

# **EXECUTIVE SUMMARY**

**FOR**

## ***PUBLIC CONSULTATION***

### ***PROPOSED BELLORA- NAIGAON DEEP OPENCAST MINE***

**(ENHANCEMENT IN LEASE AREA FROM 398.66 TO 626.17 Ha WITH PRODUCTION  
CAPACITY AS APPROVED AT 1.25 MTPA)**

**Prepared as per TOR dated 04.12.2009**

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**EXECUTIVE SUMMARY**

## 1.0 INTRODUCTION

Naigaon Opencast Project of Western Coalfields Limited was opened in Naigaon – Bellora Block in Wardah Valley Coalfield after having its Project Report (PR) approved by the competent authority on 28.01.1991. The present project is having a capacity of 1.25 MTPA with 398.66 ha of land as per Environmental Clearance received in February 2009.

At present the dip side quarry surface is approaching the dip side surface limits as per approved PR and it has balance life of 2 years only. It is necessary to initiate action for the dip side of the property so that continuity of production can be achieved.

Production projection of the existing Naigaon OC mine for the balance mine life as per the approved EIA/EMP (02.02.2009) is as under :

Year	Coal (Mt)	OB (Mm3)
2009 – 10	1.000	3.400
2010 – 11	0.655	2.339
<b>TOTAL</b>	<b>1.655</b>	<b>5.739</b>

For this, necessary advance action activities have been taken up and to be executed before commencement of production in the dip side property from 2010-11 onwards. Proposed Deep project is scheduled to commence in 2010-11.

Accordingly the Project Report of Bellora – Naigaon Deep OC has been formulated and the same has been approved by WCL Board. Based on the approved PR, the form – 1 with due – diligence along with Addendum EIA/EMP has been prepared for obtaining Environmental Clearance for enhancement of land area from 398.66 ha to 626.17 ha with sanctioned peak production capacity of 1.25 MTPA under section 7(ii) of EIA Notification, 2006. EAC meeting has been held on 25.11.2009 and subsequently TOR has been issued. Based on the said TOR, this document has been prepared and is being submitted to MPCB for conducting Public Hearing.

## 1.1 LOCATION

Bellora/Naigaon Opencast Mine is located on the West Bank of Wardha river opposite to existing Ghugus Opencast Mine in Wardha Valley Coalfield. The mine is named after Bellora village situated over quarriable area of adjoining Naigaon OCP. Bellora OCP mine is in Yeotmal District of Maharashtra State. The block is located on the western side of Bellora opencast project. It is bounded by North Latitude 19° 56' 29" to 19° 58' 41" and East Longitude 79° 4' 48" to 79° 6' 12" and is covered in the Survey of India Toposheet No. 56 M/1. It is situated in Wani Tahsil of Yeotmal district, Maharashtra.

## 1.2 COMMUNICATION

The block is approachable from Chandrapur an important mining town in Maharashtra via Ghugus colliery by crossing the Wardha river. The area can also be approached from Wani town by metalled road (22 Km). Wani is connected to District Headquarter

Yeotmal, through State Highway No. 73. Wani is also connected with Nagpur via Warora and Jam through State Highway. The nearest railhead is Ghugus which is located on Ghugus Tadali branch line of Central Railways. The distance between Tadali junction on Delhi-Madras railway line to Ghugus, is around 12 Kms. Distance by road from Nagpur to Ghugus measures approx. 160 kms.

### **1.3 TOPOGRAPHY & DRAINAGE**

The surface area of the block is fairly level. The eastern portion (incrop side) of the block is elevated and gently slopes towards north, south and west and ultimately towards Wardha river. The elevation of the block varies from 204 m to 220 m. Wardha river controls the drainage of the area. The recorded HFL of Wardha river is 208.31m (as per local Grid) recorded by mine office on 14/07/1994 whereas in national grid this value is 186.20m. The HFL of river mainly covers southern and northern parts of the block and has now been protected by embankment towards south around Bellora OCM and towards north around Taroda OC Mine. Only a limited area towards west of the central portion lies below HFL of Wardha river.

### **1.4 CLIMATE:**

The climate of the area is sub-tropical. The maximum temperature in summer is about 46°C and the minimum temperature in winter is 5-6°C. The rainy season is from mid June to September. Average annual rainfall varies from 1000 mm to 1250 mm.

### **1.5 JUSTIFICATION FOR ENHANCEMENT & LINKAGE**

The mines of WCL are under constant pressure to meet the increasing demand of non-coking coal for power houses and other bulk consumers from Western as well as Southern part of country. The proposed Bellora-Naigaon Deep OC project is located in Wardha Valley coalfields of WCL. The justification of this mine has been studied in the light of estimated demand for non-coking coal from power sector in Maharashtra and production forecast from existing, completed and ongoing projects of WCL. Moreover this mine is coming as replacement of existing Bellora/Naigaon O/C (on the dip side extn. of said mine beyond P.R. limits) there will be no problem in marketing because existing costumers may continue to lift coal from this mine

## 1.6 SOURCES OF DATA

This report has been formulated using various data from the following sources:

Sl. No.	Type of Data	Sources
1	Mining and economic parameters and other miscellaneous data	CMPDIL and Wani Area, WCL.
2	Environmental data including meteorological data, air quality, dust fall rate, water quality and noise level data.	Environmental-data generation for Naigaon OC of Wani Area of WCL, Maharashtra carried out by CMPDI.
3	Socio-economic study & Land use/cover mapping buffer zone.	Census data 2001 & base line Socio - Economic survey.
4	Flora and fauna	Survey Report prepared by the competent authority in this field.
5	Surface hydrology and hydrogeology	CMPDIL, RI- IV, Nagpur.
6	Meteorological data	Environmental-data generation for Naigaon OC of Wani Area of WCL, Maharashtra carried out by CMPDI.
7	Land use/cover mapping core zone.	As per State Govt. Record, data supplied by the concerned WCL area office.

