from sanctioned 5.25 MTPA to 5.50 MTPA). This can be easily achieved by slight increase in number of working days or improvement of operating efficiency.
- The proposed UG mine output is only 0.75 MTPA and that too from coal seams occurring more than 100m below the opencast mine floor. Hence environmental impact is insignificant which is normally so in the case of UG mines. The CHP already constructed and the pipe line conveyor already laid from the mine to the power plant can easily accommodate this additional load as the system has got designed inbuilt surplus carrying capacity.
- Coal washery adopts eco friendly wet process with zero discharge of water / effluents.

It is envisaged that due to above factors and continuation of various effective mitigative measures as explained earlier, there will be no major impact on environment due to the proposed enhancement.

4.1 LAND ENVIRONMENT :

The present land use and the during mining land use is given below:

In Ha.

S. No	Land use category	Present	End of mine life
01	Mining	206.0	866.25
02	External dump	28.40	48.40
03	Embankment	30..00	30.00
04	CHP, Washery &other Infrastructures	15.00	15.00
05	UG mine entry &Infrastructures	5.00	5.00

06	Others	680.25	-
	Total :	**964.65**	**964.65**

The effect of land degradation due to overburden extraction and dumping can be considerably reduced by planned excavation, high dumping of overburden and systematic backfilling. Infact till March 09, out of 20.39 MM3 of waste removed, 12.0 MM3 is dumped externally over an area of 28.40 Ha. and the remaining 8.39 MM3 is dumped internally in the mined out area.

By systematic and sequential backfilling / reclamation, greenery development etc the land degradation will be kept to the absolute minimum .

As far as open cast mine area is concerned, out of the total quantity of 561.60 MM^3 of solid waste generated from the opencast mine, 20MM^3 (3.56%) will be dumped externally in the external overburden dumps and the embankments and the remaining 541.60 (96.44%) MM^3 will be back filled in the mined out voids. In additional to this about 1.76 MTPA of rejects generated from the coal washery and about 0.15 MTPA of fly ash generated in the power plant also will be filled in the mined out void.

In terms of area, out of the total mine area of 938.0 Hect, by systematic reclamation, about 908Hect. of mined out land will be backfilled and reclaimed with greenery and the remaining 30.0 Hect. will remain finally as void / water body.

Besides, ultimately there will be an external overburden dump created in an area of 48.40 hect. This dump will be of 60-m high. The overall slope angle will be < 28^o**.** The external dump is selected in the non-coal bearing area only. This would be suitably carpeted with topsoil and vegetation growth provided to improve the ecology of the surroundings.

As for as subsidence in underground workings, ,as underground workings will be below the already worked opencast mine areas, the effect of subsidence will be felt only in backfilled opencast mine area and not surrounding areas.

4.2 SOCIO-ECONOMIC FACTORS :

The ongoing project operations have already bestowed positive impacts in the region on the employment arena as well as on physical and social infrastructural status. Many other tangible benefits have been gained by the local population in the surrounding areas due to ancillary units, trading operations, contractual needs, casual labor, green belt development, etc. Financial gains has also been derived by State and Central Governments due to collection of royalties, cess, taxes, etc.

As a part of corporate social commitment and philosophy, Jindal Power Limited strongly believes that the overall sustainable community development around its project areas is an essential duty and objective of the organization. The company has its objectives in this connection for overall improvement in quality of life and inclusive growth of the local community in all spheres, such as education, medical aspects, training schemes, improvements in infrastructure and civic amenities, etc.

Accordingly, for the Tamnar site, where the company is having mines and power plant, the company has selected 32 nearby village of the project for continuous monitoring and improving their living standards through constant review and are offering financial help for various social welfare measures. Facilities like Sarva Siksha Avhiyan, continuing education, Anganbadi, Balwadi, adult education, furniture distribution to schools, encouragement of sports activities, etc. are continuously being extended to the nearby communities, as above by the company, which financially supports a Samithi

called **OP JINDAL SAMAJ KALYAN SAMITI** (OPJSKS) for enforcing all above social welfare measures, around the TAMNAR Block in Raigarh District.

As these welfare schemes and socio economic upliftment measures will be continued in full earnest even after the proposed enhancement of the mining project , it can be confidently stated that this project influence on the environment will certainly be on the positive side creating an harmonious blending of industrial prosperity and environmental protection.

4.3 BIOLOGICAL ENVIRONMENT :

Substantial green belt development has already been initiated and will be further carried out during the course of mining in Gare-Pelma area in areas such as periphery of Mining lease, along roads, around infrastructures, on backfilled and external dump areas, etc. M/s.Jindal Power Limited has already carried out extensive green belt in the mine, Power Plant and nearby villages to an extent of more than 17 lakh plants till September 2009, in the area. In this mine project about 1,66,000 plans are planted.

5.0 ENVIRONMENTAL MONITORING PROGRAMME :

In this ongoing project, appropriate environmental monitoring programme is already in place. A full fledged Environment Management Department (EMD) exists with multidisciplinary team of professionals, ,technical staff and all necessary infrastructure including Lab.

Regular, systematic and sustained programme schedules for implementation and monitoring of various control measures are devised with clear cut guidelines of various

concerned plans for keeping a continuous surveillance on the various environmental quality parameters in the area.

M/S.JPL has already constituted a full fledged Environment Department for effective monitoring and implementation of control measures. A full fledged laboratory under the Sr. Chemist of EMD Cell for analytical works for determination of various environmental parameters like Ambient Air, Water Quality, Noise, Vibration is being maintained, well equipped with all necessary instruments and supporting systems.

Prompt and timely actions, based on monitoring results, will ensure that the environmental status in the area will be within statutory limits.

6.0 CONCLUSION ;

The ongoing project operations have already brought about substantial positive impact locally, especially in the socio economic front. Conclusively it can be stated that the enhanced mining project and coal washery operations will further bestow positive and tangible benefits both at Macro and Micro levels in various spheres like local community development prospects, enhanced employment opportunities, increased power generation at 1000 MW from linked Power Plant, improvement in GDP growth rates, in Industrial Production, in agricultural sector output, and in infrastructural sector growth. The project operations has already and will further greatly improve the life style and living standards of the entire tribal and scheduled caste population of the surrounding area. This is corroborated by the fact that M/s.Jindal Power Limited has already undertaken excellent social welfare improvement schemes by adoption of 32 villages, adjacent to their project areas. Well planned social upliftment of the lowest rungs of the society, and achieving overall growth in all spheres of their life, such as medical, educational, training and communicational facilities, is very laudable corporate

policy of JPL and the same can definitely be expected in this proposed enhancement project culminating in an excellent environmental management .

Besides, various welfare schemes formulated and being implemented by JPL proves to be a tremendous boon to the local population on socio economic front .

* * * * * * * *