

**EXECUTIVE SUMMARY**  
**ENVIRONMENTAL IMPACT ASSESSMENT**  
**&**  
**ENVIRONMENTAL MANAGEMENT PLAN**  
*FOR*  
**PUBLIC HEARING AS PER EIA NOTIFICATION, 2006**  
**AMALGAMATED YEKONA I & II OCP**  
**(Majri Area, WCL)**

for

**Production Capacity of  
2.75 MTPA (Normative) and 3.44 MTPA (Peak)**

**&**

**Land area - 1701.32 ha**

*(PREPARED AS PER TOR J-11015/381/2015.IA-II (M) dated 06.06.2016)*



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**Prepared by**

**CENTRAL MINE PLANNING AND DESIGN INSTITUTE LIMITED**

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

**CMPDI/EIA/WCL/2016-17/DEC/42/00**

## EXECUTIVE SUMMARY

### 1.0 Introduction

Project Report of Yekona-I & II OC had been prepared and approved by WCL Board and accordingly environmental clearance was obtained in October, 2006 for both the projects. However due to increase in land cost by Maharashtra Govt. & new R&R Policy of CIL, it was not possible to acquire the land of the two projects within the sanctioned capital. Considering the target of 1 Billion Tonne coal production by 2019-20 and to start the mine economically, a new Project Report has been formulated with amalgamation of common infrastructural facilities with enhanced production capacity by including the dip side reserves and working both the mines independently. The amalgamated Project Report has been prepared upto a maximum depth of 160 m (previously maximum 90 m) with reserves up to 57.85 MT (previously total in two projects was 16.07 MT). Now the solid waste management has been reworked whereby the percentage of backfilling has improved significantly.

Based on the approved Project Report, the Form – 1 document was submitted to MoEF&CC. The proposal was discussed in 47th, 53rd & 55th EAC (Thermal & Coal Mining) meeting of MoEF&CC and terms of References (TORs) was granted vide MoEF&CC vide letter no J-11015/381/2015.IA-II (M) dated 06.06.2016. Subsequently on the basis of the above said ToR, this executive summary of EIA & EMP is prepared for submission to Maharashtra Pollution Control Board for conducting Public Hearing.

#### 1.1.1 Location

The proposed mining area is the Northern extension of western limit of Wardha Valley Coalfield and located adjacent to Yekona village which falls in Warora Tahsil of Chandrapur District of Maharashtra State.

The mine falls in under developed region of Chandrapur district. Nagpur and Chandrapur townships are located at a distance of 110 kms and 52 kms from the block respectively.

The area is bounded by latitudes N 20° 13' 42" to 21° 15' 45" N and longitudes E 78°55'00" to 78° 58' 30" and is covered by Survey of India Topo Sheet No. 55L/15 & 55L/16.

### 1.1.2 Communication

The Delhi Madras Grand Trunk railway line passes from the East of the proposed mine. The nearest railway station is Warora, situated at 7 km distance, S.E of the block. The Nagpur-Chandrapur road is about 7 km to the East of the Yekona-I & II block. The block can be approached by a fair-weather road from Warora to Nagri via Wanoja. This road passes through the eastern part of the mine and joins Nagpur-Chandrapur road at Warora.

### 1.1.3 Topography & Drainage:

The entire area of the mine is covered by agriculture land with black cotton soil and exhibits a gently undulating topography with general slope towards north. The altitude of the area ranges from 187 m to 203.72 m from Mean Sea Level.

Yekona - I & II block exhibits a gently undulating topography with the general slope towards North. The drainage in the area is controlled by the Wardha River which is flowing southerly and also demarcates the western limit of the mine. One seasonal nala flowing towards west passes north of the block and meets Wardha River. H.F.L. of Wardha River in the block area is about 198 m. A seasonal nallah passing through the proposed land area of external Overburden Dump is envisaged to be diverted along the mine boundary.

### 1.1.4 Climate & Rainfall

The climate of the area is subtropical monsoon type characterised by hot summer and mild winter. The bulk of the rainfall is due to SW monsoon. Monsoon advances in the month of June. Maximum rainfall occurs during July and August months. The average temperature in Warora is 27.4 °C. Precipitation here averages 1233 mm.

