# EXECUTIVE SUMMARY

# ENVIRONMENTAL IMPACT ASSESSMENT

# &

# ENVIRONMENTAL MANAGEMENT PLAN

*FOR*

**PUBLIC HEARING AS PER EIA NOTIFICATION, 2006**

# PAUNI-II EXPANSION OCP

(Ballarpur Area, WCL)

**for**

**Expansion in Production Capacity from**

**0.60 MTPA to 3.25 MTPA**

**&**

**Expansion in Land Area from 316.30 Ha to 1152.66 ha**

***(PREPARED AS PER TOR J-11015/80/2016.IA-II (M) dated 30.03.2017)***

## July - 2017

**Prepared by**

**CENTRAL MINE PLANNING AND DESIGN INSTITUTE LIMITED**

(Accreditated by NABET vide No/EIA/01/12/002 Dt.31.01.2012)

**CMPDI/EIA/WCL/2017-18/July/54/00**

# EXECUTIVE SUMMARY

## 1.0 Introduction

The proposed Pauni-II Expansion OC has been envisaged by expansion of Pauni-II OC in adjacent Pauni-III geological block which is located west of Pauni Extension Geological Block and forms the south-western most coal bearing area of eastern limb of Wardha Valley Coalfield. The area falls in the Rajura tehsil of Chandrapur district of Maharashtra State. The Chandrapur the district Headquarter is located at the distance of about 25 km from the block.

The EC for Pauni – II OC was accorded by MoEF&CC vide its letter no. J-11015/71/2005 – IA.II (M) dated 02/02/2006 for 0.60 MTPA in a ML area of 316.30 ha based on the Project Report approved by WCL Board on 13/11/2003. This project is an ongoing project and excavation has been started from April, 2016.

Based on the approved Project Report, the Form – 1 document was submitted to MoEF&CC. The proposal was discussed in 6$^{th}$ EAC (Thermal & Coal Mining) meeting of MoEFCC and terms of References (TORs) was granted vide MoEF&CC vide letter no J-11015/80/2016.IA-II (M) dated 30.03.2017. Subsequently on the basis above TOR, the Draft EIA & EMP is prepared for submission to Maharashtra Pollution Control Board for conducting Public Hearing and completion of public consultation process.

### 1.1.1 Location

The proposed mine area falls in the Rajura tehsil of Chandrapur district of Maharashtra State. The Chandrapur district township is located at the distance of about 25 km from the mine. No village exist within the proposed mine area. The nearest villages, Waroda and Sakhari are located in north-west & western direction outside the boundary of the project. Both villages are connected with all-weather metal road with Rajura tehsil.

The area of Pauni-II Expansion OC block is bounded by latitudes N 19$^0$ 48’ 19” and 19$^0$ 49’ 27” and Longitude E 79$^0$ 13’ 48” and 79$^0$ 16’ 13”. The block is covered in the survey of India Toposheet No.- 55 M/1 and 55 M/5.

1.1.2 Communication

The approach to the area at present is via Sasti Colliery or Rajura, Mathra, Gauri, Pauni and Sasti villages by a fair weathered road, which is passing from north of the proposed mine leasehold boundary. Delhi-Chennai Grand Chord Railway line passes through Ballarpur township which is located in the NE of the mine at a distance of about 10 km. Ballarshah Railway Station is located in the NE at about 10 km from the area.

*1.1.3 Topography & Drainage:*

The entire area of the block is covered by agriculture land with black cotton soil. The altitude of the area ranges between 183.25 m and 200.29 m. few seasonal nallas are passing through the block and joining easterly flowing Pauni nala in the north, which ultimately joins Wardha River near Sasti village. The general slope of the area is from west to east. The main drainage of the area is controlled by the Wardha River which is flowing southerly and is located about 10 km east from the area.