## 2.0 GEOLOGY OF THE BLOCK

The block is in structural conformity with Niljai block in north and Ghugus block in the south as revealed by floor contour of the composite seam. Due to thick cover of soil/Detrital mantle and kamthi's the coal seam is not exposed. The structural interpretation i.e. subcrop, attitude, floor contour of coal seam is based entirely on the subsurface data available from boreholes and the underground workings. The geological structure thus interpreted is represented in the form of Floor Contour Plan.

### 2.1 COMPOSITE SEAM

The single thick coal seam of Wardha Valley Coalfield is well developed in this block. It occurs in Middle and Barakar formations. Thickness of seam varies from 22.05 m (CMWBE-9) to 24.15 m (CMWBE-3). The upper and central part of seam is highly interbanded. The Composite seam is separated into two split sections with a parting of 2.94 m (WG-32) to 6.57 m (WG-10) averaging to 4.5 m between Top Split section and Bottom Split section. Thickness ranges are as shown in the following table :-

Section	Thickness range(m)	Remarks
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A.Top Split Section: Upper Part Lower Part	2.07 –4.34 5.66-9.45	Highly interbanded . Lower 3.05 m has been developed extensively
B. Parting between top and bottom split section	2.94 – 6.57	Parting is predominantly sandy shale, sandstone or alternate shale and sandstone with carb.shale and shaly coal at places.
C. Bottom Split Section	6.33 – 9.73	Upper 3.05 m coal of this section has been developed extensively 6 lower most 3.15 m has been developed in patches only.

The effective quarriable thickness of the composite seam excluding the parting between top split & bottom split sections varies from 14.86m (CMWBE -8) to 16.46m (CMWBE-4A).

General strike of coal seam is NNW – SSE dipping towards WSW. The gradient varies from 1 in 6.5 to 1 in 5 from North to South.

## 2.2 GEOLOGICAL COAL RESERVES

Total net insitu coal reserves of 32.45 Mt is available in the Top Split and Bottom Split of Composite Seam. Net insitu reserves has been arrived at by giving 10% deduction from the Gross reserves for variables.

## 2.3 MINEABLE RESERVES

Total mineable reserves upto 1:10 cut-off ratio line works out to 20.20 Mt. Cut wise reserves are as shown in table below :-

Cut No.	Description	Coal (Mt)	OB (Mm <sup>3</sup> )	SR (m <sup>3</sup> /t)
Cut – I	120 FRL to 90 FRL	6.78	51.84	7.65
Cut – II	90 FRL to 60 FRL	6.64	49.61	7.47
Cut – III	60 FRL to 30 FRL	6.78	23.28	3.43
T O T A L		20.20	124.73	6.17

## 2.4 TARGET PRODUCTION

Keeping in view high average stripping ratio of 6.17 m<sup>3</sup>/t and further higher initial S.R. of 7.65 m<sup>3</sup>/t in Cut I and considering present target of mine and the total mineable reserves of 20.20 Mt, the target production of the mine has been fixed at 1.00 Mty which gives adequate life for depreciation of various assets and sustained production of 1.00 Mty. The peak production capacity has already been sanctioned for 1.25 MTPA and the same will be maintained for the proposed project also.

The existing project is to operate up to 31.3.2010, hence the coal production programme has been planned from 01.04.2010 and is given as below :-

SL.NO	YEAR	COAL PRODUCTION IN Million Tonne
1	1	0.84
2	2	1.00
3	3	1.00
4	4	1.00
5	5	1.00
6	6	1.25
7	7	1.25
8	8	1.25
9	9	1.00
10	10	1.00
11	11	1.00
12	12	1.00
13	13	1.00
14	14	1.00
15	15	1.00
16	16	1.00
17	17	1.00
18	18	1.00
19	19	0.75
20	20	0.55
21	21	0.31

## 2.5 MINE LIFE

The revenue life of the project works out to 21 years considering annual target production of 1.00 Mty and mineable reserves of 20.20 Mt. It is proposed to acquire land in first two years of mine life. First year is defined as pre-construction period. Quarry operations would start from third year of mine life. The target production of 1.00 Mt would be achieved in the third year.

## 2.6 MINING STRATEGY

In present project report Partial hiring option has been worked out and elaborated. Coal target production of 1.00 Mty has been proposed with peak capacity of 1.25 MTPA (EIA/EMP for which has already been approved by MOEF vide EC letter dated 02.02.2009) and the Peak programmed OB has been kept as 7.65 Mm<sup>3</sup>/annum.