## 1.2 Geomining Parameters

The geo-mining parameters of the proposed Amalgamated Yekona I & II OC are tabulated below:

Sl. No.	PARTICULARS	YEKONA-I	YEKONA-II	TOTAL
1	Av. Thickness of seam (m)	9.24	9.94	
2	Gradient of seam	1 in 7 to 1 in 14	1 in 4.8 to 1 in 8	
3	Depth (m): Min. Max.	30 160	25 150	

Sl. No.	PARTICULARS	YEKONA-I	YEKONA-II	TOTAL
4	Av. Strike length (m) At surface At floor	1700 1400	3800 3200	
5	Average Dip-Rise width(km) a)On floor b)On Surface	1.2 to 2.0 1.5 – 2.4	0.60 0.87	
6	Area of the Quarry (Ha) a)On floor b)On Surface	214.70 354.50	238.64 339.74	453.34 694.24
7	Total mineable reserves (Mt)	25.04	32.81	57.85
8	GCV (kCal/kg) (without dilution at each contact point)	4714 (G-9)	5053 (G-8)	4920 (G-8)
9	Total volume of OB (Mm <sup>3</sup> )	225.71	226.78	452.49
10	Average stripping ratio (m <sup>3</sup> /t)	9.01	6.91	7.82
11	Annual mine target (MTPA)	1.00 to 1.25	1.25 to 1.50	2.75
12	Life of the mine	25	24	25

**Type and Method of Mining Operations:** Opencast Mining, Semi - mechanized (Shovel-Dumper Combination) is proposed. The proposed Amalgamated Yekona I & II OC mine has two quarries namely Yekona-I & Yekona-II. *These quarries would be further sub-divided into two sub-quarries & sequence of mining shall be designed in such a way that backfilling can be maximized.*

### 1.3 Description of Environment and Anticipated Impact

The present scenario has been assessed by the data generated in pre-monsoon 2013 for nearby Wanoja OC project. The baseline data for Amalgamated Yekona I & II is under generation in post monsoon season, 2016. It will be included in final EIA & EMP report. Meteorological data of Wanoja OC generated in pre-monsoon season, 2013 is used for the purpose of air quality impact prediction.

#### 1.3.1 Micrometeorology

A meteorology station has been set up at Wanoja OC and micrometeorological parameters like wind velocity, wind direction, temperature, relative humidity, cloud cover etc. are recorded on

hourly basis for 91 days during the period from 1<sup>st</sup> April to 30<sup>th</sup> June 2013 representing pre-monsoon season. Daily rainfall also has been recorded and reported.

The wind velocity readings were ranging from 1.0 - 19.8 kmph. Predominant wind was from North-West direction. The maximum temperature recorded was 47.5°C and the minimum was 22.5 °C. The relative humidity ranges from 25% to 98% and 30.6cm rainfall was recorded during the study period.

### *1.3.2 Air quality*

Baseline ambient air quality monitoring is being carried out at six locations for nearby Wanoja OC Mine. The baseline data generated in Pre-Monsoon season 2013 is included in EIA & EMP report. Summary of reports is given below:

The Suspended Particulate Matter (SPM) values were ranging from 76  $\mu\text{g}/\text{m}^3$  to 254  $\mu\text{g}/\text{m}^3$  PM<sub>10</sub> and PM<sub>2.5</sub> values are ranging from 33  $\mu\text{g}/\text{m}^3$  to 70  $\mu\text{g}/\text{m}^3$  and 9  $\mu\text{g}/\text{m}^3$  to 21  $\mu\text{g}/\text{m}^3$  respectively. SO<sub>2</sub> and NO<sub>x</sub> values are varying between 10.0 to 15.7  $\mu\text{g}/\text{m}^3$  and 11.0 to 19.1  $\mu\text{g}/\text{m}^3$  respectively. The heavy metals values are found to be very low and negligible. Heavy metals like Arsenic (As) and Mercury (Hg) were found to be Below Detectable Limit (BDL) and other metals like Nickel (Ni), Lead (Pb) and Chromium (Cr) values are found to be very low and negligible. All the values are found to be well within the NAAQ Standards prescribed by CPCB.

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 2015 for proposed Amalgamated Yekona I & II OC are given below.

