SUMMARY

ENVIRONMENTAL IMPACT ASSESSMENT & ENVIRONMENTAL MANAGEMENT PLAN

FOR

PUBLIC HEARING AS PER EIA NOTIFICATION, 2006

NILJAI EXPN. (DEEP) OC

(Wani Area, WCL)

(Production Capacity – 3.50 MTPA)

(Land Area (Expn. In ML area from 1346.63 ha to 1761.22 ha)

(PREPARED AS PER TOR J – 11015/261/2011- IA.II(M) dated 23.05.2012)

DECEMBER-2012

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EXECUTIVE SUMMARY OF

EIA/EMP FOR

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1.0 INTRODUCTION

The existing Niljai OC mine was opened in January, 1991 in Wardha Valley Coalfields in Yavatmal district of Maharashtra State after approval of MoEF for a production capacity of 1.90 MTPA & Land area of 1530.00 ha vide its letter no. J-11015/28/85-IA.II (M) dated 13/02/1987. The further expansion in production capacity from 1.90 MTPA to 2.60 MTPA with Land area of 1530.00 ha was done and approved by MoEF vide its letter no. J-11015/81/2005-IA.II (M) dated 19/05/2005. Again expansion in production capacity was done to Niljai OC (with 3.50 MTPA production) and subsequently approved by MoEF vide letter no. J-11015/275/2008-I A.II (M) dated 10-02-09. The Niljai OC mine is being monitored as per Environment (Protection) Amendment Rule, Sept. h2000 and Quarterly reports are being sent regularly to MPCB and MoEF. The annual Environment (Audit) Statement is submitted every year to MPCB before 30th September. The six monthly compliance report against environmental clearance dated 19/05/2005 are also sent regularly to MoEF, New Delhi and Bhopal. The proposed Niljai Expn. (Deep) OC mine is the extension of existing Niljai OC mine with increase in Mine Lease Area from 1346.63 ha to 1761.22 ha.

TABLE 1.1: BRIEF OF PROJECT REPORT (MODIFIED DECEMBER-2010)

14	**Difference between price to yield 12 % IRR @ 85% capacity & Av. Selling Price (Notified) (Rs./t)**	***842.22***
SL. No.	**Particulars**	***Partial Hiring Option***
01	Balance Mineable Reserves (Mt)	*45.30*
02	Grade of coal	*'E'*
03	Volume of Overburden (Mm^3)	*383.51*
04	Average S/R (m^3/t)	*8.47*
01	Mine Capacity (Mty)	*3.00*
05	Manpower Requirement (Nos.)	*873*
06	Existing Manpower as on 01.4.2010 (Nos.)	*1339*
07	Overall OMS (t)	*13.02*
08	Additional Capital Required (Rs. in Crs.)	*414.1063*
09	Cost of Production (Rs./t)	
A	@ 100% of target capacity (Rs./t)	*1460.73*
B	@ 85% of target capacity (Rs./t)	*1581.29*
10	Av. Selling Price (Notified) (Rs./t)	*1074.50*
11	Loss (Rs./t)	
A	@ 100% of target capacity (Rs./t)	*386.23*
B	@ 85% of target capacity (Rs./t)	*506.79*
12	**Financial IRR (%)**	***Negative***
13	**price to yield 12 % IRR @ 85% capacity (Rs./t)**	***1916.72***

Based on the Project Report as mentioned above, the Form – 1 document was submitted to MOEF through MOC. Terms of Reference (TOR) accorded vide MOEF vide letter no J – 11015/261/2011- IA.II (M) dated 23.05.2012

Hence as directed by MOEF, this draft EIA/EMP has been prepared for submission to Maharashtra Pollution Control Board for conducting Public Hearing

1.1 JUSTIFICATION OF THE PROJECT

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 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.

TABLE 1.2: SURPLUS / DEFICIT OF COAL

Sl. No.	PARAMETER	YEAR					
		11-12	12-13	13-14	14-15	15-16	16-17
1.	Demand for coal	34.808	34.160	32.690	31.908	31.697	32.386
2.	Availability of coal from sanctioned projects	28.290	23.870	21.600	18.330	16.520	14.740
3.	Surplus / Deficit (+/-)	(-)6.518	(-)10.290	(-)11.090	(-)13.578	(-15.177	(-)17.646
4.	Availability of coal from future projects	1.700	4.420	5.700	8.460	10.370	12.900
5.	Surplus/Deficit (+/-)	(-)4.818	(-)5.870	(-)5.390	(-)5.118	(-)4.807	(-)4.746

As mentioned in Table indicates that supply of coal from WCL mines is not even sufficient to meet linked demand in 2011-12. Thus, there will be no problem in marketing of coal from the proposed Niljai Expansion (Deep) OC (Recast) Project in view of deficit in availability of coal from mines of WCL in near future. Socio-economic impacts of Niljai Expansion (Deep) OC Project have been considered and remedial measures have been provided in the project report.

2.0 PROJECT DESCRIPTION

2.1 SITE INFORMATION

The proposed Niljai Expn. Deep OC project is located in Wardha Valley coalfields of WCL. The proposed Niljai Expn. Deep OC mine is the extension of existing Niljai OC mine with increase in Mine Lease Area from 1346.63 ha to 1761.22 ha. The present area is located south of Ukni OC and North of Bellora Blocks.

2.2 GEOLOGY

Location

The Niljai Dip side Block under report is geologically located in the western limb of Main Rift Basin of Wardha Valley Coalfield. It lies south of Ukni Block and north west of Bellora Block.

General

The area under report is covered by thick layer of black cotton Soil. None of the underneath formations are exposed on the surface. The geological structure is, therefore, interpreted on the basis of subsurface data generated from the boreholes. Structurally the area is simple and no indication of faults have been observed

STRUCTURAL SETTING DIP & STRIKE

The general strike of the coal seam is northwest-southeast in the major part of the area with minor swings as observed from the floor contour plan of Composite Bottom Section. The dip of the strata is towards south west, the amount of dip ranges from 9^0 to 11^0 (gradient 1 in 5 to 1 in 6). The southern part of the area is generally having steep gradient (1 in 6) as compared to remaining part of the block. The structure of the seam is presented in floor contour plan.

COAL SEAMS

The major part of Wardha Valley Coalfield is characterized by presence of one thick Composite Seam varying in thickness from 15 m to 25 m, consisting of 2 to 3 correlatable sections i.e. Composite Top, Composite Middle and Composite Bottom. The sequence of coal seams encountered in the boreholes drilled by CMPDI in Niljai Dip side Block in ascending order is furnished below:

TABLE 2.1SEQUNCE OF COAL SEAMS, NILJAI DIPSIDE BLOCK

Coal seam/ Parting	Thickness range (m)		Generalized thickness range (m)	No. of B.H. intersection
	Minimum	Maximum		
Composite Top Section (Upper split)	0.20 m (NL – 26)	1.99 m (CMWNJ – 6)	0.40 - 1.00	28
Parting	0.30 m (NL-26)	1.27 m (MWNJ-8)		
Composite Top Section (Middle split)	0.26 m (MWNJ – 11)	1.05 m (MWNJ – 10)	0.40 – 1.00	28
Parting	1.16 m	3.02 m		

	(MWNJ-15)	(MWNJ-5)		
Composite Top Section (Lower split/merged)	5.98 m (CMWNJ – 3)	12.00 m (NL –21)	6.50 – 8.00	30
Parting	2.42 m (NL-26)	5.77 m (MWNJ-11)		
Composite Bottom Section	6.45 m (CMWNJ – 3)	10.93 m (MWNJ – 16)	8.00 – 10.00	30

MINE PARAMETERS

The different mine parameters of proposed Niljai Expn. Deep OC mine are tabulated below:

TABLE – 2.2 MINE PARAMETERS

Sl. No.	Particulars	QUARRY-I	QUARRY-II	TOTAL
1.	Area of the Quarry			
a)	On floor (ha)	73.22	134.58	207.80
b)	On surface (ha)	96.64	156.96	253.60
2.	Depth (m)			
a)	Initial	135	105	
b)	Final	200	200	
3.	Gradient of Seams	1 in 5 to 1 in 6	1 in 5 to 1 in 6	
4.	Average thickness of seam (m)			
a)	Bottom Section (m)	9.2	9.2	
b)	Top Section (m)	8.0	8.0	
5.	Average Strike length (m)	2000	2720	4720
6.	Width on surface (m) [dip rise]	400	600	
7.	Width on floor (m) [dip rise]	280	450	
8.	Grade (0.05m dilution at each contact point)	E (UHV 3935 kcal/kg)	E (UHV 3935 kcal/kg)	E (UHV 3935 kcal/kg)
9.	Mineable Reserves (Mt)	18.29	27.01	45.30
10.	Total OB (Mm3)	166.19	217.32	383.51
11.	Average stripping ratio (m^3/t)	9.09	8.05	8.47

Mineable Reserve

Considering the total mineable reserves of 45.30 Mt, and the present production of existing Niljai OC (around 3.10 Mt), the target production is kept as 3.0 Mty**.** The proposed Expansion

(Deep) OC PR does not suggest any further increase in the production target because of limited strike length as it is proposed to work the quarry by sub-dividing quarry into two sub-quarries for maximizing internal backfilling. To sustain this level of production, peak OB removal works out to about 31.48 Mm^3 per year in Departmental option and 34.87 Mm^3 per year in Partial hiring option.