## GEO-MINING CHARACTERISTICS

The geo-mining characteristics of the proposed quarry are as follows :-

Sl.No.	PARTICULARS	DETAILS
1	Area of the Quarry	
(a)	On floor (ha)	75.28
(b)	On surface (ha)	138.65
2	Average strike length (m)	
(a)	At surface	1750
(b)	At floor	1430
3	Average width (m) (Dip rise)	
(a)	At surface	650
(b)	At floor	490
4	Depth (m)	
(a)	Initial	80
(b)	Final	170
5	Gradient of seam	1 in 6.5 to 1 in 5
6	Average thickness of seam (m)	
(a)	Top Split	10.09
(b)	Bottom Split	8.56
7	Average parting between seams (m)	4.38
8	Balance Mineable reserves (Mt)	
(a)	Top Split	8.91
(b)	Bottom Split	11.29
(c)	Total	20.20
9	Total OB (Mm <sup>3</sup> )	124.73
10	Average SR (m <sup>3</sup> /t)	6.17
11	Grade	
(a)	Undiluted	'D' (UHV =3580kcal/kg)
(b)	0.05m Dilution at contact points	'E' (UHV =3500kcal/kg)
(c)	Additional 0.10m Dilution at contact points for blanketing	'E' (UHV =3390kcal/kg)

## SELECTION OF MINING METHOD

Considering steep gradient of seam which falls in the range of 1 in 6.5 to 1 in 5 with not reserves for full life of Dragline, deployment of Dragline would not prove to be effective and economical. Hence, only Shovel-Dumper combination is recommended in this report. It is proposed to replace existing HEMM by higher capacity HEMM as recommended in Planning Committee meeting. Accordingly, 35 T Dumpers are replaced by 50 T Dumpers. Balance workload is proposed by hiring of equipment.

## DRILLING & BLASTING

The degree of fragmentation in opencast mine has to be optimised so that total cost of drilling, blasting, excavating, transport and crushing as a total system is minimised. In OB,  
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powder factor of 1.70 m<sup>3</sup>/kg has been considered which is being achieved by mine at present. and for coal entire seam and 5 m OB cover on Top of Seam shall be blasted at one go as done in neighbouring Ghugus OC. For planning purposes, powder factor of 7 t/kg has been considered in coal. It is recommended that blasting parameters shall be optimised from time to time depending upon local site conditions at the time of actual operations.

The pattern of blasting in coal shall be as per blasting done in neighboring Ghugus OC i.e. 5 m hard cover to be left at coal top and this cover along with entire coal seam shall be blasted in one go so that exposed galleries may get fill with blasted material thereby preventing potholing.

## **2.7 SEQUENCE OF MINING**

As explained, proposed mine is an extension of present Naigaon/Bellora mine beyond PR limits up to 1:10 cut-off ratio line. Life of the PR mine is upto 2009-10 as per balance reserves. This period shall be used for land acquisition and other advance action activities.

In order to maximize internal backfilling, haul road for coal transportation is considered on northern side of quarry. This haul road shall touch the inner flank transport route at 140 FRL to reach surface at 215 RL near existing CHP. A safety distance of 100 m has been kept from toe of OB backfilling from quarry edge on dip side so that option of further deepening may be open in future.

## **WASTE DISPOSAL**

In order to arrive at the Dumping Schedule, existing dumping on surface on Quarry & within surface was assessed as per existing Quarry Layout Plan received from the project. Thereafter, maximum dumping capacity was calculated and existing dumping quantity was reduced to arrive at the dumping programme for Bellora-Naigaon Deep OC. This is explained in the following paragraphs.

The summary of total project including the existing project is as given below ;-

### **For Existing Project – Total OB - 58.40 MCM up to 01.04.2010.**

OB in Ext. Dump	– 24.67 MCM
OB in Internal Dump	– 27.79 MCM
OB in Embankment	– 5.94 MCM

In balance life Additional OB to be generated - 124.73 MCM

OB in Ext. Dump	– 89.19 MCM
OB in Internal Dump	– 34.89 MCM
OB in Embankment	– 0.65 MCM

**Thus the total scenario at the end of mine life of the proposed deepening project will be as follows :-**

Total OB – 183.13 MCM

OB in Ext. Dump – 113.86 MCM  
 OB in Internal Dump – 62.68 MCM  
 OB in Embankment – 6.59 MCM

## 2.8 COAL HANDLING ARRANGEMENT

At present, two streams of coal handling plants are existing to handle the entire production of coal from Naigaon OC and Niljai South OC mines. There is a third standby feeder breaker from which crushed coal can be loaded into both streams with the help of reversible belt conveyor as and when required. One stream is exclusively for Naigaon OC and another is for Neeljai South OC. These CHPs have facilities like crushing by feeder breaker to (-) 200 mm size screening of crushed coal, storage and steam and slack fractions, picking of steam coal, weighment of coal by road weigh-bridges and dispatch trucks. The Project Report envisages same production of the mine by mining in deep side. So no change in CHP has been suggested.

As per details available in the Asset Register, equipment life of the existing CHP will be upto 2010-11. The total replacement capital of Rs 3.3847 crores including Rs 60.00 lacs for strengthening of structures will be required in second year of project operation ie.2011-12.

## 2.9 LAND

The total requirement of the land for Bellora-Naigaon Deep OC Project would be 626.17 ha. Out of this land, 308.74 ha land is already in possession of WCL. Remaining 317.43 ha land is acquired. The proposed land required for the project comprises mainly of Tenancy land. This land is mainly used for cultivation purpose. The land required is free from forest land and no shifting of village is required.

Sl.No.	Particulars	Total Land (ha)
1	Tenancy land already acquired	230.72
2*	Tenancy land to be acquired	305.63
3	Government Land acquired	37.52
4	Government Land to be acquired	11.80
5.	Forest land, already acquired	40.50
	<b>Total</b>	<b>626.17</b>

Note: \* This includes 6 ha of colony land.