Lendi nala is passing through coal bearing area of Quarry-II, which is proposed to be diverted as per route shown in Quarry and Surface Layout Plan. The proposed diverted length of Lendi nala is 1.50 km and proposed to meet in Sakhri nala. The seasonal nala are proposed to divert and meet in Lendi nala. Sakhri Nala is passing through coal bearing area of Quarry-I and Quarry-II, which is proposed to be diverted as per route shown in Quarry and Surface Layout Plan. The proposed diverted length of Sakhri nala is 2.00 km and proposed to meet in Pauni nala.

*1.1.4 Climate & Rainfall*

The climate of the district can be classified as tropical hot climate with high range of temperature through out of year. Primarily there are two prominent seasons in the district - the very hot summer and moderate winter. The summer months are very hot and prolonged while winter is short and mild. The monsoon season starts immediately after summer till late September. The southwest monsoon bring lot of rainfall during rainy season.

## 1.2 Geomining Parameters

The geo-mining parameters of the Pauni-II Expansion OC are tabulated below:

| Sl. No. | Particulars | Approved Project Report of Pauni – II Expansion OC | | |
|---|---|---|---|---|
| | | Quarry-I | Quarry -II | Total |
| 1) | Mineable Reserves (Mt) | 5.18 | 25.45 | 30.63 |
| 2) | Grade/GCV of coal (kcal/kg) | G9/4775 | G9/4830 | (G-9)/ 4817 |
| 3) | OB Volume ($Mm^3$) | 31.90 | 157.57 | 189.47 |
| 4) | Average S/R | 6.16 | 6.19 | 6.19 |
| 5) | Mine Capacity (Mty) | 0.75 | 2.50 | 3.25 |
| 6) | *Manpower* | 242 | | |
| 7) | Overall OMS (t) | 50.87 | | |
| 8) | Total Capital | 499.0042 | | |
| 9) | Additional Capital (Rs. In Crores) | 483.6948 | | |
| 10) | Existing Capital (as on 31.3.2015) (Rs. In Crores) | 15.3094 | | |

**Type and Method of Mining Operations:** Opencast Mining, Semi - mechanized (Shovel-Dumper Combination) is proposed. The Pauni-II Expansion OC mine has two quarries namely Quarry-I & Quarry-II. Backfilling of OB has been considered in Quarry-II as the geo-mining parameters permit simultaneous backfilling of OB. However, in Quarry-I backfilling of OB has not been proposed due to limited strike length and other geo-mining parameters. Quarry-I will be further extended in dipside in future. After final extraction of extended Quarry-I, the void of Quarry-I will be considered for backfilling of OB in future.

## 1.3 Description of Environment and Anticipated Impact

The present scenario has been assessed by the data generated in post-monsoon season 2015-16 (Nov'15 to Jan'16) for the project. Summarised baseline data is provided below:

### 1.3.1 Micrometeorology

Meteorological data collected at meteorological station representing the study area during the study period (1st November 2015 to 31st January 2016) reveals the following status:

*Wind Speed/Direction*

Generally, moderate to stronger winds prevailed throughout the season. Winds were moderate particularly during the morning hours. During the afternoon hours the winds were

stronger. Wind speed readings were ranging from ≤ 0.5 m/sec to 3.9 m/sec. The seasonal average wind speed was observed to be 1.4 m/sec.

The analysis of wind pattern during the season showed that the predominant wind directions were from East, North East followed by north having frequencies 15.40%, 12.00% & 5.43% respectively. The calm conditions prevailed 46.29%.

*Temperature*

Temperature values ranged between 8.4$^{O}$C to 38.9$^{O}$C. The seasonal average temperature value during this period was found to be 24.2$^{O}$C.

*Relative Humidity*

The daily average relative humidity values were in the range of 40.0 to 73.0%. The seasonal average humidity value was found to be 59.7%.

*Cloud Cover*

Mostly clear sky was predominant during the study period.

*Rainfall*

Total 9 mm rainfall was recorded during the study period. The average rainfall during the season was found to be 0.09 mm.