TABLE –2.3 SEAMWISE DETAILS OF MINEABLE RESERVES. (Up to 200m Depth line)

NAME OF SEAM	Floor area Considered in Ha.	Thickness variation 'm'	Geological Reserves Mt	Geological Losses Mt	Mining Losses Mt	Mining Losses in batter/other Loses if any.	MINEABLE RESERV. Mt
1	2	3	4	5	6	7	8
BOTTOM SECTION	207.80	8.0-10.0	30.23	2.87	2.87	-	24.49
TOP SECTION	207.80	6.5-11.0	25.69	2.44	2.44	-	20.81
TOTAL			55.92	5.31	5.31	-	45.30

ADDITIONAL MINEABLE RESERVES FOR ANNEXING ADDITIONAL AREA (FOR EXPANSION PR): Not applicable

BALANCE MINEABLE RESERVES IN EARLIER APPROVED PR: The balance reserves of both the mines up to PR limit including reserves of approved scheme are as follows:

TABLE 2.4 Balance Reserves

SL. NO	MINE	COAL(Mt)	OB (Mm^3)	SR(m^3/t)
1	Niljai OC	10.701	64.876	6.06
2	Niljai South OC	5.235	10.687	2.04
	Total	15.936	75.563	4.74

To enhance the mine life for Niljai OC , a scheme was approved by WCL up to 1:7 cut off ratio beyond approved PR limit for mineable reserves of 10.50Mt (including barrier coal between Ukni OC & Niljai OC and OB of 59.974 Mm^3 for stripping ratio of 5.71 m^3/t with capital investment of Rs. 4.83 crores for Niljai OC. The balance total coal reserves up to scheme limit in the Niljai OC and approved PR limit in the Niljai South OC were 15.936 Mt as on 31.3.2010 With the current production of about 3 Mty, the mine life as on 31.3.2010 is about 5-6 years. In the proposed Niljai Expansion (Deep) OC. Total 45.30 Mt coal reserves would be mined (including barrier reserves of 2.70 Mt blocked between Niljai OC & Ukni OC and 3.45 Mt coal reserves blocked between Niljai OC & Bellora – Naigaon OC and 383.51 Mm^3 OB will have to be excavated (including OB of 17.20 Mm^3 between Niljai OC & Ukni OC and 18.74 Mm^3 OB between Niljai OC & Bellora – Naigaon OC at the stripping ratio of 8.47 m^3/t.

b. Type and Method of Mining Operations :

Table 2.5 Type and Method of Mining

Type	Method
Opencast	Semi- mechanized(Shovel- Dumper Combination)

c. Mine lease area : 1761.22 ha

Table 2.6 - Land details

S.N.	LAND USE	Within ML Area (ha)	Outside ML Area (ha)	Total
	Agricultural land	1728.97	--	1728.97
	Forest land	--	--	--
	Waste land	32.25	--	32.25
4	Grazing land	--	--	--
5	Surface water bodies	--	--	--
6	Settlements	--	--	--
7	Others (specify)	--	--	--
TOTAL				**1761.22**

Table 2.7-A: Stage-wise cumulative plantation

S. N.	year	Green Belt		External Dump		Backfilled area		Others (undisturbed area/etc.)		Total	
		Area (ha)	No. of trees	Area (ha)	No. of trees	Area (ha)	No. of trees	Area (ha)	No. of trees	Area (ha)	No. of trees
1	1st year	-	-	152	380000	-	-	108	269965	260	649965
2	3rd year	-	-	152	380000	-	-	108	269965	260	649965
3	5th year	-	-	230	575000	-	-	143	357465	373	932465
4	10th year	-	-	310	775000	-	-	178	444965	488	1219965
5	15th year	-	-	425	1062500	-	-	213	532465	638	1594965
6	19th year	-	-	525	1312500	-	-	248	619965	773	1932465
7	At the end of mine life	-	-	587.80	1469500	-	-	356.4	891000	944.2	2360500
8	Post mining (After 3 years end of mining)	-	-	587.80	1469500	-	-	356.4	891000	944.2	2360500

Note-: Number of trees will be = Area × 2500 plants per ha.

Table 2.7-B: Stage-wise Land use and Reclamation Area (ha)

S.N.	Land use category	Present (1st year)	5th year	10th year	15th Year	19th Year	End of Mine Life	Post Mining
1	Backfilled Area (Reclaimed with plantation)	57 (0)	57 (0)	103 (0)	200 (0)	260 (0)	295.52 (0)	295.52 (0)
2	Excavated Area (Not reclaimed)/void	278.04	352	350	388.64	328.64	293.12	293.12
3	External OB dump (Reclaimed with plantation)	587.80 (152)	587.80 (230)	587.80 (310)	587.80 (425)	587.80 (525)	587.80 (587.80)	587.80 (587.80)
4	Reclaimed Top soil dump	0	0	0	0	0	98.4	98.4
5	Green Built Area	0	0	0	0	0	0	0
6	Undisturbed area (brought under plantation)	689.38 (107.986)	615.42 (143)	571.42 (176)	435.78 (212)	435.78 (240)	257.38 (257.38)	257.38 (257.38)
7	Roads (avenue plantation)	0	0	1.6 (0.62)	1.6 (0.62)	1.6 (0.62)	1.6 (0.62)	1.6 (0.62)
8	Area around buildings and Infrastructures	149	149	149	149	149	149	149
	Total	**1761.22**	**1761.22**	**1761.22**	**1761.22**	**1761.22**	**1761.22**	**1761.22**

Table 2.7-C Details waste generation –OB & Top soil

Project	**Total waste generation (Mm^3)**	**Top soil (Mm^3)**	**Total OB generation (Mm^3)**	**Total OB in Ext. Dump (Mm^3)**	**Total OB Backfilled (Mm^3)**
Expansion Project (ha) (Balance life)	394.03	10.52	383.51	252.54	141.49
Total (Mm^3)	394.03	10.52	383.51	252.54	141.49

Drilling & Blasting

Drilling pattern in overburden, with a bench height of 18 m, the burden has been assumed as 8 m and spacing of 9m. The powder factor of 3.00 m^3/kg (from

actual field data) has been considered in Departmental Option & 2.50 m^3/kg (from actual field data) has been considered in Partial Hiring Option for planning purpose.

For coal and parting depending upon the thickness, bench height from 7 m to 9 m is being proposed. A powder factor of 7.08 t/kg (from actual field data) has been considered for blasting in coal for planning purpose. It is proposed that for increasing ground resistance for improving internal dump stability floor blasting may be done.

For storage of explosive four magazines having 3 t capacity each has been proposed.

COAL HANDLING & DISPATCH ARRANGEMENT

At present two streams of coal handling plant are existing in Niljai OC mine. To handle 3.00 Mty of coal, a third stream with one feeder breaker, two conveyors and a 2 x 100 t capacity overhead twin hopper has been proposed in this report. The third stream will be provided in Niljai South. These CHPs have facilities like crushing by feeder breaker, storage of crushed coal, weighment of coal by road weighbridges and dispatch by trucks to Ghugus railway siding.

HAUL ROADS & CULVERTS

For transportation of OB Haul Road of 4.00 km length for 190 T dumpers has been made. For transportation of Coal, Haul Road of 4.00 km length for 60 T dumpers has been made.