Rate of land has been considered as Rs. 1,00,000/- per ha. In addition to this provisions of 30% for solatium, 1.25% for Stamp Duty, Registration, Lawyer's charges and 12% interest for two years on the value of land have also been kept. Break up of proposed land use during mining for Bellora-Naigaon Deep OC Project Project is as given below :

Sl. No	Particulars	Total Area (ha)
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1.	Quarry Area	
a)	Backfilled upto surface	83.12
b)	Void left (area below surface R.L.)	142.68
2.	Embankment Area	18.45
3.	External OB dump	223.97
4.	Infrastructure & Roads etc.	26.00
5.	Area for additional quarters in residential colony	6.00
6.	Area needed for rationalization, blasting zone and safety zone along ext. OB dump	121.95
	<b>Total Land</b>	<b>626.17</b>

The above figures include area of existing OC mine but does not include land of existing residential colony which is located at Ghughus colony.

## COMPENSATION & REHABILITATION

Payment of compensation for land losers has been estimated as per the May,2008 compensation package of R&R policy of CIL. One time monetary compensation in lieu of employment is proposed to be paid to the land losers. It is contemplated that the entire exercise of land acquisition shall be completed in initial two years of project and quarry operation shall commence in Year-II.

No village shifting is involved in this Project. Additional capital provision of Rs.1520.55 lakhs has been done in this report.

### 2.10 SAFETY & CONSERVATION

The project report has been drawn in conformity with the prevailing statutory provisions applicable for safety in Opencast Mines. However, following matters related to safety during opencast operations has to be given special considerations.

The rain water falling within the project area would be diverted from the quarry area by providing garland drains and shall be collected towards low lying area. Major part of the quarry is under the HFL of Wardha river hence flood protection embankment with top RL 6 m above HFL would be constructed around quarry area.

## **SAFETY ASPECT FOR BLASTING OPERATIONS**

As explosives are required in bulk for blasting in OC mines, provision of regulation - 164 A of CMR 1957 should be ensured. All blasting operations shall be carried out in day light. Suitable precautions shall be taken as per statute before and after blasting operations. Controlled blasting technique has to be practised to minimise fly off rocks and ground vibrations and keep them within safe limits. In order to keep the ground vibrations within the permissible limit as per DGMS Circular No. 7 of 1997, to avoid flying of rock fragments and also to achieve satisfactory blasting results, optimized drilling / blasting parameters depending upon rock formation using combination of relays / delays will have to be evolved. It is further recommended that at the time of actual execution, proper study for controlled blasting and ground vibration is done with scientific body in order to evolve site specific charge distance relationship. Special precautions as per statute should be taken while working over the developed pillars/ extracted & stowed working.

## **PRECAUTION AGAINST FIRE**

Precautions should be taken against fire in the exposed coal seam. The exposed galleries should be covered with OB material to prevent from spontaneous heating in the old working.

## **SLOPE STABILITY**

It is suggested that following action may be taken to deal with slope stability problem.

- i) Water drainage system may be properly implemented to prevent accumulation of water in cracks. Also dumps shall be leveled to prevent accumulation of water over it. Proper drainage in dumps shall be also provided to prevent erosion of toe of dump.
- ii) Regular monitoring of tension cracks, horizontal and vertical movement of strata in critical area may be done.
- iii) Proper hydro-geological studies to be done.
- iv) After completion of dumping operations dumps to be stabilized by growing vegetation.

## **PRECAUTION WHILE WORKING OVER UNDERGROUND WORKING**

All precautions should be taken while working over developed workings/ depillared & stowed working to prevent the falling of equipment etc. in the underground workings. As explained earlier existing underground mine is proposed to be converted into opencast mine, this process of extraction of underground pillars is commonly associated with fire in exposed pillars.

## 2.11 MINE CLOSURE COSTS

The proposed Bellora-Naigaon Deep OC Project has been planned upto 170 depth and it is most likely that this will be extended further in dip side in future. Although no statutory guidelines exist on financial provisioning for mine closure activities as yet, financial provision of Rs.6.00/t has been provided throughout the mine life in order to undertake mine closure activities (for plantation in slope of dumps & quarry, for protection of mine boundary and continuation of monitoring programme and control of contaminated effluents). After implementation of closure activities, a small team comprising of 2-3 technical people may be required to see the efficacy of the closure activities. Cost for 4-5 years for such monitoring team functions shall be included in the final closure plan. Closure cost may be reviewed under the changing circumstances and new legislative requirements.

## 3.0 DESCRIPTION OF THE ENVIRONMENT

### AMBIENT AIR QUALITY

A) Base line & Existing Scenario – Base line ambient air quality w.r.t. the mine under consideration has also been generated during the pre monsoon season at five locations during 2005 covering the core and Buffer zone. The ambient air quality data thus generated reveal that the quality of ambient air is well within the permissible limits.

The existing environmental air quality for CO, SO<sub>2</sub>, Nox, SPM and RPM (including fugitive emissions) are being monitored continuously as per Environmental Protection (Amendment) Rule, 2000 in the mine area every fortnight and analysis result **since 2006 to 2009 show that the various quality parameters are well within the permissible limits.**

Therefore, it can be safely concluded that even after substantial increase in the production (resulting in increase in traffic density), the impact on one of the physical environmental attribute; i.e. ambient air will be insignificant.

Further, it can be inferred that the various pollution control measures already undertaken have been proved to be effective, which has arrested the deterioration of the ambient air quality in the mine activity area even after substantial increase in the production level. The peak capacity which is already been approved at 1.25 MTPA, is not getting enhanced as such the level of pollution will not increase.

