Well Water Level monitoring report

TABLE V-A: Groundwater monitoring data of dugwells in buffer zone of Ghorawari OC mine,Kanhan Area

Well No.	Name of village	Well location	Owner	Utility	Well dia (m)	Height of measuring point (m agl)	Well depth (m bmp)	WATER TABLE(m-bmp)				Formation Tapped
								May' 11	Aug' 11	Nov' 11	Jan' 12	
K												
1	DUGARIA (3.5)	In the compound of Mr. B.S. Rajput South of Road	G.P.	Domestic	4.20	0.75	6.55	Dry	1.30	1.80	4.60	M/B sand stone
2	KOLIYA (Nishtari talab)	Back side of H/O ASHARUNARE Near small Dam	G.P.	Domestic	4.60	0.70	12.00	7.25	0.35	1.25	0.55	M/B sand stone
3	NIMDHANA	North of junction of Damua & Nayagaon Road (Hirdagarh Rly. Siding)	G.P.	Domestic	3.40	0.85	8.55	5.45	0.05	1.30	1.75	M/B sand stone
4	BICHHUA	In the openfield of Mr Budhu Near G.P. office	Private	Domestic	3.45	0.40	4.55	2.80	0.00	0.50	0.90	Talchir
5	HIRDAGARH CHOWK	Near chowk in the compound of Mr. Binod kumar Vayas	Private	Irrigation	7.20	0.40	8.05	5.85	1.20	2.40	3.00	Talchir

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6	CHINDIKAMAT (Road)	About 200 m North of Kanhan bridge centre of small village	Mr.Shewak Ram	Domestic	6.50	0.65	12.55	11.15	6.25	7.65	8.65	Talchir
8	GHORAWARI (CGWB)	In the openfield near School side of road Jamai KM/11	GP	Domestic	4.00	0.80	6.50	2.40	0.50	0.70	0.70	MB Sand stone
9	GHORAWARI BAZAR	Opposite CHANIPAN PALACE	Rakesh Suryabansi	Domestic	8.25	0.60	11.45	5.55	0.35	0.70	3.40	M/B sand stone
11	DAMUA (UPKARCHOWK)	About 100 m North of Khan Niwas	G.P.	Domestic	2.90	0.90	17.55	10.80	1.40	5.25	7.40	M/B sand stone
12	DONGARIA (BHARTAGARH)	Near G.P. office	G.P.	Domestic	4.25	0.70	6.55	Dry	1.35	1.80	Dry	Taalchir
13	MANDAI	Back side of House of Shaktilal Partik	Shaktilal Partik	Domestic	4.25	G.L	12.20	11.70	7.40	8.95	9.50	Talchir
14	BIRAJPURA	In the openfield Near Road Junction opp. Chamanlal house	Chhanulal	Irrigation	2.80	G.L	10.85	14.05	NA	NA	13.55	Talchir with Dolerite dyke
15	HARYAGARH	Near L.P school & big talab	Rameshh Yadubansi	Domestic	4.80	G.L	10.75	Dry	NA	NA	10.50	Talchir
19	MARKADHANA	On Road to Rakhikol in the openfield	Private	Irrigation	6.05	0.95	7.57	1.75	0.60	1.05	1.20	Talchir
20	RAKHIKOL	Opposite manager s office	WCL	Domestic	3.35	0.85	7.10	3.35	1.35	2.95	3.45	M/B sand stone

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21	CHIKA TWARI	Extreme North of village about 100 m west of Eklama Road In the field	Rojgar Yojna	Domes tic	5.40	0.60	9.00	Dry	Dry	Dry	4.70	
23	BHAK RA	In the house of Dilip Behari	Private	Domes tic	3.90	0.45	12.00	10.75	2.85	3.95	9.35	M/B sand stone
24	BHAR DE	In the house of Munibai	Shymla l	Domes tic	3.90	0.45	9.05	6.80	3.60	4.40	5.85	M/B sand stone
25	JUNAR DEV	Side of Tambia Road near Mandir outer limit of muncipali ty	Deep chan Pawar	Domes tic	4.75	0.85	12.20	10.45	2.65	3.80	8.25	M/B sand stone
26	GARA DEI	Near Mandir on junction of Tambia & Umrai Road	G.P.	Domes tic	2.65	0.75	7.65	4.05	0.55	1.05	1.25	M/B sand stone
27	UMRAI	In the compoun d of Ramesh	G.P.	Domes tic	4.35	0.75	10.50	5.85	1.30	4.65	5.05	M/B sand stone
28	BIJORI	Centre of village in the field of Montilal	G.P.	Domes tic	3.90	0.70	8.90	6.10	1.25	1.90	3.05	Weat here d Basal t
32	MOARI	Back side of Budhanla l & near BHUDA MANSA	G.P.	Domes tic	3.60	0.75	5.95	4.75	0.80	1.35	4.05	Basal t
44	HANO TIYA	In the compoun d of school Near Hospital	G.P.	Domes tic	6.70	0.75	4.45	1.70	1.00	1.05	1.15	Talch ir

Pench area

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P												
10	SUKRI	Back side of Kherapati Mandir	Mandir Trust		D	4.00	0.45	16.45	3.65	0.15	0.60	1.00	Motu r

Note: m.bmp-meter below measuring point,m agl-meter above ground level,m.bgl-meter below ground level , D-Domestic, I-Irrigation, GP-Gram Panchayat, DCB-Dug cum borewell,TW-Tube well

Practice after the closure

The above practice of monitoring of quality of water would be continued for a period of 3 years. If required, corrective action/steps would be taken to mitigate any adverse effect on local water regime. The responsibility of maintaining the quality of drinking water will be entrusted on the State Authorities after 3 years of mine closure.

3.3 Air quality management :

3.3.1 Present practice :

a. At present air borne dust is suppressed by:

- Sprinkling water on the main haul roads and other roads of the mine where vehicles ply.
- Wet drilling and provision of dust collect in drilling machine
- Water sprinkling at the various points of the CHP, where coal is handled.
- Sufficient numbers of dust extractors have been provided in CHP.
- Avoiding overcharging of shot holes.
- Proper maintenance of I.C. engines.

b. Further, the quality of air is also monitored on regular basis by drawing Samples from the various residential and non-residential areas of the project. The test results are compared with the standards prescribed by the MoEF. The test results of recent sampling are as under:

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AIR QUALITY MONITORING DATA

NAME OF THE COMPANY : WCL YEAR : 2012
NAME OF THE AREA : KANHAN Q.E. : JUN.
NAME OF THE PROJECT : GHORAWARI OC

1. Manager Office - Ghorawadi OC : KGOA-1

(24 hourly values in µg/m³)

Month	Dates of Sampling From - To	Parameters SPM	PM-10	NOx	SO2
MAY. 2012	11.05.12 - 12.05.12	120	61	2	1
JUN. 2012	25.06.12 - 26.06.12	115	63	3	1
TLV as per Env.(Protection) Amendment Rule 2000		**600**	**300**	**120**	**120**

2. SAM Office - Ghorawadi : KGOA-2

(24 hourly values in µg/m³)

Month	Dates of Sampling From - To	Parameters SPM	PM-10	NOx	SO2
MAY. 2012	11.05.12 - 12.05.12	445	213	5	3
JUN. 2012	24.06.12 - 25.06.12	111	56	3	2
TLV as per Env.(Protection) Amendment Rule 2000		**600**	**300**	**120**	**120**

3. Colony : KGOA-3

(24 hourly values in µg/m³)

Month	Dates of Sampling From - To	Parameters SPM	PM-10	NOx	SO2
APR. 2012	08.04.12 - 09.04.12	186	81	3	2
APR. 2012	23.04.12 - 24.04.12	144	52	3	1
MAY. 2012	11.05.12 - 12.05.12	110	40	2	1
MAY. 2012	24.05.12 - 25.05.12	155	43	3	1
JUN. 2012	06.06.12 - 07.06.12	173	76	4	2
JUN. 2012	24.06.12 - 25.06.12	183	88	3	2
PERMISSIBLE LIMIT		**200**	**100**	**80**	**80**

4. Panara Village : KGOA-4

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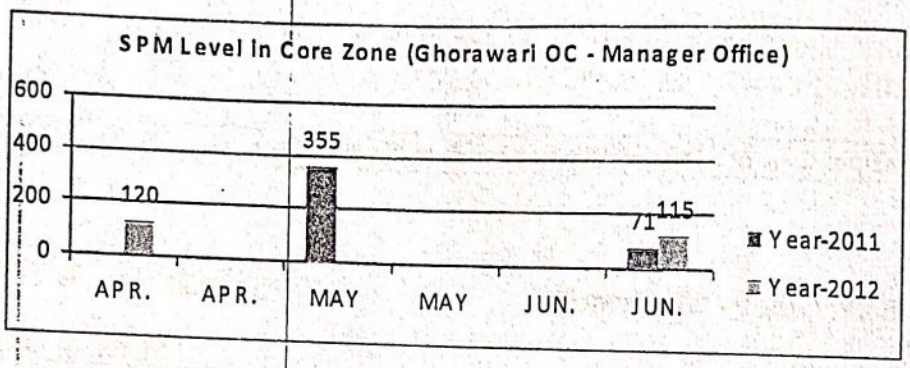
(24 hourly values in $\mu g/m^3$)

Month	Dates of Sampling From	-	To	Parameters SPM	PM-10	NOx	SO_2
APR. 2012	08.04.12	-	09.04.12	77	21	2	1
APR. 2012	24.04.12	-	25.04.12	66	25	2	1
MAY. 2012	11.05.12	-	12.05.12	67	22	2	2
MAY. 2012	24.05.12	-	25.05.12	153	41	3	2
JUN. 2012	11.06.12	-	12.06.12	54	17	2	1
JUN. 2012	25.06.12	-	26.06.12	55	24	2	1
PERMISSIBLE LIMIT				**200**	**100**	**80**	**80**



FUGITIVE DUST MONITORING DATA

1. PALACHURI SIDING

Month	Dates of Sampling From	-	To	Parameters SPM	PM-10
MAY. 2012	12.05.12	-	13.05.12	260	48

NOISE LEVEL DATA

NAME OF THE COMPANY : WCL
NAME OF THE AREA : KANHAN
NAME OF THE PROJECT : GHORAWADI OC

YEAR : 2012
Q.E. : JUN.