WASTE DISPOSAL / OB DUMPING

One external dump of 90 m height and 343.62 Mm^3 (insitu) OB including existing external dump quantity of 176.59 Mm^3 (insitu) OB (as communicated by mine authorities) is proposed to accommodate external dumping. One black cotton soil dump of 19.02 Mm^3 capacity and 30m height is proposed near embankment to avoid mixing of black cotton soil in OB of external dump to maintain its stability. About 5.50 Mm^3 (insitu) OB would be dumped for formation of embankment (8 km

length) against Wardha River. The OB of Quarry-II will be dumped in void of Quarry-I and Quarry-II keeping safe distance from the working area. Slope stability study from scientific agency should be conducted for design of backfill dump before actual start of backfill operation to find out optimum safe distance from working area. If there is any indication of slope failure, backfill dumping should be discontinued and dumping programme should be replanned. It has been projected to backfill 138.86 Mm^3 of OB in the quarry. Out of 138.86 Mm^3 of backfilled OB, 126.13 Mm^3 of OB will be dumped in Quarry-I and 12.73 Mm^3 of OB will be dumped in Quarry-II. It has been proposed to merge the internal dump of the proposed Quarry-I and proposed external Dump, it is suggested that safe distance should be left as per recommendation of slope stability expert based on study of backfill dump. The details of OB dumps have been tabulated in the table below:-

TABLE – 2.9 Details of Overburden Dumping

S.NO.	PARTICULARS	OB Quantity (Mm^3)
A	Total Quantity of External Dump including RH of 8.74 Mm^3 of dip side dump	343.62
B	Existing Dump	176.59
C	Additional Quantity in External Dump (OB of proposed PR)	158.29
D	Black Cotton Soil Dump incl. RH of 8.50 Mm^3 of dip side dump	19.02
E	Black Cotton Soil Dump as proposed in PR (External OB Dump)	10.52
F	Merged Quantity with Bellora Dump	17.92
G	Merged Quantity with internal dump of Q-I	52.42
H	Embankment Quantity	5.50
I	Additional Internal Dump Quantity	138.86
	Total Quantity to be dumped (C+E+F+G+H+I)	383.51

3.0 DESCRIPTION OF ENVIRONMENT

Air Quality

Due to coal transportation, wind erosion of OB dumps and coal handling, dust is likely to be generated. Ambient Air Quality will be controlled by black topping of roads, water spraying on roads, biological reclamation of OB dumps, green belt around CHP, OB dump, and along coal transportation roads on both sides etc.

Water Quality

Mine pumped out water, after sedimentation, will be utilized within mine premises and balance will be used for supplementing any shortage of water in the affected villages. Moreover, analysis of water pumped out from existing mines around the proposed project shows that even untreated water meets the acceptable limits, as such quality of water pumped out from the proposed project is not likely to have any significant pollution load even in untreated condition. Effluent from workshop will be treated in ETP & thereafter recycled. Similarly, water from CHP after sedimentation will be recycled. For domestic effluent, adequate sewage disposal arrangement has been proposed.

Ground Water Resource

Due to proposed project, it is anticipated that the effect on ground water regime will be pronounced up to around 500 m from mine edge and effect will be pronounced in the down-dip side and milder in the up-dip side. But this effect will be temporary in nature and once the project is over, after 2 – 3 rains, the regime will regain its almost original status.

Noise

Existing noise level at the mine site (w.r.t pre-mining level) is likely to increase but will be duly controlled (to keep well within acceptable limit) by developing green belt around CHP, workshop, and along roads, around colony, etc. The workers exposed to high noise level will be provided with earplugs. Provision of enclosed booths at the worksite to protect worker from noisy environment will be made.

Flora and Fauna

No Changes in the diversity of species or number of any species of animal are anticipated. Adequate plantation has been proposed with native species to maintain the diversity and also to attract the fauna.

Land Use

Regarding land use during mining, in addition to excavation of quarry for coal, overburden dump will be created along with development of other mine related infrastructures. Overburden dump is proposed to be technically and biologically

reclaimed and sufficient greenery will be developed. As such no significant change in present land use pattern is anticipated.

BASE LINE ENVIRONMENT OF THE STUDY AREA

The baseline environmental studies help in assessing the existing environmental conditions of the study area and identifying the critical environmental attributes which would be monitored after implementation of the project. This would facilitate the comparison of the resultant environmental conditions in the post project scenario with the present conditions and would help in preserving the environment from any deterioration and safeguard the interest of the study.

The baseline data has been collected for various environmental components such as, Air, Water, Noise and Soil for Expansion of Niljai Expn. O/C mine. Baseline data collection has been carried out within 10 KM radius from the boundary of the core zone during October'10 to December'10 (Post monsoon Season). The statutory guidelines and practices with present norms for coal mine projects have been followed during the baseline data generation/ collection.

METEOROLOGICAL DATA

A meteorology station has been set up at Core zone and micrometeorological parameters like wind velocity, wind direction, temperature, relative humidity, cloud cover etc. are recorded on hourly basis for 92 days from 01st October`2010 to 31$^{st}$ December`2010 representing post-monsoon season. Daily rainfall also has been recorded and reported below:

(i) Wind Speed/Direction during Winter Season

Generally, light to moderate winds prevail through out the season. Winds were light to moderate particularly during the morning hours. During the afternoon hours the winds were stronger. Wind speed readings are ranging from ≤0.4 m/s. to 15.2 m/s. The seasonal average wind speed is observed to be 7.1 m/s. The wind patterns of the season are presented below:

The analysis of wind pattern during the season shows that the predominant wind direction is from East-North-East with wind frequency of 21.98%. It is followed by North East with 17.75 % frequency and East with wind frequency (12.18 %).

The calm conditions prevails 19.16%. The wind speeds of 1-5 Kmph, 5-11 Kmph and 11-19 Kmph were recorded for 55.78 %, 23.47 % and 1.59 % of the total time respectively.

(ii) Temperature

Temperature values are ranging from 279.5 to 303.5 ^{O}K. The seasonal average temperature value during this period is found to be 291.5 ^{O}K.

(iii) Relative Humidity

The daily average relative humidity values are in the range of 35 to 92 %.The seasonal average humidity value is found to be 63.5 %. The relative humidity variation chart for the study period is given in Fig. No.

(iv) Cloud Cover

Mostly clear sky is predominant during the study period.

(v) Atmospheric Pressure

The average atmospheric pressure value has been found to be around 750 mm Hg.

(vi) Rainfall

The Total Rainfall recorded during the study period was 140.00 mm.

SUMMARY

The sky is mostly clear during the study period. The readings of wind velocity ranges between <0.5 m/s. to 4.8 m/s. Predominant winds are from East-North-East direction. The seasonal average wind speed is observed to be 7.1 m/s. The maximum temperature recorded is 303.5 ^{O}K and the minimum is 279.5. The daily average relative humidity values are in the range of 35 to 92 %.

AIR ENVIRONMENT

The baseline status of the ambient air quality has been assessed after selecting six nos. of monitoring locations in consultation with representatives of M/s CMPDIL. The predominant wind directions (both up and down) have been take into consideration while selecting the sampling locations. Out of the six sampling locations, two locations falls under industrial area and rest four belongs to rural/residential area. Major air pollutants viz. Suspended Particulate Matter

(SPM), Respirable Particulate Matter (RPM), Sulphur Di-oxides (SO_2) and Oxides of Nitrogen (NO_x) were monitored on 24 hourly basis.

AMBIENT AIR QUALITY MONITORING

Core zone

SPM and RPM values are ranging from 114 $\mu g/m^3$ to 178 $\mu g/m^3$ and 46 $\mu g/m^3$ to 70 $\mu g/m^3$ respectively. SO_2 and NO_x values are varying between 4.3 to 10.2 $\mu g/m^3$ and 5.0 to 12.1 $\mu g/m^3$ respectively. ***All the values are found to be well within the Standards for Coalmines stipulated by Ministry of Environment & Forests (MoEF).***

Buffer zone

SPM and RPM values are ranging from 100 $\mu g/m^3$ to 189 $\mu g/m^3$ and 36 $\mu g/m^3$ to 82 $\mu g/m^3$ respectively. SO_2 and NO_x values are varying between 4.1 – 10.8 and 4.3 – 11.3 $\mu g/m^3$ respectively. A***ll RPM, $SO_2$and NO_x values are well within the CPCB norms.***

Summary

All RPM, SO_2 and NO_x values are found to be well within the prescribed limits of CPCB.