So it may be predicted that the ambient air quality will have no harmful effect on human being, flora and fauna, soil quality, surface structures and aesthetic value of the surrounding environment as suitable mitigatory measures will be taken during the enhanced production to make the operations eco-friendly.

**The existing practice of fortnightly monitoring of ambient air quality will continue with the expansion project also and the results will be examined critically so as to identify the affected area and mine authorities will thereafter be able to take appropriate control measures to minimize the adverse effects, if any, as far as possible.**

## **WATER QUALITY: -**

**A) Base line & Existing Scenario** - In order to assess the **baseline water quality** w.r.t the mine under consideration, five sampling locations were fixed during 2005 covering surface as well as ground water sources in the buffer zone. The quality of water has been found to be well within the permissible limits.

The existing quality of mine pumped out water is being continuously monitored as per Environmental Protection (Amendment) Rule, 2000 every fortnight and the analysis results since 2006 to 2009 show that the quality is well within the permissible limits of Indian Standards.

With enhanced production from the mine, the quality of mine pumped out water is not going to change, as such the impact of enhanced production from the mine on water quality will be insignificant.

## **AMBIENT NOISE QUALITY:-**

**Base line & Existing Scenario** - The baseline ambient noise quality w.r.t. the mine under consideration has also been generated during the pre – monsoon season during 2005 at ten locations covering the core and Buffer zone. The ambient noise quality data thus generated reveal that the quality of ambient noise is well within the permissible limits. Noise level studies are being made continuously every fortnight as per Environmental Protection (Amendment) Rule, 2000 and it is found that the range varied well within the tolerable limits.

## **4.0 ANTICIPATED ENVIRONMENTAL IMPACTS & MITIGATION MEASURES**

### **IMPACT ON AMBIENT AIR QUALITY –**

The base line data generated at five locations covering the core zone and the buffer zone discussed in the previous paragraph also reveals that the levels of various parameters are well within the permissible limits. It can be inferred from the same that ambient air quality in and around the mine site under consideration has not been affected adversely due to continuing mining operations and it has been achieved by implementing various pollution control measures effectively. The same has been further corroborated by the existing ambient air quality data generated at the site as well as in the surrounding area. It may be worthwhile to mention here that during the balance life of the mine with a maximum projected production of 1.25 MTPA, the existing pollution abatement measures will continue to be taken with necessary augmentation/strengthening so that the ambient air quality level remain well within the permissible limits.

Further, it can be inferred that the various pollution control measures already undertaken have been proved to be effective, which has arrested the deterioration of the ambient air quality in the mine activity area even after substantial increase in the production level. The impact prediction through ISCT – 3 has been done in respect of SPM & RPM for Core Zone due to the approved peak capacity and has been given below and it may be seen that even after achieving the peak capacity of 1.25 MTPA the levels will remain

well within the permissible limits. The impact prediction through ISCT – 3 has been done in respect of SPM & RPM for the villages where base line data were generated and has been given in subsequent pages. It may be seen that even after achieving the peak capacity of 1.25 MTPA the levels will remain well within the permissible limits.

It may be worthwhile to mention here that the peak production capacity (which is approved) will remain the same in the proposed deep OC project, so it may be predicted that the ambient air quality will have no harmful effect on human being, flora and fauna, soil quality, surface structures and aesthetic value of the surrounding environment as suitable mitigatory measures will be taken during the balance life to make the operations eco-friendly.

The existing practice of fortnightly monitoring of ambient air quality will continue with the expansion project also and the results will be examined critically so as to identify the affected area and mine authorities will thereafter be able to take appropriate control measures to minimize the adverse effects, if any, as far as possible.

### **AIR POLLUTION CONTROL MEASURES**

The following mitigative measures have already been undertaken:

- a) All drills are fitted with dry type dust extractors;
- b) Permanent haul road has been made with WBM;
- c) Mobile water sprinklers & fixed water sprinklers have been put into use.
- d) Coal transportation road has been totally black-topped;
- e) Plantation (105470 nos.) has been done around colony, OB dump and around infrastructures like CHP, etc.
- f) Covering of coal transportation trucks by tarpaulin has been implemented and avoiding overloading of trucks;
- g) Dry sweeping of coal transportation road is also done regularly.

Further to the above, permanent water spraying arrangement in the CHP & weighbridge has already been installed. All these measures indicated above will continue to be maintained so that the adverse impacts on ambient air and noise become insignificant.

### **IMPACT ON WATER QUALITY –**

The major source of water pollution in the opencast mine is mine pumped out water. With enhanced production from the mine, the quality of mine pumped out water is not going to change, as such, the impact of enhanced production from the mine on water quality will be insignificant. The other sources are effluent from Workshop and residential colony. There is independent Workshop Effluent Treatment Plant (WETP) of 0.10 MLD operating at the site and each unit of the residential accommodation for the project personnel has been provided with individual soak pit & septic tank. The WETP has been provided with sufficient capacity to handle the requirement and is operating on ZERO

DISCHARGE concept as such there is no chance of pollution even after the enhancement of production.

**The impact prediction on ground water made in the approved EMP is for the final depth of the quarry. Therefore, change in mine production during intermittent stage will not affect the assessment except some local variations within the predicted influence area.** From the water quality analysis report of 2006,2007 & 2008, it can be concluded that the impact on water quality due to mixing of mine pumped out water with surface water, is insignificant as mine pumped out water does not contain significant pollution load. Now with the proposed Bellora – Naigaon Deep OC, so far as the enhancement in land area is concerned the water quality is not going to change which is further corroborated by the results obtained in the ground water level monitoring data being carried out in the buffer zone area (given in the chapter - III).