1.3.2 Ambient Air quality Baseline Data

Summary of the observations made during the study period are as follows:

Core Zone I – (SA - 1)

At this location, $PM_{10}$ and $PM_{2.5}$ concentration were observed in the range of 40.0 to 85.0µg/m$^3$ and 22.0 to 47.0µg/m$^3$. $SO_2$ and $NO_x$ concentration were in the range of 6.5 to 12.3µg/m$^3$ and 9.2 to 15.3µg/m$^3$ respectively.

Core Zone II – (SA - 2)

At this location, $PM_{10}$ and $PM_{2.5}$ concentration were observed in the range of 40.0 to 70.0µg/m$^3$ and 22.0 to 39.0µg/m$^3$. $SO_2$ and $NO_x$ concentration were in the range of 6.9 to 11.3µg/m$^3$ and 8.3 to 14.4 µg/m$^3$ respectively..

Pauni Village (SA - 3)

At this location, $PM_{10}$ and $PM_{2.5}$ concentration were observed in the range of 51.0 to 78.0µg/m$^3$ and 28.0 to 43.0µg/m$^3$. $SO_2$ and $NO_x$ concentration were in the range of 8.3 to 15.6 µg/m$^3$ and 12.3 to 20.3µg/m$^3$ respectively.

Sakri Village (SA - 4)

At this location, $PM_{10}$ and $PM_{2.5}$ concentration were observed in the range of 41.0 to 69.0µg/$m^3$ and 23.0 to 38.0µg/$m^3$. $SO_2$ and $NO_x$ concentration were in the range of 7.4 to 15.2µg/$m^3$ and 10.2 to 18.2µg/$m^3$ respectively.

Naweagaon Village (SA - 5)

At this location, $PM_{10}$ and $PM_{2.5}$ concentration were observed in the range of 41.0 to 61.0µg/$m^3$ and 23.0to 34.0µg/$m^3$. $SO_2$ and $NO_x$ concentration were in the range of 6.9 to 12.3 µg/$m^3$ and 10.2 to 18.3 µg/$m^3$ respectively.

Hirapur Village (SA - 6)

At this location, $PM_{10}$ and $PM_{2.5}$ concentration were observed in the range of 40.0 to 56.0µg/$m^3$ and 22.0 to 31.0 µg/$m^3$. $SO_2$ and $NO_x$ concentration were in the range of 8.2 to 16.3 µg/$m^3$ and 13.2 to 20.3 µg/$m^3$ respectively.

In general, All the values are found to be well within the AAQM Standards prescribed by CPCB.

1.3.3 Water quality

To assess the water quality, Six locations are identified and samples (6 Nos.) were collected and analyzed for physico-chemical and heavy metal parameters. Bacterial examination was also carried out to find out the Coliform contamination (if any) at water sources. The water quality all the parameters are found to be well within the prescribed norms of, IS: 10500 – 1991 (permissible) and IS: 2296 - 1982.

1.3.4 Hydrogeological quality

The average water levels fluctuations measured from the area in and around in year 2016 for Pauni-II Expansion OC are given below.

| | | |
|---|---|---|
| Pre monsoon period May-June'16 | Core Zone (within 3 km) | 7.75 m to 10.2 m |
| | Buffer zone (within 10 km) | 2.96 m to 14.3 m |
| Post monsoon period Oct-Nov'16 | Core Zone | 3.3 m to 7.62 m |
| | Buffer zone | 0.1 m to 13.3 m |

### 1.3.5 Noise levels

Baseline data of Mean Leq noise levels at day time and night time was generated at six locations (two in core zone and four in buffer zone) for project. All noise levels values are found to be within the prescribed limits.