Name of the Location : Manager Office - KGON-1

Month	Date of Data collection	Noise Level in dB(A) Day Time	Night Time	Remarks

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APR. 2012 APR. 2012	08.04.12 23.04.12	57.2 59.2		46.7 47.5		
MAY. 2012 MAY. 2012	09.05.12 22.05.12	52.3 60.1		46.9 55.3		
JUN. 2012 JUN. 2012	11.06.12 22.06.12	52.4 56.2		48.1 46.2		
Noise Level Standard as per Env. (Protection) Amendment rule 2000		**75**		**70**		

Name of the Location : Colony - KGON-2

Month	Date of Data collection	Noise Level in dB(A)		Remarks	
		Day Time	Night Time		
APR. 2012 APR. 2012	08.04.12 24.04.12	49.1 51.5	40.9 42.8		
MAY. 2012 MAY. 2012	09.05.12 22.05.12	50.6 52.3	41.7 43.8		
JUN. 2012 JUN. 2012	11.06.12 22.06.12	49.3 51.3	40.0 41.7		
Permissible Limit		**55**	**45**		

3.3.2 Practice after the closure of the mine.

a. As the sources of dust and fume generation would no longer be present, the present practice of arresting the air pollution, as enumerated above at the Para-3.3.1 would no longer be required after the closure of the mine. However, water sprinkling would be done on the roads, which remain in use after the mine closure.

b. Quality of air would be monitored for a period of 3 years after the cessation of mining activities. Efforts would be made to bring the air quality to the pre-mining standard.

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3.4 Dump Reclamation

External dump

It is estimated that around 217.86 ha of land shall be occupied by the external dump. The external OB dump shall be formed in suitable lifts of appropriate height keeping an overall slope not exceeding 28^0 from the horizontal. In course of mining and after the completion of the final lift, the external OB dump shall biologically be reclaimed. The dumps shall be afforested by selecting proper plant species in consultation with state Forest Department.

Internal Dumps:

Backfilling has already started in the OCP and the final level of reclaimed backfill will be matched with the levels of surrounding ground level leaving a final residual decoaled void which will also serve as a lagoon which may be utilized as water reservoir for the locality. Most of the back filled area shall be afforested by selecting proper plant species in consultation with state Forest Department.

3.5 Disposal of Buildings, Plants & Machineries

3.5.1 Infrastructural details

Presently, the Project has following infrastructure and it is most likely that these infrastructures will remain till the completion of the Project.

a. **CHP-Coal handling arrangement at surface with capacity of surface Bunkers.**

There is no CHP in the project area.

b. **Workshop-Size with major equipment & P&M items**

There is no workshop. Work is contractually operated.

c. **Railway Sidings**

There is no railway siding in the Project. The coal is transported Railway siding of Hirdagarh, which is about 10 Km, by tippers.

d. **Colony (number and type of quarters)**

There are 800 company quarters and 1700 private quarters in the project area.

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e. **Water supply arrangements arrangements (source & facilities available like treatment plant and its capacity).**

There is one water treatment plant of 1.35 MLD and one sewage treatment plant, which is under construction in the project.

f. **Details of non-residential building-Office building, sub-station and any other building.**

Area Workshop-01
Area Store-01
Sub Station-02
Dispensary-02
Shool-04
Filter Plant-01
Overhead Water tank-02

3.5.2 Post closer disposal / re-use of the buildings , plants and machineries

a) **Disposal or reuse of existing HEMM , CHP , workshop and railway sidling for OC mines.:**

At the time of closure of the mine, it is expected that most of the equipments would complete its rated life and would be surveyed off as per the company's guidelines., The surveyed off equipments would be auctioned.
However, if some of the equipments would not have covered their rated life, they would be diverted to the neighboring projects for gainful utilization.
There are neither CHP nor railway siding in the project area hence these provisions are not applicable in this case.

b) **Disposal or reuse of transmission lines and sub-station.**

As per the electricity demand of the existing neighboring projects, an analysis would be made as to whether the existing sub-station and transmission lines could be gainful used or not. If the scope of gainful utilization is not found, they will be dismantled and the usable items / spares / conductors etc. would be

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dispatched to needy areas / projects.

c) Disposal or reuse of residential and non-residential buildings

At the time of closure, a list of surface buildings would be prepared in detail. Thereafter following steps would be taken in chorological order in respect of the available buildings:

- An assessment would be made to find that whether the available buildings can be used by the existing neighboring projects or any new project that might have come up in the vicinity .
- Thereafter the state agencies/ local agencies may be asked to take possession of the building, if required by them.
- When there are no takers, the buildings would be demolished and usable items would be recovered for future use.

3.6 Safety and security arrangement

3.6.1 Details of fencing around abandoned quarry.

As explained earlier a major portion of the quarry will be backfilled and the remaining void will act as water reservoir. It is proposed to develop a water lagoon in the dip side area of the quarry, which could not be back filled. The water lagoon will be handed over to state authorities for conversion into picnic spot.

The remaining void of the quarry would be properly fenced to avoid inadvertent entry of animals or human beings. Sufficient boards and danger signs shall be placed all around.

Later on, the responsibility of keeping the fencing secured would be entrusted on the state authorities. The entry into the mine is the haul road; it will remain for entry

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into the picnic spot. Both side of this haul road will be afforested.

3.6.2 Slope stability arrangement for high wall and back filled dumps

During operation of the mine, overall slope will be maintained at an angle not exceeding 25-28 degrees. Vegetation cover will also be provided along the slopes to arrest any failure.

As regards stability of back-filled dumps, the final level of reclaimed backfill will be matched with the levels of surrounding ground level leaving a final residual void. For the stability of the back-filled dump the slope of the dump will be maintained at the stable angle of 25-28 degrees. Vegetation cover will also be provided along slopes to arrest any failure.

3.7 Survey records of workings

All the mine workings including quarry, roads, ponds, tanks, etc shall be resurveyed and records shall be updated. Copy of such records shall also be submitted to the appropriate competent authorities, such as DGMS and state authorities.

3.8 Disposal management of hazardous material

At the time of closure, assessment would be made as to find whether there is any hazardous material that could cause problem. Such hazardous material e.g. explosives, chemicals, oil, etc. shall be appropriately disposed off.

3.9 Re- deployment of work force

3.9.1 The current manpower of the project is 134 as on 1.04.2013.

3.9.2 However , at the time of final closure, after exhaustion of entire mineable reserve, following steps would be taken for effective management of available manpower at the time of closure:

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A). First, option of VRS would be given to the age group of + 50 years. Some may accept , others will be gainfully utilized in other projects.

B). After exhausting the above portion, the middle aged group workforce (between 40 – 50 years) would be transferred to the similar projects.

C). If vacancy in similar nature projects gets exhausted. The relatively young workforce would be re-trained and re-deployed in other projects.

3.10 Emancipation from the community facilities and the facilities to the PAPs

3.10.1 The project affected persons (PAPs) and also the local communities are being provided many civic facilities, such as educational facilities, health facilities, and drinking water. At the time of final closure after exhaustion of entire mineable reserve these facilities will be entrusted upon the local people and state authorities so that the same could continue even after mine closure. If needed, a lump sum amount would also be paid to the local bodies/trust of PAPs/ state bodies for proper upkeep and maintenance of various community facilities.

3.10.2 To ensure that no financial loss occurs due to the closure of mining activity to the local community engaged indirectly in the exhausting mine, following steps would be taken:

- Will be given option to shift in the new or expansion mines located in the nearby area.
- They will be given vocational training for continuance / sustenance of income level.
- It is proposed that reclaimed and afforested land may be handed over to state forest dept. for the benefit of local ecosystem as per rules in vogue. The forest wealth can also be utilized by local people or tribal in the form of fruits and fodders.

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- The proposed picnic spot would be handed over to society of local people for commercial use of picnic spot by them.

3.11 Plantation Details of Last Five Years

Sr.No	Year	No. of Plants
1	2007-08	50,000
2	2008-09	Nil
3	2009-10	20,000
4	2010-11	20,000
5	2011-12	40,000
Total		1,30,000

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Chapter - 4
ECONOMIC REPURCUSSION OF CLOSURE OF MINE

4.1. Manpower of the project: -The current manpower of the mine is 134 as on 1.04.2013.

4.2. Assessment of income scenario of local resident employee: -

(a) Local employees will be redeployed in other projects of the company

(b) People engaged in indirect employment / ancillary activities will find no financial loss due to the mine closure as their activities will be shifted in the new or expansion mines located in the coalfield area. As such the direct and indirect manpower will not be affected due to mine closure.

(c) Resettlement / Redeployment of (a) & (b)

- Compensation for loosing employment or income.
- Vocational training for continuance / sustenance of income level.

Note: After the closure of the mine, the reclaimed leasehold area and any structure thereon, which is not to be utilized by the mine owner, shall be surrendered to the state Govt. Concerned following a laid down procedure as in vogue at that point of time.

The forest wealth can also be utilized by local people or tribal in the form of fruits and fodders.