The ground water quality is monitored every fortnight in respect of mine pumped out water and the results discussed in previous paragraphs show that all the parameters are well within the permissible limits.

## **WATER POLLUTION CONTROL MEASURES**

As seen from Analysis Data, the mine pumped out water does not contain significant pollution load and the discharge water quality even without treatment is quite satisfactory. Workshop Effluent Treatment Plant (WETP) has already been put into operation and each unit of the residential accommodation for the project personnel has been provided with individual soak pit & septic tank.

However, if required in future, the abatement measures would be strengthened.

The strata seepage water gets accumulated in the mine sump underground, which has sufficient capacity allowing thereby considerable time for initial settlement of suspended particles in the sump itself. The supernatant water is then pumped out and fed into surface sedimentation pond for further settlement of remaining suspended particles (if any). The water is partly reused in the mine itself for dust suppression measures in Underground workings as well as on surface, plantation etc. The balance treated water is then discharged onto surface nullah. In the proposed Bellora – Naigaon Deep OC mine, the same system will be followed. There is provision of separate sedimentation pond to be constructed on surface for treatment of mine pumped out water

## **IMPACT ON HYDRO-GEOLOGICAL REGIME**

The projections on ground water inflow to the mine and the mine influence on ground water table are for the final stage of the quarry. Therefore, change in mine production during intermittent stage will not effect the assessment except for some local variation within the predicted influence area.

In the proposed deep OC mine, due to deepening of the mine, the radius of influence will change as the area is increasing this result in increase of the influence area but it is very likely that the trend will remain same. However, if any declining trend is recorded in

the vicinity of the mine then appropriate remedial actions as detailed out below will be taken to minimise the adverse impact. Moreover, during the water scarcity months, adequate water supply to the affected villages shall be taken in case village wells go dry.

## **IMPACT ON AMBIENT NOISE QUALITY**

The noise levels are being monitored regularly as per Env. Protection Amendment Rule, 2000 at existing OC MINE, which shows a quite satisfactory level. The base line data generated in the villages around the 10 km radius also reveals that the ambient noise levels are well within the permissible limits which also corroborate the fact that opencast mining activities at the said mine has not affected the ambient noise quality in the surrounding adversely and it has been achieved by implementing various pollution control measures effectively. **It may be seen from the existing noise level data that the existing quality of ambient noise is well within the permissible limits.** Therefore, it can be concluded that due to increase in production in this mine, the impact on ambient noise level is insignificant. As such, for peak approved production capacity of the mine there will no adverse impact on the ambient noise level. With the existing control measures the ambient noise levels will be maintained well within the permissible limits.

In the proposed Bellora – Naigaon Deep OC mine there is no increase in the approved peak production capacity but only additional mineralized zone is being annexed to the existing mine along with additional land for OB Dumping and other allied activities. Therefore, the scale of operation is not going to increase in terms of the capacity as such the impact on ambient noise level will not be significant and with the continuation of noise control measures the ambient noise level will be maintained within the permissible limits.

## **NOISE POLLUTION CONTROL MEASURES**

Monitoring of the noise control is being carried out on regular basis as per the Env (Protection) Amendment Rule 2000. It has been seen that the noise levels at the mine site are all below TLV. While planning for an effective noise attenuation measures, the concept of source, path and receiver has been considered.

### **(A) Noise Control at Source**

There are two areas where the noise generation can be checked at source.

### **(i) Proper Design**

Since the generation of noise can be reduced by reducing the vibration amplitude, the area of vibrating part and frequency of vibration is being taken care that all loose contact between metal parts avoided.

Shock absorbing pads are being fixed in the foundation of vibrating equipment / machines. In case of aerodynamic noise producing sources, mufflers are provided with the machines.

### **(ii) Proper Maintenance**

All machines and equipment is being properly maintained. Sound muffler system and bearing lubricating system etc. of equipment is being kept in proper condition.

### **(B) Noise control in Transmission Path**

The measures are to be taken for control of noise along the transmission path have been put in following two categories:

- (i) Air borne path
- (ii) Ground borne path

#### **(i) Air Borne Path**

The control in air – borne path has been planned in a number of ways as:

- (a) The crusher house, screen house etc., which are source of high level noise generation are to be enclosed.
- (b) Planting of furrows of trees along the thick foliage around the compound and wall of CHP, workshop and other industrial buildings. This will reduce the spread of noise. It can be also used as an acoustic enclosure to reduce ambient noise.

#### **(ii) Ground Borne Path**

It has been proposed to provide vibration isolators in the form of vibration absorbing pads placed at the base of vibrating equipment.

### **(C) Noise Control at Receiver End**

Even after adopting above measures, if desired noise level is not achieved at receiver end, in that case, following measures are suggested:

- (a) The workers exposed to high noise level are provided with earplugs.
- (b) Provision of enclosed booths at the worksite to protect worker from noisy environment.
- (c) The workers are subjected to Periodic Medical Examination once in every five years.

## LAND RECLAMATION

The total requirement of the land for Bellora-Naigaon Deep OC Project would be 626.17 ha. Out of this land, 308.74 ha land is already in possession of WCL. Remaining 317.43 ha land is acquired. The proposed land required for the project comprises mainly of Tenancy land. This land is mainly used for cultivation purpose. The land required is free from forest land and no shifting of village is required. The land proposed to be acquired will be mostly utilised for deepening of existing quarry up to 170 m and for accommodating external OB dumps. Only a meagre quantity of 6.00 ha will be acquired for making township for additional quarters.