WATER ENVIRONMENT

The abstract of water quality status is furnished in Table 3.1.

Table – 3.1 (a) Waste water quality status

Source	pH		Suspended Solids (mg/l)		BOD (mg/l)		COD (mg/l)	
	Min.	Max.	Min.	Max.	Min	Max.	Min.	Max.
ETP /Mine discharge	6.44	7.08	18	32	-	3	22	27
GSR 422E Norms	5.5-9.0		100		30		250	

Table –3.1 (b) Ground Water quality status

Source	pH		Turbidity (NTU)		TDS (mg/l)		Total Hardness (mg/l)		Iron (mg/l)		Chloride (mg/l)		Sulphate (mg/l)	
	Min.	Max.	Min.	Max.	Min.	Max.	Min.	Max.	Min.	Max.	Min.	Max.	Min.	Max.
Ground Water	7.18	7.34	6		988	1024	364	380	0.14	0.18	248		94	102
IS 105000 Norms	6.5-8.5		10		500-2000		300-600		0.3-1.0		250-1000		200-1000	

Table – 3.1 (c) Surface water quality status

Source	pH		Colour (Hazen Units)		TDS (mg/l)		Iron (mg/l)		Chloride (mg/l)		Sulphate (mg/l)		Fluoride (mg/l)	
	Min.	Max.	Min.	Max.	Min.	Max.	Min.	Max.	Min.	Max.	Min.	Max.	Min.	Max.
River	7.34	7.54	<5	15	466	1024	0.11	0.14	104	248	32	102	0.10	0.11
IS:2296-1982	6.5-8.5		300		1500		50		600		400		1.5	

Summary

At all locations, Oil and grease, phenolic compounds, cyanides, sulphides and insecticides are found to be absent and all heavy metal values except Iron and Zinc are found to be below the detectable limit. In general, the water quality at all six locations are found to be well within the prescribed norms of GSR: 422E IS: 10500 - 1991 and IS: 2296 - 1982.

NOISE ENVIRONMENT

The impact of noise may lead to annoyance depending upon the loudness of the noise levels. The environmental impacts of noise generated from the proposed project due to various mining activities can be undertaken by taking into consideration of various factors like potential damage to hearing, psychological response and annoyance. Generated noise level data are given in Tables - 3.2.

Table – 3.2: Noise level status

S.No.	Zone	Leq. Noise level (mean)(dB(A))		Noise level Standards	
		Daytime	Nighttime	Daytime	Nighttime
1.	Core zone	50.7- 56.6	47.4 – 49.5	**75**	**70**
2.	Buffer zone	40.7 – 44.4	37.4-40.1	**55**	**45**

Mean L_{eq} noise levels at day time and night time are ranging from 43.4 to 53.3 dB (A) and 41.2 to 49.6 dB (A) respectively in the study area. While comparing with IS: 4954 -1986 norms for acceptable outdoor noise levels in residential area (55 dB (A)) in respect of buffer zone and Industrial area (75 dB (A)) in respect of core zone.

Summary

While comparing with IS: 4954 -1986 norms for acceptable outdoor noise levels in residential area, the Leq values are found to be within the limits.

SOIL ENVIRONMENT

The main aim of the soil testing is to assess the soil quality of the area to define the present status of soil. It helps in the assessment of impact if any, due to proposed project activities and selection of suitable species of plants for green belt and afforestation as an anti pollution measure. Keeping this in view, three sampling locations were selected so as to represent the soil quality of the entire study area. The soil quality data collected are given in Table – 3.3

Table - 3.3 Soil quality status

S.No.	Parameters	Range of Concentration
1	pH	6.80 -7.84
2.	Organic Carbon (%)	0.7 – 2.41
3.	Potassium (mg/kg)	0.02 – 0.108
4.	Nitrogen (mg/kg)	0.370 – 0.50
5.	Available magnesium (mg/kg)	0.59 – 2.80
6.	Texture Class	Clay Loam

Summary

The soil quality in the project area appears to be good and would support after suitable reclamation measures.

4.0 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. At present WCL headquarter acts as apex body which supervises the activities relating to environment at project level through the General Manager. 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 is provided in the Area for undertaking the plantation jobs including raising of a nursery. 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.

Impact assessment

The mining and its related activities create ambient air pollution. The impacts of mining on ambient air quality are highlighted in the following paragraphs:

(a) The ambient air quality is influenced due to the presence of RPM, SPM, SO_2, NOx, etc., which are generated due to various activities like drilling, blasting and handling related to the project. Further, the ambient air quality is affected marginally to a varying degree due to the mining activities of other nearby opencast and underground coal mines of the same coalfield. The concentration of pollutants may vary depending upon the various micro-meteorological parameters and the seasons of a year.

(b) The baseline ambient air quality data has been generated surrounding the proposed site of Niljai OC to assess the present ambient air quality scenario corresponding to the pre-mining status of the proposed project. The details of the same have been given in previous chapter.

(c) The routine monitoring data generated for last one year have been shown in subsequent paragraphs. All the monitored parameters are well below the permissible limit.

(d) Now, with the start of the proposed project, there is likelihood of addition of pollution to the existing concentration level of different attributes of ambient air due to proposed enhancement in production capacity.

(e) Efforts will be made by implementation of proper abatement measures so as to maintain the sinking capacity of ambient air to absorb the additional

load, if any, thereby maintaining the quality of ambient air to the existing level to the extent possible.

(f) Further, as per TOR received from MOEF, AQI Prediction modeling will be done with FDM -90121 and will be incorporated in final EIA/ EMP.

AIR POLLUTION CONTROL MEASURES

Since Niljai OC Expn. Mine is an extension of Niljai OC mine therefore the existing pollution control measures will continue and further strengthened if required. The existing pollution control measures are as under:

EXISTING AIR POLLUTION CONTROL MEASURES

1) COAL STOCK YARD , CHP & WEIGH BRIDGE;-

- ✓ Water Spraying by - 21 nos.of fixed Sprinklers
- ✓ Green belt is being continuously developed around mining lease area, roads, workshop CHP etc. with density of trees around 2500 plants/ha.

2) HAUL ROADS

- ✓ Water spraying by 7 nos. Mobile Water Sprinkler

3) TRANSPORTATION:

- ✓ Black topping Roads
- ✓ Avoiding overloading & Coal transportation in trucks covered with tarpaulin
- ✓ Avenue Plantation
- ✓ Regular Manual Brooming on roads.

4) OVERBUDEN DUMPS:

- ✓ Plantation

5) DRILLING & BLASTING:

- ✓ Wet Drilling
- ✓ Controlled Blasting as per DGMS Permission
- ✓ Monitoring, Maintaining &Evaluation of records.

6) AAQ MONITORING:

- ✓ Fortnightly Monitoring & Annual Statement

- ✓ Quarterly Submission of Report to MPCB.

7) EC COMPLIANCE:

- ✓ Submission of six monthly compliance report to MOEF

8) ENVIRONMENT STATEMENT

- ✓ Every year Environment Statement of Niljai OC mine is submitted to SPCB before 30th September furbishing every information of mine.

Drilling Operations

In order to reduce dust generated by drilling operation wet drilling will be done.

Blasting Operation

In order to minimize the generation of dust during blasting, the following measures will be adopted:

(a) Blast holes are properly placed/spaced/positioned.

(b) Blast is properly designed in respect of hole-spacing. Hole placing and blast design are looked into as a fresh case every time, by a competent Blasting Officer who takes into consideration the actual geo-mining conditions of the site.

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

(d) Adaptation of Controlled Blasting Technique as permitted by DGMS.