The water reservoir in the mine voids will be utilized for pisciculture, irrigation, domestic drinking water or stabilizing the ground water regime. Landscaping during closure of mine will make the spot for tourist attraction.

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CHAPTER – V
TIME SCHEDULING FOR ABANDONMENT

IMPLEMENTATION SCHEDULE FOR MINE CLOSURE (LIFE OF THE MINE: 24 YEARS FROM 1.04.2013)

Sl. NO	ACTIVITY	TIME FRAME	1st Phase					2nd Phase					3rd Phase					4th Phase					FINAL PHASE				Post Closure Programme		
			1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	PC1	PC2	PC3
A	Dismantling of Structures																												
	Service Buildings	2 years																											
	Residential Buildings	2 & ½ years																											
	Industrial structures like CHP, Workshop, Field Sub-Station, etc.	2 & ½ years																											
B	Permanent Fencing of mine void and other dangerous area																												
	Random rubble masonry of height 1.2 metre including levelling up in cement concrete 1:6:12 in mud mortar	2 years																											
C	Grading of Highwall slopes																												
	Levelling and grading of highwall slopes	2 years																											
D	OB Dump Reclamation																												
	Handling/Dozing of OB Dump into mine void and preparation of Internal dump for reclamation.	Throughout the life of mine including 3 years after cessation of mine operation																											
	Technical and Bio-reclamation including plantation and post care	Throughout the life of mine including 3 years after cessation of mine operation																											
E	Landscaping																												
	Landscaping of the open space in the leasehold area for improving its esthetics and eco value	Throughout the life of mine including 3 years after cessation of mine operation																											
F	Plantation																												
	Plantation over cleared area obtaining after dismantling	2 years																											
	Plantation around the quarry area and in safety zone	Throughout the life of mine including 3 years after cessation of mine operation																											
	Plantation over the external OB Dump	Throughout the life of the mine																											
G	Post Closure Env. Monitoring / testing of parameters for three years																												
	Air Quality	3 years																											
	Water Quality	3 years																											
H	Entrepreneurship Development (Vocational / skill development training for sustainable income of affected people	Throughout the life of the mine																											
I	Miscellaneous and other mitigative measures	Throughout the life of mine including 3 years after cessation of mine operation																											
J	Post Closure Manpower cost for supervision	3 years																											

PC1: Post Closure Year 1, PC2: Post Closure Year 2, PC3: Post Closure Year 3

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Chapter-6
MINE CLOSURE COST

6.1 The mine closure cost will cover the following activities for which a corpus fund will be created by opening an escrow account with the coal controller organization in nationalised bank. In case of occurrence of acid mine drainage, post closure acid mine drainage management cost shall also be included in the total closure cost. An amount @ Rs 6.00 lakhs per Ha of the project area will be deposited in this account for final mine closure. Progressive mine closure will be done with the fund provided in approved report.

6.2 The balance life of the project is 25 years and mine closure fund has been assessed based on project life. However the mine is likely to be extended and the project under reference will get dovetailed into the future /extension project. As such the progressive closure under the extension will continue and final mine closure plan will be prepared 5 years before the cessation of mining activity.

6.3 The above rate has been taken from Circular No. 55011-01-2009-CPAM, Government of India, Ministry of Coal, Dated 27 August 2009 duly updated on 7th Januaryl 2013.

6.4 Type of Mine : Open Cast. Life of Mine(as on 1.04.2012) 25 years
Total project area of the mine: 1296.011ha
The financial provision for closure of Ghorawari OC Mine comes to around Rs. 18728.11 lakhs (based on April 2012 WPI at the @ Rs 6 lakh/ Ha.

6.5 Mine closure cost break – up for Ghorawari OC mine is hereunder;-

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Sl. No.	Activity	% of Total Mine closure Cost	Amount (Rs.In Lakhs)
A	**Dismantling of structures**		
	Service Building	0.2	37.46
	Residential Building	2.67	500.04
	Industrial Structures like, Workshop, Field substation, etc.	0.3	56.18
B	**Permanent Fencing of mine void and other dangerous area**		
	Random rubble masonry of height 1.2 meter including leveling up in cement concrete 1:6:12 in mud mortar	1.5	280.92
C	**Grading of highwall slopes**		
	Levelling and grading of highwall slopes	1.77	331.49
D	**OB Dump Reclamation**		
	Handling/Dozing of OB Dump into mine void and preparation of Internal dump for reclamation.	88.66	16604.34
	Technical and Bio-reclamation including plantation and post care.	0.4	74.91
E	**Landscaping**		
	Landscaping of the open space in leasehold area for improving its aesthetic and eco value.	0.3	56.18
F	**Plantation**		
	Plantation over cleared area obtained after dismantling.	0.5	93.64
	Plantation around the quarry area and in safety zone.	0.2	37.46
	Plantation over the external OB Dump.	0.02	3.746
G	**Post Closure Env Monitoring/Testing of Parameters for three years.**		
	Air Quality	0.22	41.20
	Water Quality	0.2	37.46
H	**Entrepreneurship development (vocational/ skill development) Training for sustainable income of affected people.**	0.26	48.69
I	**Miscellaneous and other mitigative measures.**	2	374.56
J	**Post Closure Man power cost for supervision**	0.8	149.82
	TOTAL	**100%**	**18728.11**

1. Mining is to be carried out in a phased manner initiating afforestation/ reclamation

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work in the minedout area of first phase while commencing mining in the 2nd phase.

2. Upto 80% of the total deposited amount including interest accrued in the ECSROW account may be released after every 5 years. The amount released should be equal to expenditure incurred on Progressive Mine closure in past 5 years or 80% whichever is less.
3. The above cost/expenditure will be met from the corpus fund deposited in the escrow account by the mine operator. However, the additional amount beyond the escrow account will be provided by the mine operator after estimating the final mine closure cost (as per the mine closure guideline).
4. The amount indicated separately under each head is indicative only and based on actual expenditure the amount may change.

6.6 Estimate of proposed escrow fund.

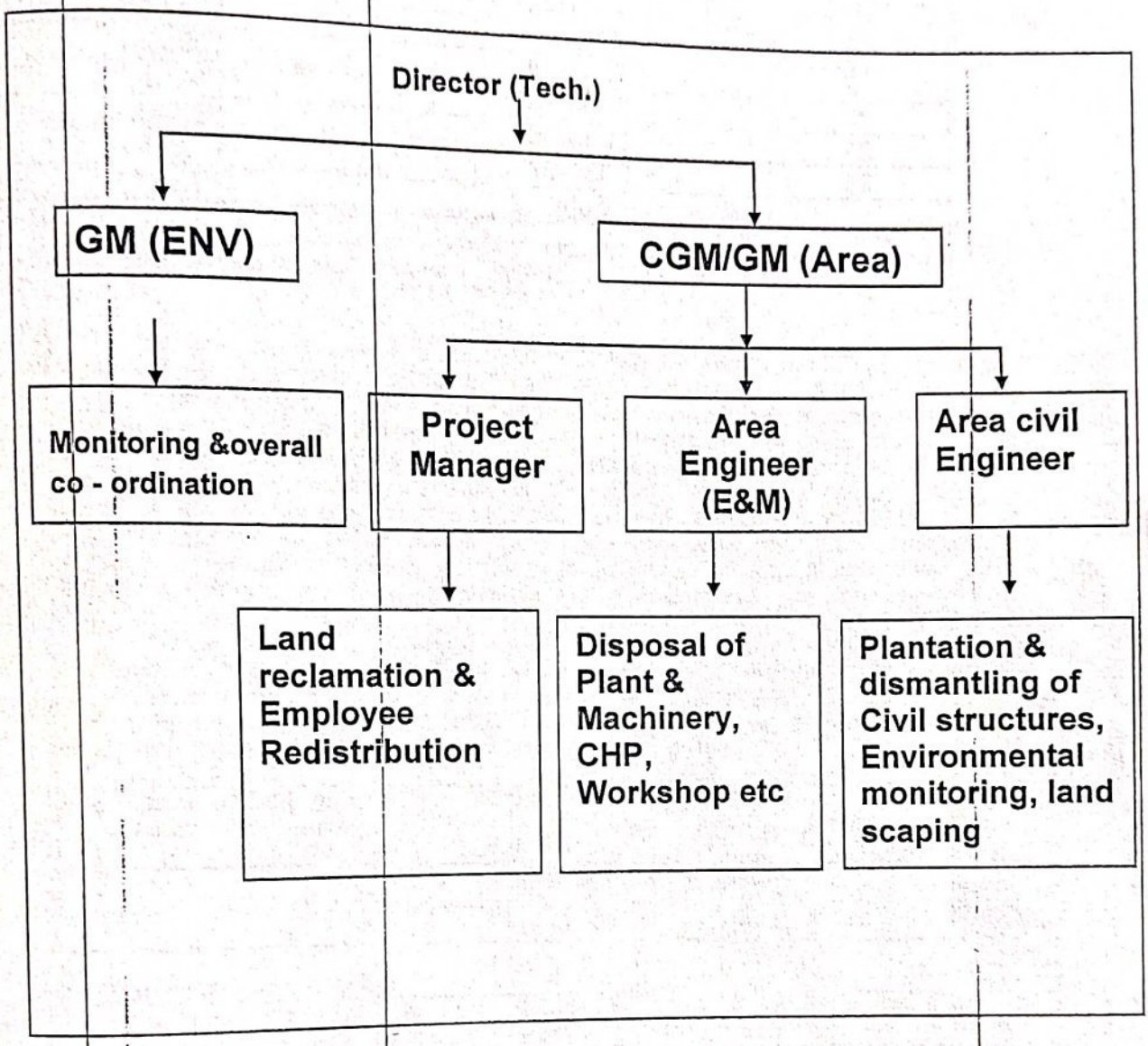
The total project area is 1296.011 Ha. So the corpus based on August, 2009 rate is 7776.06 Lakhs @ Rs 6.0 Lakh /ha of project Area. The wholesale price Index in August, 2009 is 129.6 and the WPI, for the month of April 2012 available in the website of Office of Economic Adviser, Ministry of Commerce, Government of India is 163.5. So the current value of corpus is Rs. 7776.06 *163.5/129.6 Lakhs, which comes to Rs. 9810.07 lakhs. This corpus is to be divided by the life of mine i.e. 25 years. So dividing by 25 years, the annual corpus comes to Rs 392.40 lakhs. This amount is to be deposited in escrow account every year with 5% escalation.