### 1.3.6 Land Use

Present Land use of the land required for Pauni-II Expansion OC is given below:

Table 1 Present Land use of the land required for Pauni-II Expansion OC

| S. N. | LAND USE | Within ML Area (ha) | Outside ML Area (ha) | Total |
|---|---|---|---|---|
| 1 | Agricultural land | 1047.55 | 3.44 | 1050.99 |
| 2 | Forest land | 12.07 | - | 12.07 |
| 3 | Waste land/Govt. Land | 89.6 | - | 89.6 |
| 4 | Grazing land | - | - | - |
| 5 | Surface water bodies | - | - | - |
| 6 | Settlements | - | - | - |
| 7 | Others (specify) | - | - | - |
| | Total | 1149.22 | 3.44 | 1152.66 |

The land use during the mining would be as follows: -

Table 2 The Land Use During the Mining

| **Sl. No.** | **Particulars** | **Area (ha)** |
|---|---|---|
| 1. | Quarry Area | 295.35 |
| 2. | External OB dump | 308.90 |
| 3. | Infrastructure | 10.00 |
| 4. | Area needed for rationalization | 336.41 |
| 5. | Area needed for blasting zone | 200.00 |
| 6. | Colony land (Hostel only) | 2.00 |
| | **Total Land** | **1152.66** |

The land use at the end of the mine would be as follows:-

Table 3 Land use at the end of the mine

| S. N. | Land use during mining | Land use (ha) | | | | |
|---|---|---|---|---|---|---|
| | | Plantation | Water Body | Public use | Undisturbed | Total |
| 1 | External OB Dump | 214.57 | -- | -- | -- | 214.57 |
| 2 | Top soil dump | 35.40 | -- | -- | -- | 35.40 |
| | Land reclaimed after rehandling of Top soil dump up to ground level | 58.93 | -- | -- | -- | 58.93 |
| 3 | Excavation | 107.00 | 188.35 | -- | -- | 295.35 |
| 4 | Roads | 0.50 | -- | 1.50 | -- | 2.00 |

| S. N. | Land use during mining | Land use (ha) | | | | |
|---|---|---|---|---|---|---|
| | | Plantation | Water Body | Public use | Undisturbed | Total |
| 5 | Built up area | 3.00 | -- | 7.00 | -- | 10.00 |
| 6 | Green Belt | Included in S. No 4, 5 & 7 | | | | |
| 7 | Undisturbed Area | 350.00 | -- | -- | 186.41 | 536.41 |
| | Total | 769.40 | 188.35 | 8.50 | 186.41 | 1152.66 |

*1.3.7 Socio Economic:*

Positive impacts on socio-economic environment are expected due to creation of direct and indirect employment opportunities and development of infrastructure such as roads, schools, hospitals etc.

## 1.4 Anticipated Environmental Impacts and Mitigation Measures

To have a close watch on the environmental condition and implementation of various measures suggested, a multi- disciplinary approach is essential.

1.4.1 Air Quality:

Prediction of fugitive dust level in the surrounding is carried out (for 24 hours average) with the help of computerized Fugitive Dispersion Model (FDM90121 by USEPA), based on Gaussian Plume formulation. The resultant values are within limits as per CPCB rules.

Air Pollution Control Measures

In order to mitigate the adverse impacts on ambient air, the following main control measures have been proposed and will be implemented during the actual operation of the mine.

a) Water sprinkling on road, stockpiles by mobile tankers.

b) Black topping of road.

c) Covering of trucks carrying coal & avoiding overloading of trucks.

d) Development of adequate green belt all along the coal transportation road on both sides will be done.

e) Blasting will be done between shifts or during the rest interval when the minimum number of persons are present around the blast area. In order to quickly disperse the dust generated in blasting operations, blasting will be avoided when there is wind. Blasting will be avoided in the mornings and during cloudy situations.

f) Optimize travel distances through appropriate site layout and design.

g) Vehicular emission of particulates, $SO_2$, NOx, hydrocarbons can be minimized by proper training and maintenance of vehicles and other oil - operated equipment.

h) Regular monitoring of ambient air quality as per CPCB rules for Coal Mines.