Table – 4.1 Air Monitoring Data

SL. NO	NAME OF SAMPLING POINT	QUARTER ENDING	PARAMETERS			
			SPM	RPM	NOX	SO2
1	NILJAI COLONY-WNOA-1	SEPTEMBER 2011	195	78	< 6	< 6
		DECEMBER 2011	170	81	< 6	< 6
		MARCH 2012	185	89	4	2
		JUNE 2012	186	96	4	3
Permissible Limits			**200**	**100**	**80**	**80**
2.	TARODA VILLAGE- WNOA-2	SEPTEMBER 2011	85	41	< 6	< 6
		DECEMBER 2011	178	86	< 6	< 6
		MARCH 2012	189	80	5	3
		JUNE 2012	194	85	5	3
Permissible Limits			**200**	**100**	**80**	**80**

3.	CIVIL OFFICE-WNOA-3	SEPTEMBER 2011	371	166	< 6	< 6
		DECEMBER 2011	312	124	< 6	< 6
		MARCH 2012	471	198	8	3
		JUNE 2012	401	190	8	6
TLV as per Env.(Protection) Amendment rule 2000			**600**	**300**	**120**	**120**
4.	Workshop (ETP) of NOCM - I	SEPTEMBER 2011	202	47	< 6	< 6
		DECEMBER 2011	451	189	< 6	< 6
		MARCH 2012	526	220	8	5
		JUNE 2012	480	280	4	4
TLV as per Env.(Protection) Amendment rule 2000			**600**	**300**	**120**	**120**

NOTE: For all parameters highest value/reading has been taken

Table 4.2 Fugitive Dust Monitoring Data

SL. NO	NAME OF SAMPLING POINT	QUARTER ENDING	PARAMETERS	
			SPM	PM-10
1	**Weigh Bridge (24 hourly values in µg/m^3)**	SEPTEMBER 2011	445	--
		DECEMBER 2011	693	--
		MARCH 2012	931	--
		JUNE 2012	140	62
2.	**CHP (I) (24 hourly values in µg/m^3)**	SEPTEMBER 2011	290	--
		DECEMBER 2011	762	--
		MARCH 2012	433	--
		JUNE 2012	205	19

Table 4.3 CO MONITORING DATA

(All values are given in µg/m^3)

Sl. No.	Monitoring Location	Monitoring Date	Observed Value	NAAQ Standards (1 hour)
1.	**Niljai Colony**	17.03.12	< 114.3	4000
2.	Taroda village	17.03.12	< 114.3	4000
3.	Civil office	17.03.12	< 114.3	10000
4.	Workshop ETP of NOCM - I	17.03.12	< 114.3	10000

Loading & Transport

The loosened overburden material as well as coal, as far as possible will be wetted first with help of water spray arrangements before the start of loading operations.

Movement of vehicles and HEMM on haul roads, particularly when they are un - metalled, is another major source of dust generation. To minimize dust generation due to this operation, the following abatement measures will be taken.

(a) All long-life haul roads and service roads will be properly constructed and metalled. Unmetalled roads will be kept free of ruts, potholes etc.
(b) All haul-roads will be regularly sprayed with water. Water sprinklers will be regularly used in the project.
(c) Overloading of vehicles will be avoided.
(d) Covering of loaded trucks by tarpaulin.
(e) Regular cleaning of transportation roads.
(f) Adequate green belt will be developed all along the coal transportation road on both sides.

All the above-mentioned control measures will be continued during the entire life of the project.

OB Dumps

On the dump slopes and top surface, plantation of grass and trees will be done in phases.

Coal Handling Plant

Lot of dust is generated in coal handling plant during operations like coal crushing, transfer and conveying. Following abatement measures will be adopted for Coal Handling Plant.

i) Enclosure of the crusher house where maximum dust is generated. Also installation of dust suppression system in the crusher house (specially above the hopper in such a way that air borne dust is suppressed without adding much water to the coal).
ii) Minimizing the height of coal-fall at transfer points (to reduce dust formation) and, if necessary, installing dust suppression measures.
iii) Enclosure of the belt conveyor to reduce the generation of dust due to blowing wind.
iv) Creation of a green belt on both sides of belt conveyors and around coal stocks and the CHP building.

Noxious gasses are emitted through exhaust fumes during the operation of diesel / petrol operated equipment. In order to reduce such emission, regular maintenance of the diesel / petrol operated vehicles will also be carried out so that

the emissions from these vehicles are under control. However, wherever, the condition will permit petrol / diesel operated HEMM will be replaced by electrically operated ones.

Water sprinkling on coal stock/face, blanketing of exposed surface will be carried out to avoid spontaneous heating and minimize air pollution.

Ambient Air Quality Monitoring

The ambient air quality monitoring is being carried out on regular basis and will be done in future also as per the Env (Protection) Amendment Rule, 2000 so as to ascertain the likely load of various air pollutants and thereby suitably modifying the various control measures.

Plantation to Check Air Pollution

Plantation has been under taken in the mine area as mitigatives 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 as well as reduce the rate of dispersion of dust generated due to various mining operations viz. quarrying, coal and OB transportation, OB dumping, CHP operation.

Species to be planted (recommended by Forest Department) in the area are as follow.

a) Ornamental trees viz Gulmohar, Eucalyptus and fruit trees like Mango, Guava, Jamun and medicinal plant like Neem etc. will be planted in colony area, schools, dispensary, community buildings, play ground etc.

b) Ornamental shady trees will be planted e.g. around colony along roads, haul roads, and around industrial buildings etc.

c) The fast growing varieties of trees like Eucalyptus act as sound barriers where as ornamental shady trees e.g. Subabuland karanj will add to the aesthetic look of the area.

d) The Species to be planted on OB dumps etc are: Gravalia, Robusia, Punis, Vanetis, Semal, Karanj, Babul, etc

Table 4.4 – (A) Stage-wise Land use and Reclamation Area (ha)

S.N.	Land use category	Present (1st year)	5th year	10th year	15th Year	19th Year	End of Mine Life	Post Mining
1	Backfilled Area (Reclaimed with plantation)	57 (0)	57 (0)	103 (0)	200 (0)	260 (0)	295.52 (0)	295.52 (0)
2	Excavated Area (Not reclaimed)/void	278.04	352	350	388.64	328.64	293.12	293.12
3	External OB dump (Reclaimed with plantation)	587.80 (152)	587.80 (230)	587.80 (310)	587.80 (425)	587.80 (525)	587.80 (587.80)	587.80 (587.80)
4	Reclaimed Top soil dump	0	0	0	0	0	98.4	98.4
5	Green Built Area	0	0	0	0	0	0	0
6	Undisturbed area (brought under plantation)	689.38 (107.986)	615.42 (143)	571.42 (176)	435.78 (212)	435.78 (240)	257.38 (257.38)	257.38 (257.38)
7	Roads (avenue plantation)	0	0	1.6 (0.62)	1.6 (0.62)	1.6 (0.62)	1.6 (0.62)	1.6 (0.62)
8	Area around buildings and Infrastructures	149	149	149	149	149	149	149
	Total	**1761.22**	**1761.22**	**1761.22**	**1761.22**	**1761.22**	**1761.22**	**1761.22**

Table 4.4 – (B): Stage-wise cumulative plantation

S. N.	year	Green Belt		External Dump		Backfilled area		Others (undisturbed area/etc.)		Total	
		Area (ha)	No. of trees	Area (ha)	No. of trees	Area (ha)	No. of trees	Area (ha)	No. of trees	Area (ha)	No. of trees
1	1st year	-	-	152	380000	-	-	108	269965	260	649965
2	3rd year	-	-	152	380000	-	-	108	269965	260	649965
3	5th year	-	-	230	575000	-	-	143	357465	373	932465
4	10th year	-	-	310	775000	-	-	178	444965	488	1219965
5	15th year	-	-	425	1062500	-	-	213	532465	638	1594965
6	19th year	-	-	525	1312500	-	-	248	619965	773	1932465
7	At the end of mine life	-	-	587.80	1469500	-	-	356	891000	944.2	2360500
8	Post mining (After 3 years end of mining)	-	-	587.80	1469500	-	-	356	891000	944.2	2360500

Table 4.4 –(C): Post-mining Land use pattern of ML/Project Area (ha)

S.N.	Land use during mining	Land use (ha)				
		Plantation	Water Body	Public use	Undisturbed	Total
1	External OB Dump	587.80	--	--	--	587.80
2	Top soil dump	98.4	--	--	--	98.40
3	Excavation	--	293.12	--	295.52	588.64
4	Roads	0.62	--	0.98	--	1.6
5	Built up area	--	--	147.4	--	147.4
6	Green Belt	--	--	--	--	--
7	Undisturbed Area	257.38	--	--	--	257.38
8	Embankment around quarry	--	--	--	80	80
	Total	**944.20**	**293.12**	**148.38**	**375.52**	**1761.22**

WATER QUALITY

Identification of the sources of water pollution Likely sources of water pollution from this project along with the type of pollutants are as follows:

Table 4.5 sources of water pollution from this project along with the type of pollutants

Sl No.	Activities		Generation
(i)	Sanitary (domestic) wastewater	:	Suspended solids and BOD.
(ii)	Industrial wastewater from workshop	:	Suspended solids, oil & grease;
(iii)	Wastewater from mine	:	Suspended solids of coal, clay and oil;
(iv)	Surface run-off passing through coal stockpiles	:	Suspended solids;
(v)	Storm water from leasehold area and built-up area	:	Suspended solids.