S.NO.	FINANCIAL YEAR	AMOUNTS IN LAKHS
1	2012-13	392.40
2	2013-14	412.02
3	2014-15	432.62
4	2015-16	454.25
5	2016-17	476.96
6	2017-18	500.81
7	2018-19	525.85
8	2019-20	552.15
9	2020-21	579.75
10	2021-22	608.74
11	2022-23	639.18
12	2023-24	671.14
13	2024-25	704.69
14	2025-26	739.93

MANAGER
Ghorawari Colliery No.

Chapter-7
IMPLIMENTATION PROTOCOL

For implementing the mine closure activities, the following organizational structure has been proposed:



Environmental monitoring for three years after closure of mine will be carried out to evaluate the environmental quality of the area. If need be, proper mitigative measures will be taken up after evaluating the environmental quality. The funds for this have been provided in the cost estimate. Before closure of the mine, Area GM will prepare survey and disposal report and the same will be submitted to DGMS for acceptance.

****

MANAGER
Ghorawari Coll

15	2026-27	776.93
16	2027-28	815.77
17	2028-29	856.56
18	2029-30	899.39
19	2030-31	944.36
20	2031-32	991.58
21	2032-33	1041.15
22	2033-34	1093.21
23	2034-35	1147.87
24	2035-36	1205.27
25	2036-37	1265.53
	Total	18728.11

****

MANAGER
Ghorawari Colliery No.

No.J-11015/367/2008-IA.II(M)
Government of India
Ministry of Environment & Forests

Paryavaran Bhawan,
C.G.O.Complex,
New Delhi -110510.

Dated: 26th December 2008

To
Director (Tech.)
M/s Western Coalfields Ltd.,
Coal Estate, Civil Lines,
Nagpur- 440001.

Sub: Ghorawari Opencast Coal Mine Project (from 0.45 MTPA to 1.50 MTPA) of M/s Western Coalfields Ltd. (WCL), located in village Ghorwari Khurd, Tehsil Junnardeo, District Chindwara, Madhya Pradesh - Environmental clearance – reg.

Sir,

This has reference to letter No. 43011/65/2008-CPAM dated 30.07.2008 forwarding the application and letters dated 18.11.2008 and 18.11.2008 on the above-mentioned subject. The Ministry of Environment & Forests has considered the application. It has been noted that the project proposal is to mine coal from patches of old UG workings by opencast operations **and expansion in production of coal from 0.45 MTPA to 1.50 million tonnes per annum(MTPA).** EC was granted for 0.45 MTPA capacity project on 19.02.2008. The total lease area is 1296.011 ha of which 178.10 ha is agricultural land, 593 ha is forestland, 192 ha is grazing land, and 332.911 ha is Govt. land. Forestry clearance has been applied for for renewal of lease. There area no National Parks, Wildlife Sanctuary, Biosphere Reserves found in the 10 km buffer zone. River Kanhan flows at a distance of 6-7km from the ML. It is not proposed to modify the existing natural drainage.

There is no change in the geo-mining characteristics of the working of the various patches within the ML. Of the total lease area, area for excavation is 750.36 ha, area for OB dumps 217.86 ha, infrastructure is 12.34 ha, roads is 2.65 ha, area for green belt is 497.049 ha, area for township is 140 ha, and area for rationalisation is 172.80 ha. The proposal is to mine coal from patches of old UG workings by opencast operations as given below:

S.N.	Name of OC Patch	Quarry Area (ha)	TOTAL		Quarry Depth (m)		Final Backfilled Area (ha)	Final Void (ha)
			Balance Coal in LTPA	Balance OB in Lakh M3	Present	Max.		
A. Present Working Patches								
1.	No. 16/17	17	Nil	Nil	45	50	9.50	7.50
2.	No. 6A & 6B	20	0.89	17.45	30	52	18	2
	TOTAL =	**37**	**0.89**	**17.45**			**27.50**	**9.50**
B. Proposed upto 2015-16								
1.	No. 16 & 17 B. Ph.III	40.50	8.57	60.75	--	54	40.50	Nil
2.	Ghogra OC Patch	8.0	2.99	13.13	--	53	6	2
3.	Kathldeo OC Patch	12.50	5.12	17.83	--	34	10	2.50
	TOTAL =	61	16.68	91.71			56.50	4.50

MANAGER
Ghorawari Colliery No.

C. Proposed beyond 2015-16 upto 2025-26								
1.	Ghorawari Kalan OC Patch	15	4.50	28.45	--	30	10.44	4.56
2.	Dunganiya OC Patch	39	10.60	109.50	--	50	27.13	11.87
3.	Panara OC Patch	12.50	4.25	39.75	--	54	8.70	3.0
4.	Bharat Colliery OC Patch	79.20	24.0	198.0	--	48	55.10	24.10
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	TOTAL =	**187.95**	**55.84**	**518.48**			**130.758**	**57.192**
D. Proposed beyond 2015-16 upto 2025-26								
1.	Vegin Patch	168	Individual Schemes will be firmed up after 2014-15					
2.	Datla East	139.994						
	TOTAL =	424.594						
E. Abandoned Patches								
1.	No. 16 & 17 OC Patch Phase-I	12.50	Not Applicable				12.50	Nil
2.	No. 6 & 7 OC Patch Ph I & II	7.50					7.50	Nil
3.	Gh-2 OC Patch	6.0					6.0	Nil
4.	Gh-3 OC Pat	4.50					4.50	Nil
5.	Kolhiya OC Patch	4					4	Nil
6.	DQ-3 OC Patch	5.316					5.316	Nil
	TOTAL =	39.816					39.816	Nil
GRAND TOTAL (A+B+C+D+E)		**750.36**	**82.90**	**679.11**			**254.574 =552.074**	**71.192 = 198.288**

Mineral transportation of **1100 TPD** of coal is by road to railway siding covering a distance of 12 km and the balance 270 TPD is by road. Ultimate working depth of the mine is 45m below ground level (bgl). Present working depth is 40m bgl. Water table is in the range of 4.05m-17.20 m bgl during pre-monsoon season and 0.05-8m bgl during post-monsoon. Mining has intersected water table. Peak water requirement is 440 m3/d, which will be met from mine pit water. Presently a total of 11.82 Mm3 of OB has been generated of which 11 Mm3 has been used for backfilling and 0.82 Mm3 has been dumped in ext. OB dump. An estimated 64.64 Mm3 of OB would be generated in the balance life of mine, which be backfilled simultaneously.

Of the total quarry area of 750.36 ha, of which 552.07 ha would be backfilled and plantation developed thereon as per table below:

S.N.	Area (ha)	Existing	Status upto 2015-16	Status upto 2025-26	Status beyond 2025-26	Status at the end of mine life
1.	Excavation	83.36	81.00	187.95	424.594	750.36
2.	Backfilled	59.316	64.50	130.758	297.500	552.074

MANAGER
Ghorawari Colliery No.

Balance life of the mine at the rated capacity is 12 years. A void of 198.286 ha with a max. depth of 10-15m would be left at the end of mine life which would be converted into a reservoir. Public Hearing was held on 22.11.2005. The project was approved by M/s WCL on 05.11.2008. The capital cost of the project is **Rs. 1.37 crores.**

2. The Ministry of Environment & forests hereby accords environmental clearance for the above-mentioned **Ghorawari Opencast Coal Mine Project** of **M/s WCL for production of coal at 1.50 MTPA rated capacity** under section 7.2 of the Environmental Impact Assessment Notification, 2006 and subsequent amendments thereto subject to the compliance of the terms and conditions mentioned below:

A. Specific Conditions

(i) No mining operations shall be undertaken in the forestland until clearance for renewal has been obtained under the provisions of FC Act, 1980.

(ii) The environmental clearance is only for the specific patches consisting of details submitted to the Committee and summarised in the table.

(iii) OC mining should be carried out at a safe distance for old UG workings.

(iv) Prior permission of DGMS shall be obtained before start of the working based on the Environmental Clearance.

(v) Safe distance shall be maintained for working adjacent to agricultural fields.

(vi) The entire OB being generated in the balance life of mine shall be backfilled.

(vii) No OB generated in the balance life of the mine shall be dumped in the external OB dumps. Reclamation, monitoring and management of the existing external OB dumpsite should continue until the vegetation becomes self-sustaining. Compliance status should be submitted to the Ministry of Environment & Forests and its Regional office located at Bhopal on yearly basis.

(viii) Catch drains and siltation ponds of appropriate size should be constructed to arrest silt and sediment flows from soil, OB and mineral dumps. The water so collected should be utilised for watering the mine area, roads, green belt development, etc. The drains should be regularly desilted and maintained properly.

Garland drains (size, gradient and length) and sump capacity should be designed keeping 50% safety margin over and above the peak sudden rainfall and maximum discharge in the area adjoining the mine site. Sump capacity should also provided adequate retention period to allow proper settling of silt material.