Plantation to Check Air Pollution

Plantation will be under taken in the mine area as mitigative measure against air pollution, noise pollution and to increase the aesthetic value. The plantation will be developed at suitable places like overburden dump, along the road sides, unused land etc. to arrest dust generated due to various mining operations viz. quarrying, coal and OB transportation, OB dumping, CHP operation. About 350.0 ha of plantation will be carried out in undisturbed area as green belt. Total 769.40 Ha out of total 1152.66 Ha (67%) area will be planted till the end of mine life.

1.4.2 Water Quality

Anticipated Impact

Mining and its associated activities not only use a lot of water but also likely to affect the hydrological regime of the area. The major impact of deep and large mines is of natural groundwater table. Lowering of water table may result in reduced groundwater availability. Extraction of different minerals is known to lead to water pollution due to heavy metal, acid discharges and increased suspended solids. However effect of coal mining due to nearby mines of Ballarpur area on water is mainly observed as increase in suspended solids.

Salient controls measures to be taken to reduce water pollution are as follows:

i) Industrial Effluent

The waste-water from workshop and CHP, which normally remain laden with oil and grease, suspended and dissolved solids etc. will be treated in the Effluent Treatment Plant (ETP). Clear water coming out from the treatment plant will be taken into the closed water circuit and recycled for its reuse. All parameter of ETP waste discharge will be monitored regularly as per Env. (Protection) Amendment Rule, 2000.

ii) Mine Water

Most of the suspended particles will be settled in the sump located in the quarry and the supernatant water is pumped out to the sedimentation tank present on surface. This water

is to be passed through sedimentation pond on surface, before being discharged in to natural drain or agricultural field.

iii) Surface Run-off

Adequate numbers of vegetation will be grown on the top surface and slopes of the dumps in order to arrest the erosion of soil and it will also reduce surface run-off, which helps averting siltation of natural water courses.

Impact on Hydro-Geological Regime

In the opencast mines, the different aquifers overlying the working coal seam would be contributing groundwater to the mine by gravity drainage since they are exposed/removed at the mine. The anticipated groundwater inflow to the mine is to the tune of 4332.00 $m^3$/day (approx.). As such due to this pumping/gravity drainage, cone of depression would be formed. The shape and extent of the cone would depend on mainly hydraulic conductivity and specific yield of aquifers, mine depth & area etc.

Generally steep drawdown cone would be formed in poor potential aquifers, thereby the influence area will be limited to small distance and reverse is established in respect of aquifers with high hydraulic conductivity

The radius of mine influence area estimated for the Quarry-I & Quarry-II is 356 m and 406 m respectively based on the above mentioned aquifer. The stage of ground water development in the buffer zone (10 km from the periphery of the core zone) of Pauni-II Expansion CO comes to about 29.69%.

## Conservation Measures:

1. The mine discharge will be utilized to meet the mine's domestic, dust suppression, firefighting and other industrial water needs.

2. The artificial recharge by water conservation structures in the outside mine influence areas will check water level lowering. The impact on ground water level is being minimized by artificial recharge by spreading of pumped out water, creation and filling of ponds with mine water and construction of rainwater harvesting structure.

3. After the cessation of mining, with copious rainfall and abundant groundwater recharge, the water levels will recoup and attain normalcy. Thus, the impact of mining on groundwater system may be considered as a temporary phenomenon. The old mine workings also behave as water pools and improves the resource availability in the area.

4. The discharged mine water would be available for the local people to utilize in irrigation and domestic use. Thereby the mine water will be a resource for many of the local villagers.

5. Monitoring of water quality of mine water discharge, local river/nala and domestic water (dug well/hand pumps) will be done under routine monitoring. On analyzing the field data if any area receiving the maximum impact, suitable controls measures will be adopted by the project authorities.