- **Impact assessment**

  Mining and its related activities may create water quality problems. The impact of mining at the project on both surface and ground water sources has been assessed and given below:

(a) Surface water sources

- Deterioration of water quality and pollution of water bodies due to discharge of mine effluent, if not treated. Change in relief pattern due to mining may cause flooding, siltation, choking and pollution. Mitigatory measures would involve provision of (i) garland drains on periphery to prevent surface run-off from entering into the quarry, (ii) catch drain around the dumps for avoiding siltation and (iii) sedimentation ponds for reducing the pollution of surface water bodies.
- Possible overflow of water from nearby rivers / nalas must be safeguarded by stone pitching and strengthening the embankment along the side of the water course
- In order to assess the existing quality of surface as well as ground water quality surrounding the proposed project site , base line data has been generated during post monsoon season of 2009-10 and the details have been furnished in previous chapter and it is observed that all the parameters are well within the permissible limit.
- The mine water discharge quality of existing opencast project is being monitored regularly as per Env. (Protection) Amendment Rule, 2000. The result indicates that mine pumped out water does not contain any pollution load.

As such, in the Niljai Expn. Deep OC with further deepening similar quality of mine effluent can be expected because of same hydro geological set up.

Following are the existing water pollution control facility at Niljai OC

1. A settling/sedimentation pond (2 Nos.) has been provided for sedimentation of mine water before discharging into surface water body;
2. Domestic effluent plant in operation.
3. Water Treatment Plant of 1.40 MLD has been provided for drinking water for use in the colony.
4. ETP (2 Nos.) has been provided for workshop effluent.
5. Domestic effluent treatment plant 0.5 MLD has been provided.

6. Garland drain around the OB dump & coal dump will be made to avoid siltation of natural water course.

The quality of mine pumped out water is monitored once in every fortnight. The base line data generated at surface watercourses and at the ground water in the villages in the buffer zone have revealed that all parameters are well within the permissible limits.

Based on the data collected at similar coal mine, it can be concluded that the impact due to proposed mining operation, the adverse impacts on water both surface as well as ground water will be insignificant.

Table 4.6 Effluent water Quality Report

SL. NO	NAME OF SAMPLING POINT	QUARTER ENDING	PARAMETERS				
			pH	TSS (mg/l)	COD (mg/l)	O & G (mg/l)	BOD (3 days 27°C)
1	NILJAI COLONY-WNOW-1	SEPTEMBER 2011	8.11	58	80	BDL	-
		DECEMBER 2011	8.28	80	260	BDL	-
		MARCH 2012	7.99	38	60	BDL	-
		JUNE 2012	7.82	38	60	BDL	-
2.	MINE WATER DISCHARGE-NILJAI - II OC- WNOW-2	SEPTEMBER 2011	8.01	46	80	BDL	-
		DECEMBER 2011	8.46	82	160	BDL	-
		MARCH 2012	8.34	46	90	BDL	-
		JUNE 2012	7.65	38	60	BDL	-
3.	ETP (NILJAI) TREATED WATER-WN(ETP)W-3	SEPTEMBER 2011	7.63	48	80	BDL	-
		DECEMBER 2011	8.24	66	120	BDL	-
		MARCH 2012	7.99	32	60	BDL	-
		JUNE 2012	7.54	56	100	BDL	-
4.	ETP (NILJAI-S) TREATED WATER-WN(ETP)W-4	SEPTEMBER 2011	7.62	58	100	BDL	-
		DECEMBER 2011	8.21	64	180	BDL	-
		MARCH 2012	8.14	76	140	BDL	-
		JUNE 2012	7.44	74	180	BDL	-
5.	STP(DOMESTIC EFFLUENT) TREATED WATER-WN(STP)W-5	SEPTEMBER 2011	-	72	-	-	18
		DECEMBER 2011	-	62	-	-	18
		MARCH 2012	-	84	-	-	20
		JUNE 2012	-	60	-	-	18
TLV as per Env.(Protection) Amendment rule 2000			**5.5 - 9.0**	**100**	**250**	**10**	**30**

WATER POLLUTION CONTROL MEASURES

Salient controls measures have been taken are as follows:

i) Industrial Effluent

The wastewater 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.At present there is already an ETP in operation for the existing project with oil & grease trap and the same will be continued and if required an additional ETP may be commissioned or the existing ETP may be further strengthened augmented.

ii) Mine Water

Most of the suspended particles will be settled in the sump and the supernatant water will be pumped out. This water will be passed through sedimentation pond on surface, before being discharged in to natural drain. The same practice is already there in place and will be continued and if required an additional Sedimentation pond may be commissioned.

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 also reduces surface run-off, which helps averting siltation of natural watercourses.

Catch drains of suitable size will be provided around periphery of the OB dump as well as soil dumps to arrest site and sediment flows from the respective dump sites. In case of OB benches in the quarry, cross drainage will be provided which will carry silt and sediments into main sump made at the floor of the seam which will accumulate all the silts and act as first stage settling pond. The water will then be pumped out through pumps on to the surface and discharged in to surface settling tank/sedimentation pond. The clear water from the surface sedimentation tank will be used for watering the mine area, roads and green belt development.

The catch drains mentioned above will be regularly desilted and maintained properly. In addition, garland drains will also be provided around the periphery of the excavated area, which will carry surface run off and the drains will be regularly desilted before onset of monsoon. These drains will allow accumulation of silt materials and sufficient retention time for settling of silt materials. The same system is already being practiced in the existing mine and will therefore, be continued.

The domestic sewage disposal arrangement is provided in the township.

Regular water quality/effluent quality monitoring will be carried out so as to ascertain the likely load of pollutants and thereby suitably modifying the control measures.

IMPACT ON HYDRO-GEOLOGICAL REGIME

The projections on ground water inflow to the mine and the mine influence on ground water table 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.

Remedial measures to control ground water depletion

The following methodology and remedial measures will be taken to minimize the mine-induced impact on ground water levels and also adverse effects in the area.

(i) Artificial recharge to ground water system at the periphery of the anticipated influence area by local stagnation in low lying areas/drains by providing low height dams/bunds or by injection of mine water discharge. Surface water through tube wells /percolation structures.

(ii) The water shortage in the villages, if any, in the influence area can be supplemented by supply of water from outside source or from the mine water after treatment.

(iii) While reclamation of the mined area, void at the deepest portion of the pit has to be left. This residual pit void would initially serve as access for future expansion and subsequently it could be backfilled.

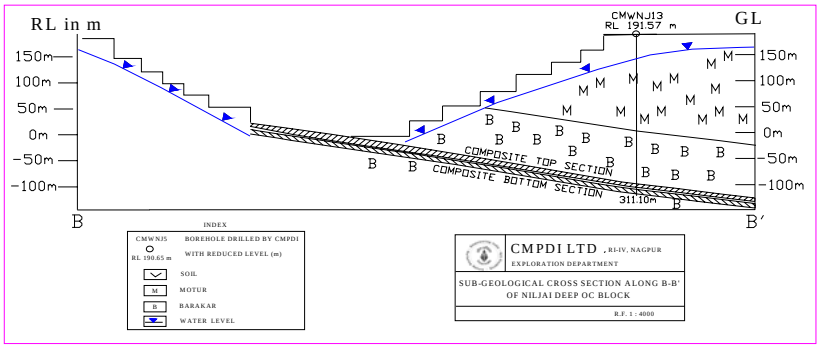
(iv) Regular well water monitoring in nearby villages will be carried out quarterly as per MOEF's guidelines.