(ix) Dimension of the retaining wall at the toe of the dumps and OB benches within the mine to check run-off and siltation should be based on the rainfall data.

(x) Mining shall be carried out as per statuette at a safe distance from the Pench River flowing adjacent to the lease boundary.

(xi) The road for coal transport shall be black topped and avenue trees developed on both sides.

(xii) Drills should be wet operated or with dust extractors.

(xiv) Controlled blasting should be practiced with use of delay detonators. The mitigative measures for control of ground vibrations and to arrest the fly rocks and boulders should be implemented.

MANAGER
Ghorawari Colliery No.

(xv) Area brought under afforestation shall be not less than 769.93 ha and includes area external OB dump (217.86 ha), backfilled area (552.074 ha), along ML boundary, infrastructure along roads and safety zone located within and outside the lease by planting native species in consultation with the local DFO/Agriculture Department. The density of the trees should be around 2500 plants per ha.

(xvi) A Progressive Mine Closure Plan shall be implemented by reclamation of decoaled quarry area of 750.36 ha of which 552.074 ha shall be concurrently backfilled with 67.778 Mm3 of OB generated in the balance life of mine and reclaimed with plantation using native plant species in consultation with the local DFO/Agriculture Department. The number of the trees should be around 2500 plants per ha. The balance 198.286 ha of decoaled void would be converted into a water reservoir of a maximum depth of 15m, the upper benches of which shall be gently sloped and stabilised with plantation and a peripheral fencing erected all around the reservoir.

(xvii) Regular monitoring of groundwater level and quality should be carried out by establishing a network of exiting wells and construction of new peizometers. The monitoring for quantity should be done four times a year in pre-monsoon (May), monsoon (August), post-monsoon (November) and winter (January) seasons and for quality in May. Data thus collected should be submitted to the Ministry of Environment & Forests and tot eh Central Pollution Control Board quarterly within one month of monitoring.

(xviii) Besides carrying out regular periodic health check up of their workers, 10% of the workers identified from workforce engaged in active mining operations shall be subjected to health check up for occupational diseases and hearing impairment, if any, through an agency such as NIOH, Ahmedabad within a period of one year and the results reported to this Ministry and to DGMS.

(xix) For monitoring land use pattern and for post mining land use, a time series of landuse maps, based on satellite imagery (on a scale of 1: 5000) of the core zone and buffer zone, from the start of the project until end of mine life shall be prepared once in 3 years (for any one particular season which is consistent in the time series), and the report submitted to MOEF and its Regional office at Bhopal.

(xx) Digital processing of the entire lease area using remote sensing technique should be done regularly once in 3 years for monitoring land use pattern and report submitted to MOEF and its Regional office at Bhopal.

(xxi) The detailed Final Mine Closure Plan along with details of Corpus Fund should be submitted within six months to the Ministry of Environment & Forests Regional Office, Bhopal.

B. General Conditions

(i) No change in mining technology and scope of working should be made without prior approval of the Ministry of Environment and Forests.

(ii) No change in the calendar plan including excavation, quantum of mineral coal and waste should be made.

(iii) Four ambient air quality monitoring stations should be established in the core zone as well as in the buffer zone for monitoring SPM, RPM, SO2 and NOx and heavy metals such as Hg, As, Pb, etc. Location of the stations should be decided based on the meteorological data, topographical features and environmentally and ecologically sensitive targets in consultation with the State Pollution Control Board.

(iv) Fugitive dust emissions (SPM and RPM and heavy metals such as Hg, As, Pb, etc) from all the sources should be controlled regularly monitored and data recorded properly. Water

MANAGER
Ghorawari Colliery No.

spraying arrangement on haul roads, wagon loading, dump trucks (loading and unloading) points should be provided and properly maintained.

(v) Data on ambient air quality (SPM, RPM, SO2, NOx and heavy metals such as Hg, As, Pb, etc.) should be regularly submitted to the Ministry including its Regional Office at Bhopal and to the State Pollution Control Board and the Central Pollution Control Board once in six months.

(vi) Adequate measures should be taken for control of noise levels below 85 dBA in the work environment. Workers engaged in blasting and drilling operations, operation of HEMM, etc should be provided with ear plugs/muffs.

(vii) Industrial wastewater (workshop and wastewater from the mine) should be properly collected, treated so as to conform to the standards prescribed under GSR 422 (E) dated 19th May 1993 and 31st December 1993 or as amended from time to time before discharge. Oil and grease trap should be installed before discharge of workshop effluents.

(viii) Vehicular emissions should be kept under control and regularly monitored. Vehicles used for transporting the mineral should be covered with tarpaulins and optimally loaded.

(ix) Environmental laboratory should be established with adequate number and type of pollution monitoring and analysis equipment in consultation with the State Pollution Control Board.

(x) Personnel working in dusty areas should wear protective respiratory devices and they should also be provided with adequate training and information on safety and health aspects.

Occupational health surveillance programme of the workers should be undertaken periodically to observe any contractions due to exposure to dust and to take corrective measures, if needed.

(xi) A separate environmental management cell with suitable qualified personnel should be set up under the control of a Senior Executive, who will report directly to the Head of the company.

(xii) The funds earmarked for environmental protection measures should e kept in separate account and should not be diverted for other purpose. Year-wise expenditure should be reported to this Ministry and its Regional Office at Bhopal.

(xiii) The Regional Office of this Ministry located at Bhopal shall monitor compliance of the stipulated co. itions. The Project authorities shall extend full cooperation to the office(s) of the Regional Office by furnishing the requisite data/ information/monitoring reports.

(xiv) A copy of the will be marked to concerned Panchayat/ local NGO, if any, from whom any suggestion/representation has been received while processing the proposal.

(xv) State Pollution Control Board should display a copy of the clearance letter at the Regional Office, District Industry Centre and Collector's Office/Tehsildar's Office for 30 days.

(xvi) The Project authorities should advertise at least in two local newspapers widely circulated around the project, one of which shall be in the vernacular language of the locality concerned within seven days of the clearance letter, informing that the project has been accorded environmental clearance and a copy of the clearance letter is available with the State Pollution control Board and may also be seen at the website of the ministry of Environment & Forests at http://envfor.nic.in. The compliance status shall also be uploaded by the project authorities in their website so as to bring the same in the public domain.

3. The Ministry or any other competent authority may stipulate any further condition for environmental protection.

4. Failure to comply with any of the conditions mentioned above may result in withdrawal of this clearance and attract the provisions of the Environment (Protection) Act, 1986.

Add.

MANAGER
Ghorawari Colliery No.

5. The above conditions will be enforced *inter-alia*, under the provisions of the Water (Prevention & Control of Pollution) Act, 1974, the Air (Prevention & Control of Pollution) Act, 1981, the Environment (Protection) Act, 1986 and the Public Liability Insurance Act, 1991 along with their amendments and Rules. The proponent shall ensure to undertake and provide for the costs incurred for taking up remedial measures in case of soil contamination, contamination of groundwater and surface water, and occupational and other diseases due to the mining operations.

(Dr.T.Chandini)
Director

Copy to:

1. Secretary, Ministry of Coal, Shastri Bhawan, New Delhi.
2. Secretary, Department of Environment & Forests, Government of Madhya Pradesh, Secretariat, Bhopal.
3. Chief Conservator of Forests, Regional office (EZ), Ministry of Environment & Forests, E-2/240 Arear Colony, Bhopal – 462016.
4. Chairman, Madhya Pradesh State Pollution Control Board, Paryavaran Parisar, E-5, Arera Colony, Bhopal – 462016.
5. Chairman, Central Pollution Control Board, CBD-cum-Office Complex, East Arjun Nagar, New Delhi-110032.
6. Member-Secretary, Central Ground Water Authority, Ministry of Water Resources, Curzon Road Barracks, A-2, W-3 Kasturba Gandhi Marg, New Delhi.
7. Shri M.K. Shukla, CGM, Coal India Limited, SCOPE Minar, Core-I, 4t Floor, Vikas Marg, Laxminagar, New Delhi.
8. District Collector, Chindwara, Government of Madhya Pradesh, New Delhi.
9. Monitoring File 10. Guard File 11. Record File

MANAGER
Ghorawadi Colliery No.