Sl.No.	Particulars	Total Land (ha)
1	Tenancy land already acquired	230.72
2*	Tenancy land to be acquired	305.63
3	Government Land acquired	37.52
4	Government Land to be acquired	11.80
5.	Forest land, already acquired	40.50
	<b>Total</b>	<b>626.17</b>

## PRESENT STATUS OF LAND RECLAMATION

PRESENT OB RECLAMATION STATUS					
S.N.	PARTICULARS	Nos.	AREA (ha)	PRESENT STATUS	
1	Existing External OB Dump & Embankment	06	66.27	i) Planted Area – 20.78 ha ii) Active Dump – 48.09 ha	
2	Internal Dump	--	7.20	Planted	
PRESENT PLANTATION STATUS					
S.N.	PARTICULARS	No. of Trees	AREA (ha)	PRESENT STATUS	TYPE OF SPECIES
1	External OB Dump, Embankment & Backfilled Area	69950	27.98	Planted	Mixed native species e.g. Teak, Bamboos, Khair, Neem, Shisam, Bija, Karanj, Siwan
2	Avenue	670	0.268	Planted	Cassia, Neem, Imli & Gulmohar
3	On plain land covering infrastructure, colony & Rationalization Area	34850	13.94		Mixed native species e.g. Teak, Bamboos, Khair, Neem, Shisam, Bija, Karanj, Siwan
<b>TOTAL</b>		<b>105470</b>	<b>42.188</b>		

The OB management plan for proposed deep OC project is given below:-

# **OB MANAGEMENT**

**TOTAL OB IN EXISTING PROJECT - 58.40 MCM up to 31.03.2010.**

**OB in Ext. Dump – 24.67 MCM & OB in Embankment – 5.94 MCM  
OB in Internal Dump – 27.79 MCM**

**In balance life Additional OB - 124.73 MCM**

**OB in Ext. Dump – 89.19 MCM & OB in Embankment – 0.65 MCM  
OB in Internal Dump – 34.89 MCM**

**Thus the total scenario at the end of mine life of the proposed deepening project will be as follows :-**

**Total OB – 183.13 MCM**

**OB in Ext. Dump – 113.86 MCM & OB in Embankment – 6.59 MCM**

**OB in Internal Dump – 62.68 MCM**

## **CONCEPTUAL LAND – USE PATTERN AT THE END OF MINE LIFE**

S.N.	Category	Plantation	Void	Public Use	Undisturbed	Total
1.	External OB Dump	190.00	-----	-----	33.97	223.97
2.	Excavation Area	72.20	142.68	----	10.92 (Backfilled area without plantation)	225.80
3.	Plantation	21.608	-----	-----	-----	21.608
4.	Infrastructure & Roads	6.00	-----	20.00	-----	26.00
5.	Danzer Zone & Rationalisation Area	Plantation in & around is included in Sl.No.3 Above	-----	-----	147.891 (90.35+ 57.541)	147.891
6.	Emabnkment	18.45	----	-----	-----	18.45
7.	Township for Additional Quarters	0.50	----	5.50	----	6.00
	<b>Total</b>	<b>308.758</b>	<b>142.68</b>	<b>25.50</b>	<b>149.21</b>	<b>626.17</b>

# **PROPOSED PLANTATION PROGRAMME**

## **WITH NATIVE SPECIES ONLY**

(considering 2500 plants/ha) (Area figs in ha)

AFFORESTATION PLAN										
Year	External OB Dump & Embankment		Internal OB Dump (backfilled area)		Roads & Infrastructure		Vacant Land		Total	
	Area (ha)	No. of plants	Area (ha)	No. of plants	Area (ha)	No. of plants	Area (ha)	No. of plants	Area (ha)	No. of plants
EXISTING	20.78	51950	7.20	18000	5.608	14020	8.60	21500	42.188	105470
END OF MINE LIFE	187.67	469175	65.00	162500			13.40	33500	266.07	665175
Post - Mining	33.97	84925	10.92	27300	0.50	1250	----	-----	45.39	113475
<b>Total</b>	<b>242.42</b>	<b>606050</b>	<b>83.12</b>	<b>207800</b>	<b>5.608</b>	<b>15270</b>	<b>22.00</b>	<b>65000</b>	<b>353.648</b>	<b>884120</b>

The conceptual land - use pattern at the end of Mine life can be summarized as below :-

### **CONCEPTUAL LAND - USE PATTERN AT THE POST MINING STAGE**

S N	Category	Plantation	Void	Public Use	Undisturbed	Total
1	External OB Dump	223.97	-----	-----	-----	223.97
2	Excavation Area	83.12	142.68	----	-----	225.80
3	Plantation	21.608	-----	-----	-----	21.608
4	Infrastructure & Roads	6.00	-----	20.00	-----	26.00
5	Danzer Zone & Rationalisation Area	Plantation in & around is included in Sl.No.3 Above	-----	-----	104.342	104.342
6	Embankment	18.45	-----	-----	-----	18.45
7	Township for additional Quarters	0.50	----	5.50	----	6.00

Total	353.648	142.6 8	25.50	104.342	626.17
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## 5.0 ENVIRONMENTAL MONITORING PROGRAMME

15.1 ENVIRONMENTAL MONITORING – The environmental monitoring programme at present is being carried at the mine as per details given below: -