Table 4.7 Drinking water Quality Monitoring Data

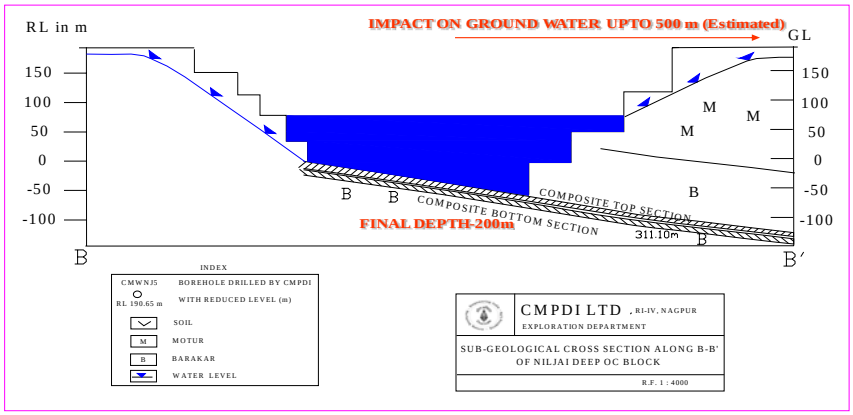
Name of the Location : Drinking water from Filter Plant

Sl. No.	Parameter	Quarter- Sep 2011 Analysis Result	Quarter-Dec 2011 Analysis Result	Quarter-Mar 2012 Analysis Result	Quarter-June 2012 Analysis Result	Standard (IS 10500 : 1991) Desirable limit	Standard (IS 10500 : 1991) *Permissible limit in the absence of alternate source*
1.	Colour (Hazen)	2	3	3	1	5	*25*
2.	Odour	Unobjectionable	Unobjectionable	Unobjectionable	Unobjectionable	Unobjectionable	-
3.	Taste	Agreeable	Agreeable	Agreeable	Agreeable	Agreeable	-
4.	Turbidity (NTU)	2	2	2	2	5	*10*
5.	pH value	7.48	7.56	7.47	7.68	6.5 to 8.5	*No relaxation*
6.	Total Hardness(as CaCO3) (mg/l)	160	172	188	376	300	*600*
7.	Iron (mg/l)	BDL	0.031	BDL	BDL	0.3	*1.0*
8.	Chlorides (mg/l)	30	30	30	44	250	*1000*
9.	Residual, Free Chlorine (mg/l)	BDL	BDL	BDL	BDL	0.2	-
10.	Dissolved Solids (mg/l)	250	300	330	514	500	*2000*
11.	Calcium (mg/l)	29	34	38	80	75	*200*
12.	Copper (mg/l)	0.02	0.002	BDL	BDL	0.05	*1.5*
13.	Manganese (mg/l)	0.005	0.009	BDL	0.016	0.1	*0.3*
14.	Sulphate (mg/l)	36	48	54	90	200	*400*
15.	Nitrate (mg/l)	6.4	1.8	1.8	8.36	45	*100*
16.	Fluoride (mg/l)	0.03	0.03	-	0.80	1.0	*1.5*
17.	Selenium (mg/l)	BDL	BDL	BDL	BDL	0.01	*No relaxation*
18.	Arsenic (mg/l)	BDL	BDL	BDL	BDL	0.05	*No relaxation*
19.	Lead (mg/l)	BDL	BDL	BDL	BDL	0.05	*No relaxation*
20.	Cadmium (mg/l)	BDL	BDL	BDL	BDL	0.01	*No relaxation*
21.	Zinc (mg/l)	0.14	BDL	BDL	0.015	5	*15*
22.	Chromium (Cr^{6+}) (mg/l)	BDL	BDL	BDL	BDL	0.05	*No relaxation*
23.	Alkalinity (mg/l)	96	156	172	396	200	*600*
24.	Aluminium (mg/l)	BDL	BDL	BDL	BDL	0.03	*0.2*
25.	Boron (mg/l)	BDL	BDL	BDL	BDL	1	*5*
26.	Phenolic Compounds (mg/l)	BDL	BDL	BDL	BDL	0.001	*0.002*
27.	Coliform (MPN / 100 ml)	NIL	NIL	NIL	NIL	Shall be absent	-

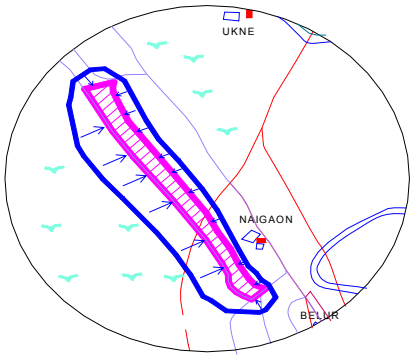
DURING MINING GROUND WATER PROFILE OF NILJAY DEEP OC



POST MINING GROUND WATER PROFILE OF NILJAY DEEP OC



PLAN SHOWING -IMPACT ON WATER TABLE DUE TO MINING OF NILJAI DEEP OC



NOISE QUALITY

In order to assess the existing ambient noise level in the surrounding of proposed project site corresponding to pre-mining scenario , base line ambient noise level data in the surrounding of the project site has been detailed out in Chapter – III and noise level values have been found to be within permissible limits. In addition, at the existing Niljai Expn. (Deep) OC OC mine, routine monitoring of noise level on fortnightly basis is being carried out continuously & details are furnished below. It may be seen that all the values are well within the permissible limit.

Existing mine may generate noise during operation:

(a) Drilling
(b) Blasting
(c) Shovel operation
(d) Dozing
(e) Movement of dumper
(f) Operation of CHP / Workshop

The following are some of the important activities responsible for high noise level generation, with their expected noise levels:

a. All mining activities i.e. drilling, blasting, shoveling, dozing and dumping are associated with high noise level [about 100 dB (A)].
b. Operation of most HEMMs produce high noise level. The noise level is in range of 80 – 100 DB (A). Noise levels have been found to be related to engine capacity.
c. Crusher – General noise level due to crusher ranges from 90 dB (A) – 105 dB (A). Some of noisy equipment produce noise whose level is around 120 dB (A).

The average sound pressure level of some of the HEMM associated with mining operation which are responsible for high noise level generation are as follows :

Table No 4.8 Equipment and their Noise Level

EQUIPMENT	NOISE LEVEL [dB(A)]
Dozer	98
Dumper	92
Power shovel	93
Drilling machine	96

NOISE POLLUTION CONTROL MEASURES

Monitoring of the noise control will be carried out on regular basis as per the Env (Protection) Amendment Rule 2000. 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 will be taken care that all loose contact between metal parts avoided.

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

(ii) Proper Maintenance

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

(B) Noise control in Transmission Path

The measures are to be taken for control of noise along the transmission path has 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.

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

Table 4.9 Post-mining Land use pattern of ML/Project Area (ha)

S.N.	Land use during mining	Land use (ha)				
		Plantation	Water Body	Public use	Undisturbed	Total
1	External OB Dump	587.80	--	--	--	587.80
2	Top soil dump	98.4	--	--	--	98.40
3	Excavation	--	293.12	--	295.52	588.64
4	Roads	0.62	--	0.98	--	1.6
5	Built up area	--	--	147.4	--	147.4
6	Green Belt	--	--	--	--	--
7	Undisturbed Area	257.38	--	--	--	257.38
8	Embankment around quarry	--	--	--	80	80
	Total	**944.20**	**293.12**	**148.38**	**375.52**	**1761.22**

LAND RECLAMATION / LAND MANAGEMENT

The following activities have been proposed for reclamation of land.

1. Backfilling of the excavated area to the extent possible.
2. Leveling 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. The density of trees is around 2000 – 2500 plants/Ha.

Table 4.10 Summary of Solid Waste –

Sl. NO	Particulars	Disposal of Solid Wastes(In Mm3)		
		External OB Dump	Internal Dump in Decoaled Void	Total
1.	Solid Waste (Over burden)	244.65	138.86	383.51

Solid Waste Management

- **YEAR OF STARTING INTERNAL DUMPING**

  No simultaneous backfilling has been proposed in the mine due to steep gradient of the mine. The internal dumping has been proposed to start from X year of mine life. Special precaution should be taken while backfilling in Quarry-I keeping safe distance between toe of backfill dump and working face. In the X year, OB removal shall also be started in Quarry-II.