Survey Dept GM'O

MINING PLAN

OF

GHORAWARI OC PATCHES

&

JHARNA UNDERGROUND COLLIERY

FOR

RENEWAL OF COAL MINING LEASE

(MCR LEASES NO - 5,6,7,8,9,10, 11,12,13,14,15,16,26,29,35&36) OF KANHAN AREA

UNDER RULE 22 (3) OF MINERAL CONCESSION RULES 1960

DISTRICT – CHINDWARA, MADHYAPRADESH

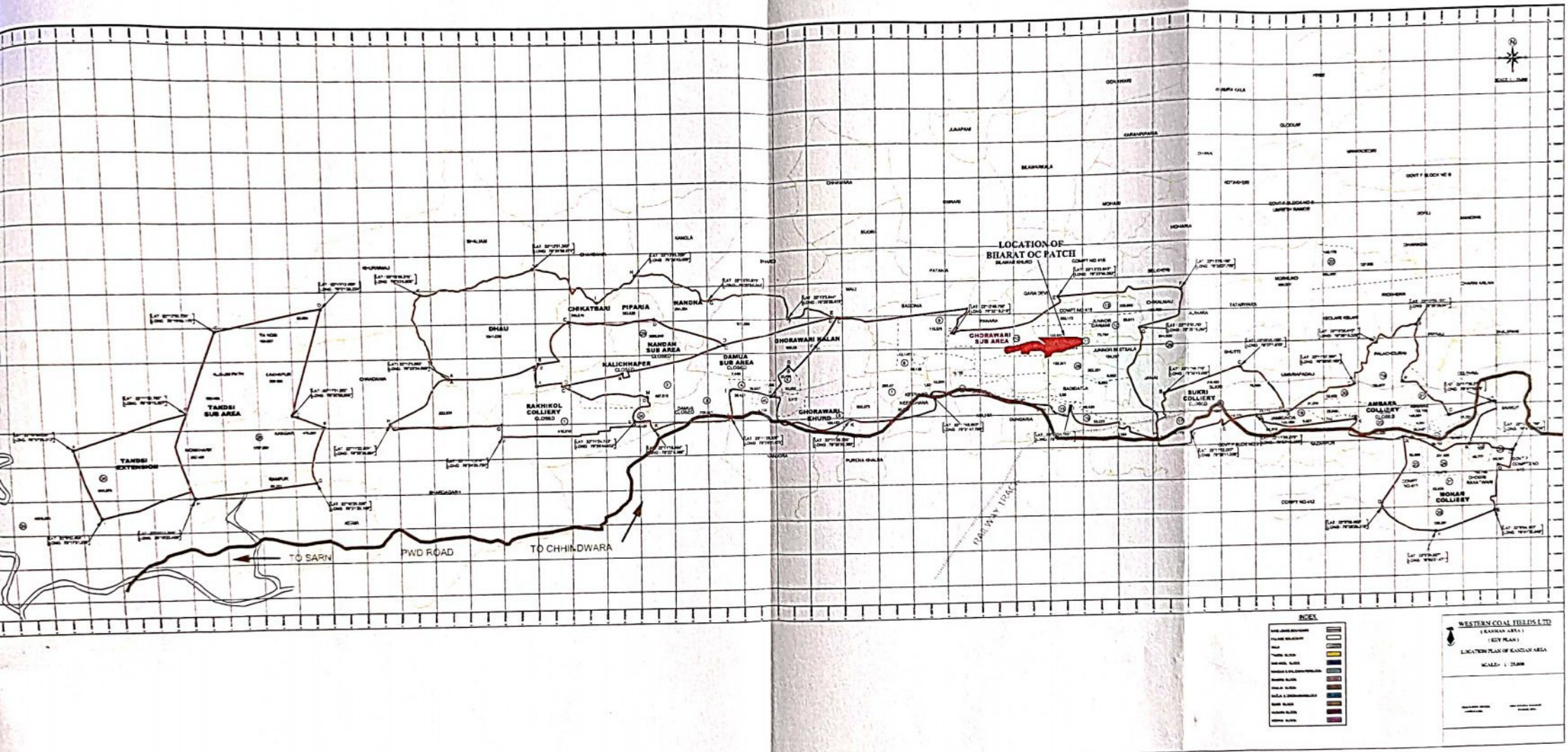
KANHAN AREA

WESTERN COALFIELDS LIMITED
(A Subsidiary of Coal India Limited)
Coal Estate, Civil Lines,
Nagpur – 440001

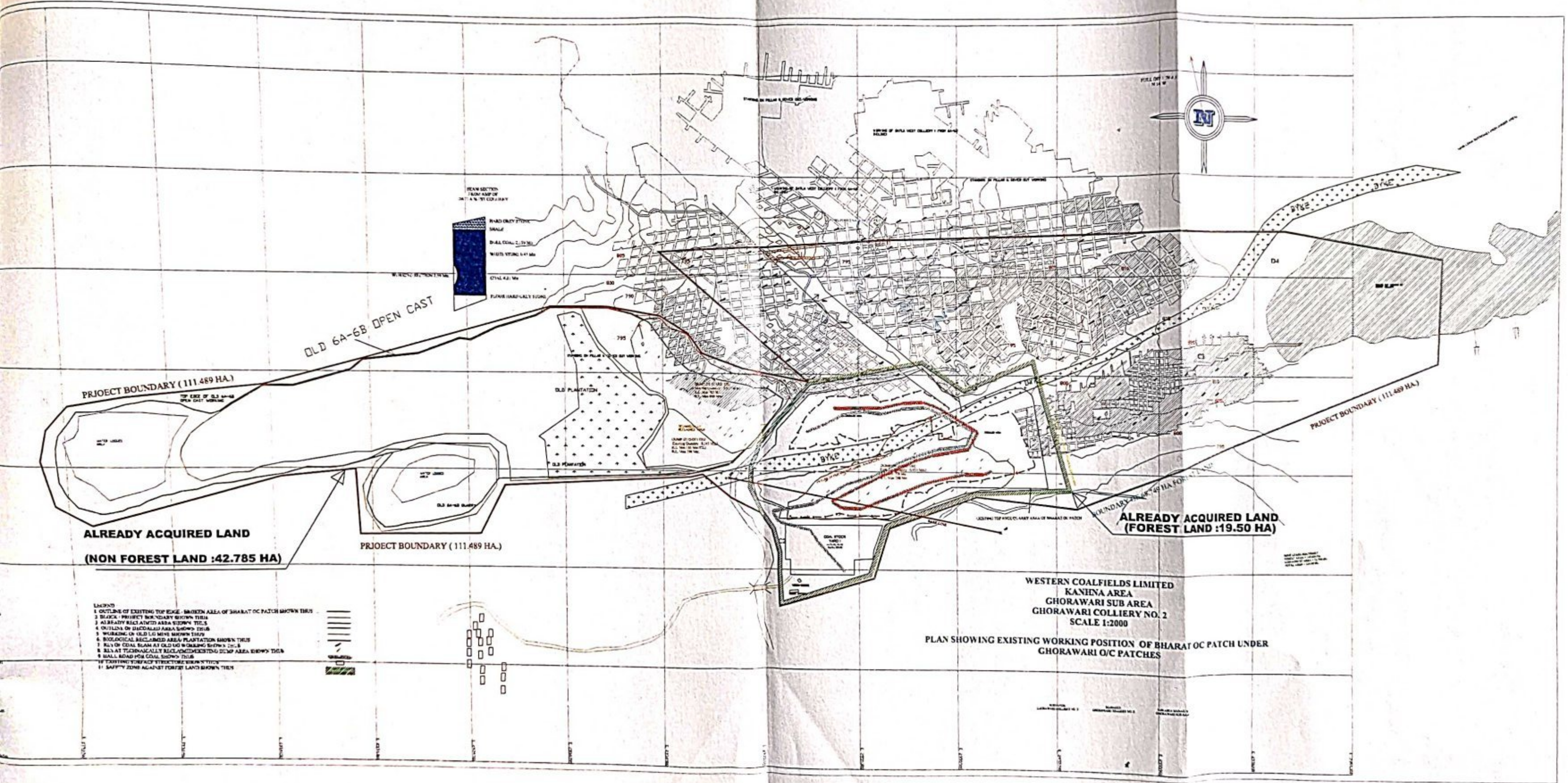
V. K. MACHHARIAL
B.Sc. (Mining), AIGM (Mining), FCCM
Mining Consultant / RQP

MANAGER
Ghorawari Colliery No. 3

PLANS



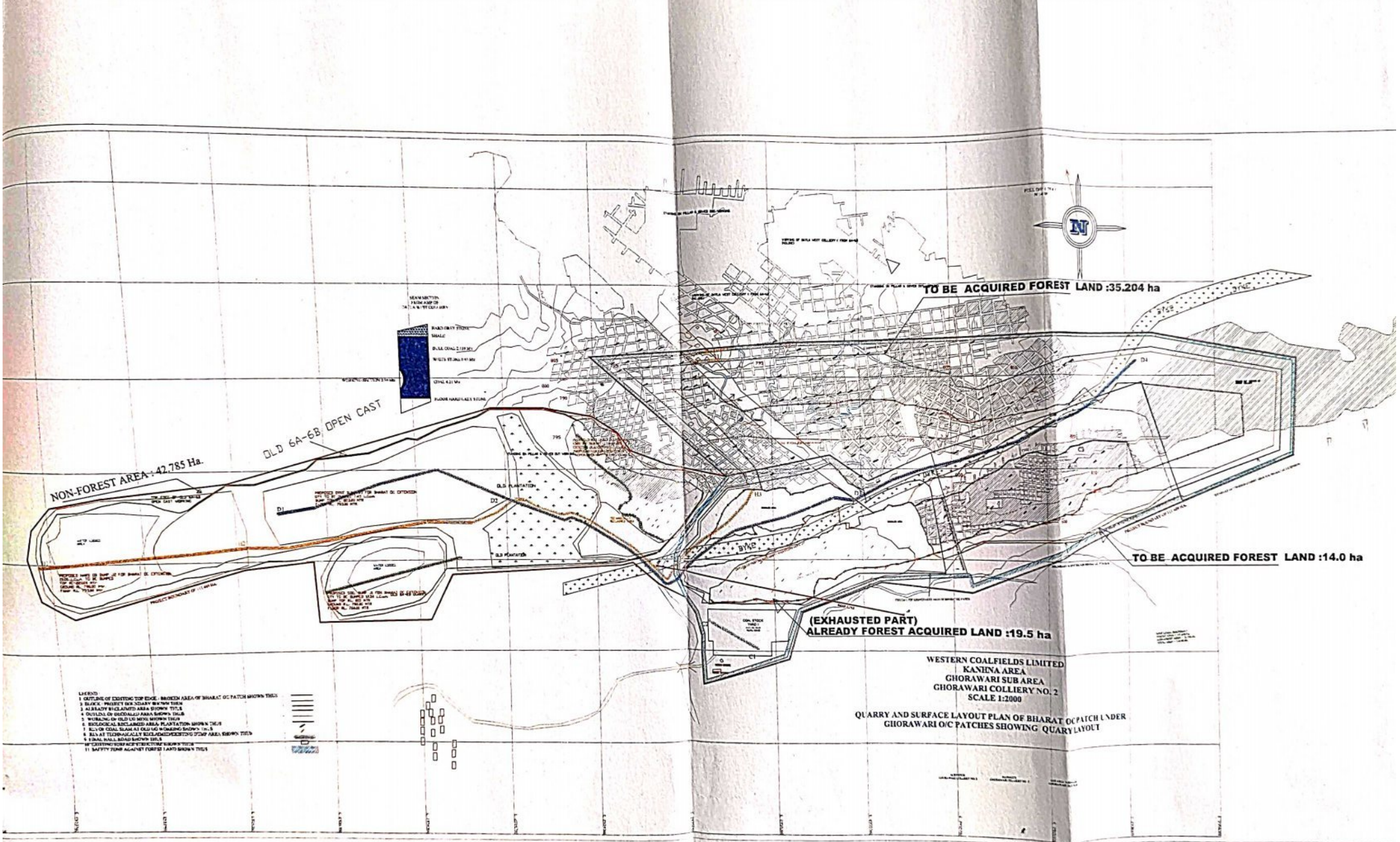
MANAGER
Ghorawari Colliery No.