### 1.4.3 Noise Quality

In order to assess the existing ambient noise level in the surrounding of proposed project site, the baseline data generated for Pauni-II Expansion OC in Post-Monsson season 2015-16 is documented in chapter III of the EIA & EMP report and noise level values have been found to be within permissible limits.

Noise Pollution Control Measures

Monitoring of the noise control will be carried out on regular basis as per the Environment (Protection) Amendment Rule 2000. While planning for an effective noise attenuation measures, the concept of source, path and receiver has been considered.

### 1.4.4 Impact on Land and Land Reclamation

Total area required for the project is 1152.66 Ha. Total agricultural land of 1050.99 ha and govt land of 89.6 ha is involved in the project. About 12.7 ha of forest land is also required for quarry-II operations.

The land use in core zone is mainly agricultural land. So the major impact on land will degradation of agriculture land in the mining area.

The following activities have been proposed for reclamation of land.

1. Backfilling of the excavated area at the time of mine closure.

2. Levelling of the backfilled area and carpeting with the topsoil.

3. Creation of garland drains in order to arrest the silt load, due to erosion, to enter into natural watercourses during surface run-off.

4. Grass, legumes and different types of plants etc. will be planted on such reclaimed land in order to make it, as far as possible, conducive to agricultural growth.

5. Technical and biological reclamation of external OB dump and rehandling at the end of mine life. The density of trees will be around 2500 plants/Ha.

1.4.5 Rehabilitation & Resettlement

The project does not require village rehabilitation, however total 1050.99 ha of tenancy land will acquired. Suitable compensation will be provided to the land loosers as per R & R policy of Coal India Limited and Maharashtra Government.

1.4.6 Progressive Mine Closure Plan

The mine closure cost will cover the different mine closure activities for which a corpus fund will be created by opening an escrow account with the coal controller organization in nationalised bank. An amount @ Rs 6.00 lakhs per Ha of the project area will be deposited in this account for final mine closure. Progressive mine closure will be done with the fund provided in approved report. The financial provision for closure of Project Report of Pauni-II Expansion OC for the entire mine life comes out to be around Rs. 129.08 Crores (based on March, 2015 WPI @ Rs 6 lakh/ Ha and 5% escalation each year).

**1.5 Environmental Monitoring Programme**

The Environmental Monitoring Programme will be carried out as per statutory requirements and detailed in the chapter – IV of the Draft EIA report.

Environment Management Cell

WCL, has an Environment Deptt. headed by General Manager (Env.) at its HQ. The department provides necessary support that are required for environmental management of various mining projects under the jurisdiction of the company. At area level, Area General Manager co-ordinates the activities of various disciplines in the area to render all necessary assistance at the implementing level i.e. the Project level. Nodal Officer (Environment) of the area monitors all aspects of environment on behalf of the Area

General Manager. He will also take suitable steps for generation of environmental data along with CMPDI team for its analysis and interpretations.

### 1.6 Environmental Cost Projection

A capital provision of Rs **97.09** lakhs has been made against environment protection. Rs. 6.00/t of coal has been provided to absorb environmental related cost in the project.

### 1.7 Provision for CSR Work

The fund for the CSR will be allocated based on 2% of the average net profit of the Company for the three immediate preceding financial years or Rs 2.00 per Tonne of Coal Production of the previous year whichever is higher.

### 1.8 Conclusion

The mining sequence has been planned in a way to maximise internal dumping so that least area is required for external OB dumping.

The project authorities need to follow the mitigation measures strictly as given in the EIA & EMP report. This will minimise the impact on environment.

The Pauni-II Expansion OC may be granted environmental clearance so that the project can bridge the gap between demand and supply of coal in the country and help in achieving the target of 1 BT of domestic coal production by 2019-20.

**Hence as directed by MoEF&CC, this Executive Summary of Draft EIA of Pauni-II Expansion OC has been prepared for submission to Maharashtra Pollution Control Board for conducting Public Hearing.**