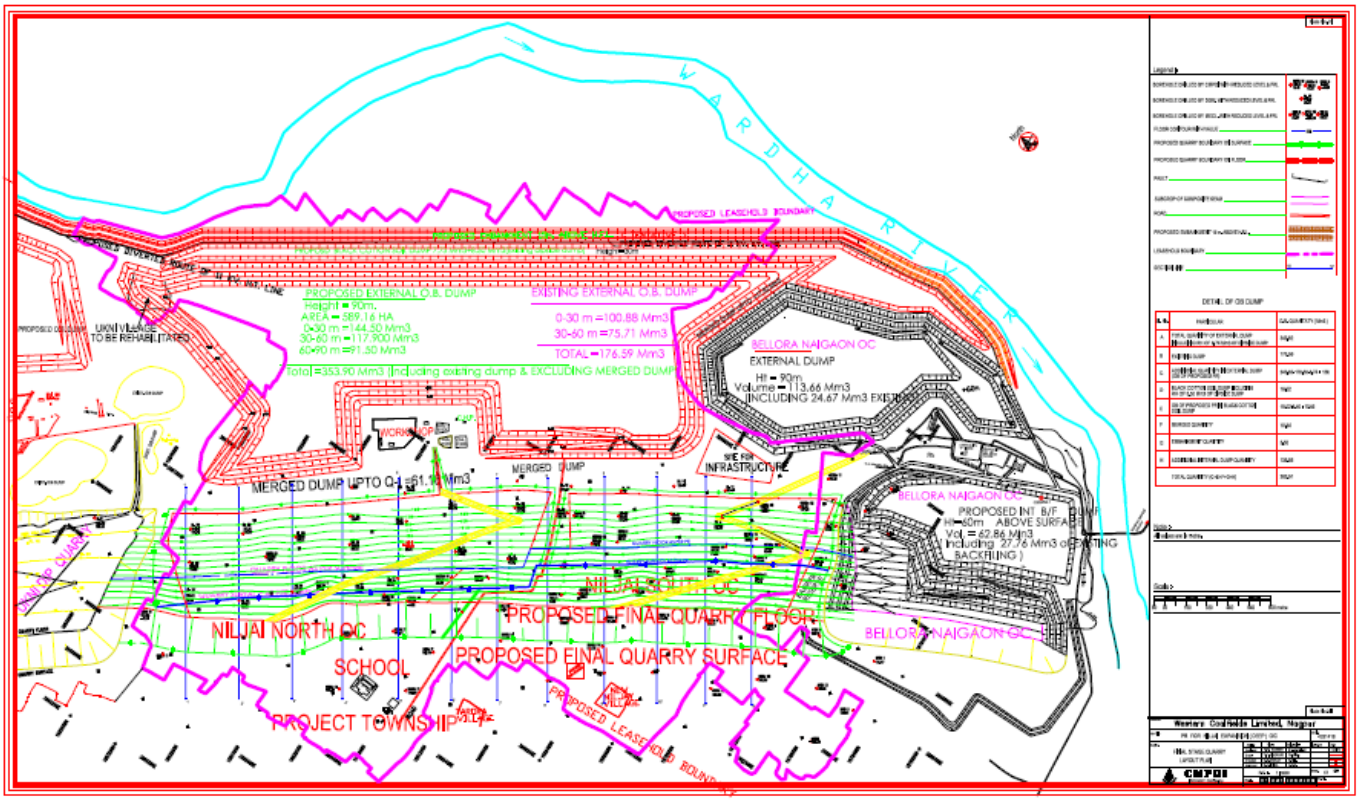
- **ANY FOREST LAND USED FOR EXTERNAL DUMPING.**

  The proposed external OB dumps are on non-coal bearing area. No forest land is used for external dumping (based on the land details provided by mine officials).

- **PLACE FOR TOP SOIL DUMPING**

  Top soil / black cotton soil dump has been proposed in the rise side of the quarry near embankment.

QUARRY AND SURFACE LAYOUT PLAN



PROGRESSIVE MINE CLOSURE PLAN

A. OBJECTIVES OF CLOSURE PLANNING

Mine closure planning has to be carried out at the starting of the mine and needs periodic reviewing and revision during its life cycle to cope with the geo-technical constraints, safety and economic risks, social and environmental challenges. Various other objectives are as follows:

(a) To allow a productive and sustainable after-use of the site which is acceptable to the mine owner and the regulatory authority;

(b) To protect public health and safety;

(c) To alleviate or eliminate environmental damage and thereby encourage environmental sustainability;

(d) To minimize adverse socio-economic impacts.

ENVIRONMENTAL MONITORING PROGRAMME

The environmental monitoring programme at present is being carried at the mine:

Table 4.11 Environmental Monitoring programme:

Sl. No.	Items	Parameters	Frequency	No. of Stations	Submission
1.	Ambient Air Quality Monitoring	SPM, RPM, SO2, NOx, CO & Fugitive dust	Every Fortnight as per Environment Protection (Amendment), Rule 2000	4	Quarterly Report are to be submitted to SPCB & MOEF
2.	Water Quality Monitoring	1) 4 Parameters viz. p H, Total Suspended Solids (TSS), Chemical Oxygen Demand (COD) & Oil and Grease. 2) 35 Parameters	Every Fortnight Once in a Year	3	Quarterly Report are to be submitted to SPCB & MOEF
3.	Noise Quality Monitoring	Noise Levels	Every Fortnight	2	Quarterly Report are to be submitted to SPCB & MOEF
4.	Environmental Statement		Annual		Annually Report is to be submitted to SPCB before 30th September.
5.	Ground Water Level Monitoring & Quality	Water Level & Quality Parameters.	Water Level – Quarterly. Water Quality – Yearly.	In Buffer Zone Villages.	Quarterly Report are to be submitted to SPCB & MOEF
6.	Compliance Report of EC Conditions.	All conditions both Specific & General	1st June & 1st December	Not Applicable	Half yearly Report are to be submitted to MOEF

ADDITIONAL STUDIES

PUBLIC CONSULTATION

To ascertain the concern of local affected and others who have a plausible stake in environmental impacts of the project / activity public consultation will be done at project site or close proximity for local affected persons with the following activities.

i) The process in which public would be directly involved or participate and indirect responses would be received through different modes of communications.

ii) District Magistrate will preside over the Public Hearing process to get public concerns incorporated in the EIA report.

iii) Videography of proceedings would be done and would be enclosed with the application for Expert Committee.

iv) The proceedings will be signed by DM/ADM in the same day of hearing.

v) The proceedings will be displayed in web site and other Govt. offices.

Disaster Management Plan

The project report has been drawn in conformity with the prevailing statutory provisions as per Mines Act 1952, CMR 1957 applicable for safety in Opencast Mines. However, the following matters related to safety during opencast operations have been given a special consideration. The rain water falling within the project area would be diverted from quarry area providing garland drains and shall be collected towards low lying area. However, sufficient space has been left between quarry boundary and Wardha River for accommodating flood protection embankment. The bench height and width would be kept as per the Statute. The gradient of haul road should not be steeper than 1 in 16. Adequate care must be taken for proper construction and maintenance of haul road. The HEMM deployed in the project are equipped with suitable in-built safety devices like audio-visual alarm, fire extinguishers, etc. The fencing should be erected round the quarry surface so that entry to unauthorized persons is checked. Hard hat, safety boots, dust respirators, etc. has been provided for safe working. Necessary fund provision has been made for the same.

PROJECT BENEFITS

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

a) Development of road, thereby improving the communication.
b) Improvement in Power, Telephone (including Mobile) facility.
c) Improvement in Health Care facility & Educational facility.
d) Improvement in Market / Trade & Business

ENVIRONMENT MANAGEMENT PLAN

GENERAL

Close monitoring of the environment and implementation of various protective measures discussed in the report forms an important part of EMP. Description of the administrative aspects of ensuring that mitigative measures are implemented and their effectiveness monitored, after approval of the EIA is being discussed.

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, Niljai OC is responsible for mechanical reclamation of the area. He is also responsible for biological reclamation with the assistance of CGM's office.

Conclusion

In view of the above as per Terms of reference (TOR) J – 11015/261/2011-IA.II (M) dated 23.05.2012 for Niljai Expn OC project, Wani Dist. Yeotmal for production capacity 3.5 MTPA with increase in Land area from 1346.63 ha to 1721.22 ha, Public area may be con