Att.

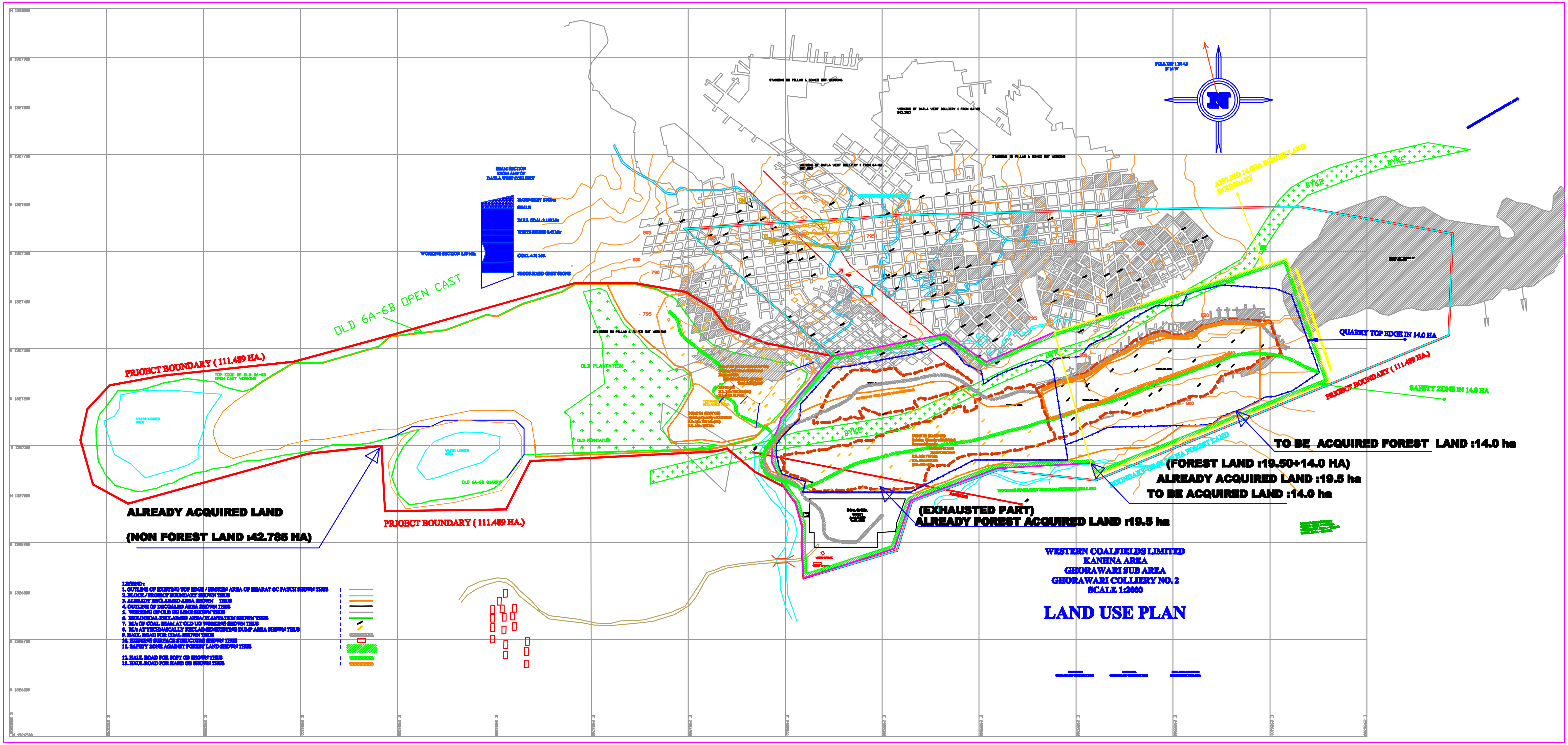
MANAGER
Ghorawari Colliery No.


KML PLAN
BHARAT OC PATCHES EXTENSION (111.489 Ha.)
Legend
Polygon
N22°1 22.08"
N22°1 56.16"
TOTAL FOREST LAND (68.704 Ha.)
TOTAL NON FOREST LAND (42.785 Ha.)
N22°1 30.24"
Google Earth
1 km
N
Ghorawari Colliery No.



MANAGER
Ghorawari Colliery No.

Annexure-VI


WESTERN COALFIELDS LIMITED
KANHNA AREA
GHORAWARI SUB AREA
GHORAWARI COLLIERY NO. 2
SCALE 1:2000
LAND USE PLAN
PRJOECT BOUNDARY (111.489 HA.)
OLD 6A-6B OPEN CAST
TOP EDGE OF OLD 6A-6B OPEN CAST WORKING
WATER LOGGED AREA
OLD 6A-6B QUARRY
ALREADY ACQUIRED LAND
(NON FOREST LAND :42.785 HA)
OLD PLANTATION
STANDING ON PILLAR & GOVED OUT WORKING
WORKING OF DATLA WEST COLLIERY (FROM 6A-6B INCLINE)
SEAM SECTION FROM AMP OF DATLA WEST COLLIERY
HARD GREY STONE
SHALE
DULL COAL 2.139 Mtr
WHITE STONE 0.45 Mtr
COAL 4.21 Mtr
WORKING SECTION 2.59 Mtr
FLOOR HARD GREY STONE
FULL DIP 1 IN 43
N 14 W
N
DYKE
APPLIED 14.0HA FOREST LAND BOUNDARY
QUARRY TOP EDGE IN 14.0 HA
SAFETY ZONE IN 14.0 HA
TO BE ACQUIRED FOREST LAND :14.0 ha
(FOREST LAND :19.50+14.0 HA)
ALREADY ACQUIRED LAND :19.5 ha
TO BE ACQUIRED LAND :14.0 ha
(EXHAUSTED PART)
ALREADY FOREST ACQUIRED LAND :19.5 ha
LEGEND :
1. OUTLINE OF EXISTING TOP EDGE / BROKEN AREA OF BHARAT OC PATCH SHOWN THUS
2. BLOCK / PROJECT BOUNDARY SHOWN THUS
3. ALREADY RECLAIMED AREA SHOWN THUS
4. OUTLINE OF DECOALED AREA SHOWN THUS
5. WORKING OF OLD UG MINE SHOWN THUS
6. BIOLOGICAL RECLAIMED AREA/ PLANTATION SHOWN THUS
7. RL's OF COAL SEAM AT OLD UG WORKING SHOWN THUS
8. RL's AT TECHNAICALLY RECLAIMED/EXISTING DUMP AREA SHOWN THUS
9. HAUL ROAD FOR COAL SHOWN THUS
10. EXISTING SURFACE STRUCTURE SHOWN THUS
11. SAFETY ZONE AGAINST FOREST LAND SHOWN THUS
12. HAUL ROAD FOR SOFT OB SHOWN THUS
13. HAUL ROAD FOR HARD OB SHOWN THUS

Annexure-VII

No.J-11015/367/2008-IA.II(M)
Government of India
Ministry of Environment & Forests

Paryavaran Bhawan,
C.G.O.Complex,
New Delhi -110510.

Dated: 26th December 2008

To
Director (Tech.)
M/s Western Coalfields Ltd.,
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Mineral transportation of **1100 TPD** of coal is by road to railway siding covering a distance of 12 km and the balance 270 TPD is by road. Ultimate working depth of the mine is 45m below ground level (bgl).Present working depth is 40m bgl. Water table is in the range of 4.05m-17.20 m bgl during pre-monsoon season and 0.05-8m bgl during post-monsoon. Mining has intersected water table. Peak water requirement is 440 m3/d, which will be met from mine pit water. Presently a total of 11.82 Mm3 of OB has been generated of which 11 Mm3 has been used for backfilling and 0.82 Mm3 has been dumped in ext. OB dump. An estimated 64.64 Mm3 of OB would be generated in the balance life of mine, which be backfilled simultaneously.

Of the total quarry area of 750.36 ha, of which 552.07 ha would be backfilled and plantation developed thereon as per table below:

S.N.	Area (ha)	Existing	Status upto 2015-16	Status upto 2025-26	Status beyond 2025-26	Status at the end of mine life
1.	Excavation	83.36	81.00	187.95	424.594	750.36
2.	Backfilled	59.316	64.50	130.758	297.500	552.074

Balance life of the mine at the rated capacity is 12 years. A void of 198.286 ha with a max. depth of 10-15m would be left at the end of mine life which would be converted into a reservoir. Public Hearing was held on 22.11.2005. The project was approved by M/s WCL on 05.11.2008. The capital cost of the project is **Rs. 1.37 crores**.