S N	Items	Parameters	Frequency	No. of Stations	Submission
1	Ambient Air Quality Monitoring	SPM, RPM, SO <sub>2</sub> , Nox, CO & Fugitive dust	Every Fortnight as per Environment Protection (Amendment), Rule 2000	4	Quarterly Report are submitted to SPCB & MOEF & will be continued.
2	Water Quality Monitoring	1) 4 Parameters. 2) 35 Parameters	Every Fortnight Once in a Year	3	Quarterly Report are submitted to SPCB & MOEF & will be continued.
3	Noise Quality Monitoring	Noise Levels	Every Fortnight	2	Quarterly Report are submitted to SPCB & MOEF & will be continued.
4	Environmental Statement		Annual		Annually Report is submitted to SPCB before 30 <sup>th</sup> September & will be continued.
5	Ground Water Level Monitoring & Quality	Water Level & Quality Parameters.	Water Level – Quarterly. Water Quality – Yearly.	In Buffer Zone Villages.	Quarterly Report are submitted to SPCB & MOEF & will be continued.
6	Compliance Report of EC Conditions.	All conditions both Specific & General	1 <sup>st</sup> June & 1 <sup>st</sup> December	Not Applicable	Half yearly Report are submitted to & MOEF & will be continued.

## 6.0 PROJECT BENEFITS

The benefits of the project can be summarized as below:-

- The physical infrastructure in the area has already been improved substantially by following ways:-
- Development of road, Road Bridge over Wardha River, thereby improving the communication.
- Improvement in Power, Telephone (including Mobile) facility.

- Improvement in Health Care facility & Educational facility.
- Improvement in Market / Trade & Business.
- The social infrastructure by way of cultural mixing of people of other states with local community glorifying "UNITY IN DIVERSITY".
- Substantial employment in the project & indirect employment for business & trading, contractor, transportation, vehicle contractor, nursery development.

**WCL** as a responsible corporate organisation in Central India is playing a significant role in developing the region around its mines in the States of Madhya Pradesh & Maharashtra. WCL takes up various infrastructural development works in the surrounding area covering the felt needs of the local community and the various works undertaken by WCL during last five years have been detailed out in previous chapter at para 6.9. In addition to the details detailed out earlier, various other works done by WCL at Naigaon OCP has also been given in previous chapter. It may be worthwhile to mention here that, Once proposed Bellora – Naigaon Deep OC mine comes up, similar works will also be taken up in and around the mine thereby developing the entire region.

## **7.0 ENVIRONMENTAL MANAGEMENT PLAN**

The administrative organization for ensuring that the mitigative measures for control of pollution are continued to be maintained and operated ( & if necessary augmented) and also for monitoring the effectiveness of the total system there is three tier set – up as given below –

### **7.1 MONITORING ORGANISATION**

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

(a) WCL headquarter acts as an apex body which supervises the activities relating to environment at project level through the General Manager.

(b) General Manager of the area coordinates the activities of various disciplines in the area to render all necessary assistance at the implementing level i.e. the Project. Area Nodal Officer (Environment) monitors all aspects of environment on behalf of the General Manager. He also takes suitable steps for generation of environment data along with its analysis and interpretations.

As far as plantation is concerned horticulturist with suitable backup staff shall be provided in the area for undertaking the plantation jobs including raising of a nursery. Plantation will have to be done on a large area. Therefore, it may be desired that an outside agency may have to be employed for this purpose. The horticulturist along with the supervisor shall only monitor and guide the agency for selection of site, treatment of soil, selection of species etc.

(c) Sub Area Manager is responsible for mechanical reclamation of the area. He is also responsible for biological reclamation with the assistance of GM's office.

### ORGANISATION FOR ENVIRONMENT MANAGEMENT

S.N	Measures/Actions		Agency
1.	Environmental Control	1	Chief General Manager, Wani Area
		2	Nodal Officer, (Environment), Wani Area
		3	Sub Area Manager, Bellora - Naigaon Deep OC .
		4	Staff Officer (Civil), Wani Area
		5	Environmental Cell (WCL H.Q.)
2.	Environmental Monitoring	1	Chief General Manager, Wani Area
		2	Staff Officer (Civil), Wani Area
		3	Nodal Officer (Environment), Wani Area.
		4	Sub Area Manager, Bellora - Naigaon Deep OC
		5	Environment Cell of WCL Headquarters
		6	Environmental Laboratory of CMPDI, RI-IV
3.	Reclamation	1	Sub Area Manager, Bellora - Naigaon Deep OC
		2	Nodal Officer (Environment), Wani Area
		3	Environmental Supervisor
		4	Horticulturist

## 7.2 ENVIRONMENTAL COST PROJECTION

It is an existing mine running since 11.4.96. One sedimentation pond for treatment of mine pumped out water and ETP for workshop effluent have already been constructed. Mobile and fixed water sprinklers have been put into use. Coal transportation road has been totally blacktopped. Plantation is being done regularly through revenue budget of the mine.

The total expenditure incurred on environmental Protection Measures are as given below :-

S.No.		Capital Cost		Annual recurring cost	
		Existing	Proposed	Existing	Proposed
1.	Pollution Control	9.09			
2.	Pollution Monitoring	--	---		
3.	Occupational Health	In built in the project Cost			
4.	Green Belt ▪ Mine ▪ Township			28.36	
5.	Reclamation/Rehabilitation of mined out area	In built in the project Cost			
6.	Others (specify)			18.00	
<b>Total</b>		<b>9.09</b>	<b>--</b>	<b>46.36</b>	