Pre monsoon	Core Zone	4.7 m to 10.2 m
	Buffer zone	2.6 m to 9.3 m
Post monsoon	Core Zone	2.85 m to 8.2 m
	Buffer zone	2.65 m to 8.95 m

### 1.3.5 Noise levels

Baseline data of Mean Leq noise levels at day time and night time was generated at six locations for proposed nearby Wanoja OC Mine.

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 Amalgamted Yekona I & II OC is given below:

S. N.	LAND USE	Within ML Area (ha)	Outside ML Area (ha)	Total
1	Agricultural land	1579.18	38	1617.18
2	Forest land	--	--	--
3	Waste land/Govt. land	84.14	-	84.14
4	Grazing land	--	--	--
5	Surface water bodies	--	--	--
6	Settlements	--	--	--
7	Others (specify)	--	--	--
	Total	1663.32	38	1701.32

### Final Land Use

S. N.	Land use during mining	Land use (ha)				Total
		Plantation	Water Body	Public use	Undisturbed	
1	External OB Dump	320.02	--	--	--	320.02
2	Top soil dump	--	--	--	--	--
3	Excavation	352.00	337.20	--	--	689.20
4	Roads	5.00	--	25.00	--	30.00
5	Built up area	70.00	--	122.37	--	250.72
5a	Nalla and Canal Diversion	--	58.35	--	--	58.35
6	Green Belt	Included in S. No. 4, 5 & 7				
7	Undisturbed Area	100.00	--	--	311.38	411.38
	Total	847.02	395.55	147.37	311.38	1701.32

### 1.3.7 *Socio Economic:*

Marda village falling within the core zone are required to be rehabilitated and resettled. The village is 50 meters away from the proposed quarry area. 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) Wet suppression of unpaved areas can achieve dust emission reductions of about 70 percent or more, and this can sometimes be increased by up to 95% through the use of chemical stabilisation.
- g) Optimize travel distances through appropriate site layout and design.
- h) Vehicular emission of particulates, SO<sub>2</sub>, NO<sub>x</sub>, hydrocarbons can be minimized by proper training and maintenance of vehicles and other oil - operated equipment.
- i) 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 100.0 ha of plantation will be carried out in undisturbed area as green belt. Total 847.02 Ha out of total 1701.32 Ha (50%) 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 Majri 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 3673.53 m<sup>3</sup>/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 Yekona I and II Quarry is 529 m and 302 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 Amalgamated Yekona I & II OC comes to about 12.54%.

#### 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 Wanoja OC mine in summer season 2013 is documented in previous chapter III of the 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 1701.32 Ha. Out of this about 254.15 Ha is acquired for Yekona I OC and 421.70 Ha is acquired for Yekona-II OC. Total 675.85 Ha land acquired and additional 1025.47 Ha land will be acquired for proposed project.

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. No forest land is involved.

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

In this report rehabilitation of Marda village is proposed as it is located on coal bearing area. The census data of year 2011 is available for Marda village. The data for Marda Village is as tabulated below:-

#### **Population of Marda Village As Per 2011 Census Data**

Sl. No	Village Name	Households	Population	Males	Females
1	Marda	208	864	450	414

A Capital provision of Rs. 41.1908 crores has been made in approved Project Report for resettlement of Marda Village. This includes 8.00 ha land for resettlement site of village and cost of 8.12 ha Gaothan land of Marda village.

#### Rehabilitation Scheme

Compensation will be paid to the families as per the R & R Policy of Coal India. Rate adopted for Government land is Rs 14.82 lacs/ha. For tenancy land Rs 24.70 lacs/ha is adopted assuming irrigated land. Provision of 41.1908 Crores has been made in approved project report for the rehabilitation and resettlement of Marda village.

#### 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 for Amalgamated Yekona-I & II OC mine for the entire mine life comes to around Rs. 281.5160 Crores (based on January, 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 project envisaged R & R of Marda village. The compensation is to be paid as per R & R policy of Coal India Limited in timebound manner. 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 report. This will minimise the impact on environment.

The Amalgamated Yekona I & II 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 Amalgamated Yekona I & II OC has been prepared for submission to Maharashtra Pollution Control Board for conducting Public Hearing.**