2. The Ministry of Environment & forests hereby accords environmental clearance for the above-mentioned **Ghorawari Opencast Coal Mine Project** of **M/s WCL for production of coal at 1.50 MTPA rated capacity** under section 7.2 of the Environmental Impact Assessment Notification, 2006 and subsequent amendments thereto subject to the compliance of the terms and conditions mentioned below:

A. Specific Conditions

(i) No mining operations shall be undertaken in the forestland until clearance for renewal has been obtained under the provisions of FC Act, 1980.

(ii) The environmental clearance is only for the specific patches consisting of details submitted to the Committee and summarised in the table.

(iii) OC mining should be carried out at a safe distance for old UG workings.

(iv) Prior permission of DGMS shall be obtained before start of the working based on the Environmental Clearance.

(v) Safe distance shall be maintained for working adjacent to agricultural fields.

(vi) The entire OB being generated in the balance life of mine shall be backfilled.

(vii) No OB generated in the balance life of the mine shall be dumped in the external OB dumps. Reclamation, monitoring and management of the existing external OB dumpsite should continue until the vegetation becomes self-sustaining. Compliance status should be submitted to the Ministry of Environment & Forests and its Regional office located at Bhopal on yearly basis.

(viii) Catch drains and siltation ponds of appropriate size should be constructed to arrest silt and sediment flows from soil, OB and mineral dumps. The water so collected should be utilised for watering the mine area, roads, green belt development, etc. The drains should be regularly desilted and maintained properly.

Garland drains (size, gradient and length) and sump capacity should be designed keeping 50% safety margin over and above the peak sudden rainfall and maximum discharge in the area adjoining the mine site. Sump capacity should also provided adequate retention period to allow proper settling of silt material.

(ix) Dimension of the retaining wall at the toe of the dumps and OB benches within the mine to check run-off and siltation should be based on the rainfall data.

(x) Mining shall be carried out as per statuette at a safe distance from the Pench River flowing adjacent to the lease boundary.

(xi) The road for coal transport shall be black topped and avenue trees developed on both sides.

(xii) Drills should be wet operated or with dust extractors.

(xiv) Controlled blasting should be practiced with use of delay detonators. The mitigative measures for control of ground vibrations and to arrest the fly rocks and boulders should be implemented.

(xv) Area brought under afforestation shall be not less than 769.93 ha and includes area external OB dump (217.86 ha), backfilled area (552.074 ha), along ML boundary, infrastructure along roads and safety zone located within and outside the lease by planting native species in consultation with the local DFO/Agriculture Department. The density of the trees should be around 2500 plants per ha.

(xvi) A Progressive Mine Closure Plan shall be implemented by reclamation of decoaled quarry area of 750.36 ha of which 552.074 ha shall be concurrently backfilled with 67.778 Mm3 of OB generated in the balance life of mine and reclaimed with plantation using native plant species in consultation with the local DFO/Agriculture Department. The number of the trees should be around 2500 plants per ha. The balance 198.286 ha of decoaled void would be converted into a water reservoir of a maximum depth of 15m, the upper benches of which shall be gently sloped and stabilised with plantation and a peripheral fencing erected all around the reservoir.

(xvii) Regular monitoring of groundwater level and quality should be carried out by establishing a network of exiting wells and construction of new peizometers. The monitoring for quantity should be done four times a year in pre-monsoon (May), monsoon (August), post-monsoon (November) and winter (January) seasons and for quality in May. Data thus collected should be submitted to the Ministry of Environment & Forests and tot eh Central Pollution Control Board quarterly within one month of monitoring.

(xviii) Besides carrying out regular periodic health check up of their workers, 10% of the workers identified from workforce engaged in active mining operations shall be subjected to health check up for occupational diseases and hearing impairment, if any, through an agency such as NIOH, Ahmedabad within a period of one year and the results reported to this Ministry and to DGMS.

(xix) For monitoring land use pattern and for post mining land use, a time series of landuse maps, based on satellite imagery (on a scale of 1: 5000) of the core zone and buffer zone, from the start of the project until end of mine life shall be prepared once in 3 years (for any one particular season which is consistent in the time series), and the report submitted to MOEF and its Regional office at Bhopal.

(xx) Digital processing of the entire lease area using remote sensing technique should be done regularly once in 3 years for monitoring land use pattern and report submitted to MOEF and its Regional office at Bhopal.

(xxi) The detailed Final Mine Closure Plan along with details of Corpus Fund should be submitted within six months to the Ministry of Environment & Forests Regional Office, Bhopal.

B. General Conditions

(i) No change in mining technology and scope of working should be made without prior approval of the Ministry of Environment and Forests.

(ii) No change in the calendar plan including excavation, quantum of mineral coal and waste should be made.

(iii) Four ambient air quality monitoring stations should be established in the core zone as well as in the buffer zone for monitoring SPM, RPM, SO2 and NOx and heavy metals such as Hg, As, Pb, etc. Location of the stations should be decided based on the meteorological data, topographical features and environmentally and ecologically sensitive targets in consultation with the State Pollution Control Board.

(iv) Fugitive dust emissions (SPM and RPM and heavy metals such as Hg, As, Pb, etc) from all the sources should be controlled regularly monitored and data recorded properly. Water

spraying arrangement on haul roads, wagon loading, dump trucks (loading and unloading) points should be provided and properly maintained.

(v) Data on ambient air quality (SPM, RPM, SO2, NOx and heavy metals such as Hg, As, Pb, etc) should be regularly submitted to the Ministry including its Regional Office at Bhopal and to the State Pollution Control Board and the Central Pollution Control Board once in six months.

(vi) Adequate measures should be taken for control of noise levels below 85 dBA in the work environment. Workers engaged in blasting and drilling operations, operation of HEMM, etc should be provided with ear plugs/muffs.

(vii) Industrial wastewater (workshop and wastewater from the mine) should be properly collected, treated so as to conform to the standards prescribed under GSR 422 (E) dated 19th May 1993 and 31st December 1993 or as amended from time to time before discharge. Oil and grease trap should be installed before discharge of workshop effluents.

(viii) Vehicular emissions should be kept under control and regularly monitored. Vehicles used for transporting the mineral should be covered with tarpaulins and optimally loaded.

(ix) Environmental laboratory should be established with adequate number and type of pollution monitoring and analysis equipment in consultation with the State Pollution Control Board.

(x) Personnel working in dusty areas should wear protective respiratory devices and they should also be provided with adequate training and information on safety and health aspects.

Occupational health surveillance programme of the workers should be undertaken periodically to observe any contractions due to exposure to dust and to take corrective measures, if needed.

(xi) A separate environmental management cell with suitable qualified personnel should be set up under the control of a Senior Executive, who will report directly to the Head of the company.

(xii) The funds earmarked for environmental protection measures should e kept in separate account and should not be diverted for other purpose. Year-wise expenditure should be reported to this Ministry and its Regional Office at Bhopal.

(xiii) The Regional Office of this Ministry located at Bhopal shall monitor compliance of the stipulated conditions. The Project authorities shall extend full cooperation to the office(s) of the Regional Office by furnishing the requisite data/ information/monitoring reports.

(xiv) A copy of the will be marked to concerned Panchayat/ local NGO, if any, from whom any suggestion/representation has been received while processing the proposal.

(xv) State Pollution Control Board should display a copy of the clearance letter at the Regional Office, District Industry Centre and Collector's Office/Tehsildar's Office for 30 days.

(xvi) The Project authorities should advertise at least in two local newspapers widely circulated around the project, one of which shall be in the vernacular language of the locality concerned within seven days of the clearance letter informing that the project has been accorded environmental clearance and a copy of the clearance letter is available with the State Pollution control Board and may also be seen at the website of the ministry of Environment & Forests at http://envfor.nic.in. The compliance status shall also be uploaded by the project authorities in their website so as to bring the same in the public domain.

3. The Ministry or any other competent authority may stipulate any further condition for environmental protection.

4. Failure to comply with any of the conditions mentioned above may result in withdrawal of this clearance and attract the provisions of the Environment (Protection) Act, 1986.

5. The above conditions will be enforced *inter-alia*, under the provisions of the Water (Prevention & Control of Pollution) Act, 1974, the Air (Prevention & Control of Pollution) Act, 1981, the Environment (Protection) Act, 1986 and the Public Liability Insurance Act, 1991 along with their amendments and Rules. The proponent shall ensure to undertake and provide for the costs incurred for taking up remedial measures in case of soil contamination, contamination of groundwater and surface water, and occupational and other diseases due to the mining operations.

(Dr.T.Chandini)
Director

Copy to:

1. Secretary, Ministry of Coal, Shastri Bhawan, New Delhi.
2. Secretary, Department of Environment & Forests, Government of Madhya Pradesh, Secretariat, Bhopal.
3. Chief Conservator of Forests, Regional office (EZ), Ministry of Environment & Forests, E-2/240 Arear Colony, Bhopal – 462016.
4. Chairman, Madhya Pradesh State Pollution Control Board, Paryavaran Parisar, E-5, Arera Colony, Bhopal – 462016.
5. Chairman, Central Pollution Control Board, CBD-cum-Office Complex, East Arjun Nagar, New Delhi -110032.
6. Member-Secretary, Central Ground Water Authority, Ministry of Water Resources, Curzon Road Barracks, A-2, W-3 Kasturba Gandhi Marg, New Delhi.
7. Shri M.K. Shukla, CGM, Coal India Limited, SCOPE Minar, Core-I, 4t Floor, Vikas Marg, Laxminagar, New Delhi.
8. District Collector, Chindwara, Government of Madhya Pradesh, New Delhi.
9. Monitoring File 10. Guard File 11. Record File