INDEPENDENT ENVIRONMENTAL COMPLIANCE AUDIT REPORT

FOR

RAJMAHAL OPEN CAST COAL MINE PROJECT
OF
M/s. EASTERN COALFIELDS LIMITED,
(A SUBSIDIARY OF COAL INDIA LTD.)
SANCTORIA, WEST BENGAL

By

ENVIRONMENT MANAGEMENT DIVISION
Directorate of Extension
Indian Council of Forestry Research and Education
(An Autonomous Body of Ministry of Environment, Forest and Climate Change, GoI)
DEHRADUN – 248 006 (UTTARAKHAND) INDIA
www.icfre.gov.in

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CHAPTER 1
INTRODUCTION

1.1 INTRODUCTION

M/s. Coal India Limited (CIL) *vide* its letter No. CIL/PMD/36/241 dated 31st July, 2015 communicated the Letter of Award (LoA) for conducting Environmental Audit study for 20 open Cast Mines of its various subsidiaries to the Indian Council of Forestry Research and Education (ICFRE), Dehradun **(Annexure-I)**. The concerned officials from subsidiaries of CIL visited ICFRE during 15-16th January, 2015. A detailed deliberation on the scope of study, methodology and the modality of carrying out the study was held on 16th January, 2015 at ICFRE Board Room **(Annexure-II)**. Further, the proposed methodology was also discussed at length with the team of officials from CIL at Kolkata on 10th April, 2015 before initiating the study **(Annexure-III).** The scope of the environmental audit works are as follows:

1.2 SCOPE OF THE ENVIRONMENTAL AUDIT WORK

1. To review the conditions laid down in the Environmental Clearances (EC) approval for mitigation of environmental pollution.
2. To assess the compliance with the project approval conditions and other approvals of the mine *vis-a-vis* progress of development of the mine.
3. To conduct site inspection, verify the existing levels of pollution *vis-a-vis* the laid down standards; review on-site documentation, monitoring data mechanism in the place for sampling and analysis that are relevant to the audit.
4. Discussion/consultation with the concern project staff on the development consent, other approval conditions, infrastructure and operation to comply the EC.
5. To assess the environmental performance based on the development with the requirements of the approval of EC and the Mining Lease conditions (including any assessments, plans or programs required under these consents/approvals).
6. To assess the progressive mine closure *vis-a-vis* technical; greenbelt development; biological reclamation of overburden (OB), top soil management and review the adequacy of strategies, plans or programs prepared for its effectiveness.
7. To assess the status of final mine closure if reserves have been exhausted.
8. To assess the change detection of open/underground mining activity and reclamation based on a machine learning approach through imagery; advancement in assessment and monitoring.
9. Provision of recommendations if considered necessary for implementation of measures or actions to improve environmental performance of the development, and/or any assessment, plan or program required under the mine approvals.
10. Preparation of individual Environmental Audit Report providing assessment of compliance against each approval condition and provision of recommendations or actions

considered appropriate to improve the environmental performance of the development, and/or the environmental management and monitoring systems.

11. After completion of Environment Audit of each subsidiary, ICFRE shall present an interim report at M/s. CIL or any other place as advised, and
12. ICFRE shall submit final report after incorporating the comments of M/s. CIL and/ or its subsidiaries on the draft report.

Accordingly, the Experts from Environment Management Division of ICFRE have conducted the environmental audit of the Rajmahal OCP of ECL of Coal India Limited during July, 2017 involving experts from its sister institute, Institute of Forest Genetics and Tree Breeding, Coimbatore and other domain experts from the country. The structure of the Environment Audit report consists of five chapters as outlined below:

Chapter 1- Introduction and Background information on Rajmahal Open Cast Coal Mine Project.

Chapter 2- Audit Methodology: A detailed description of the audit process and scope of the audit.

Chapter 3- An overview of the findings of the audit, including descriptions of compliance and findings from the site inspection in compliance to the EC conditions.

Chapter 4- Audit Findings

The draft report of audit finding was submitted to CIL for needful and comments. The comments of the PP on ICFRE observation were recorded, which were discussed and finalized in the working group meeting with CIL, ICFRE team and the concerned subsidiary on 16th & 17th August 2018 at SCOPE Complex , New Delhi. Accordingly, the post Audit comments and conclusion have been presented in Chapter -5 as has been included in the final report.

Chapter 5- Post Audit comments of PP on Draft audit report of ICFRE and clarification and final comments from ICFRE.

1.3 BACKGROUND INFORMATION ON RAJMAHAL OPEN CAST PROJECT

The Eastern Coalfields Limited (ECL) is one of the eight subsidiaries of CIL and coal producing company of India with its Head Quarters at Sanctoria, Distict Paschim Bardhaman, West Bengal. As on 31st March 2017, there were 87 working mines under ECL of which 60 being underground; 19 opencast and 8 mixed mines. 71 mines are in West Bengal and 16 in Jharkhand.

1.4 LOCATION AND APPROACH

Rajmahal Open Cast Project (OCP) of ECL is located at Boarijore block of Godda District of Jharkhand State. It lies within Lalmatia Exploration Block, and measures 15 sq km is at about 30 km from Godda District. The project is located in rural setting between latitudes 25º1'12'' and 25º3'15'' N and 87º21'0'' and 87º24'0''E. The project is accessible by road from Suri (120 km to the South), or from Sahibganj (50 km to the North-East). Its nearest railway station is at Pirpainti, approximately 32 km north of the project area on the Bhagalpur-Sahibganj-Burdwan loop line of Eastern Railway (Figure 1.1).

1.4.1 Topography, Drainage and Climate

The project physiography is characterised mostly by plains except Lalmatia Hill which is located to the North of the mine property and the hills to the extreme East and South of the property. Ground surface elevation varies from 70 m to 100 m above mean sea level. General slope thereof is towards the North-East and South-West on either side of the Lalmatia Hill that is aligned in a North-South direction is 204 m to the North and 168 m to the South. There is no year-round drainage within the project area, and overall drainage thereof is poorly and sparsely developed. However, the River Ganga flowing 35 km to the North of the area overall dominates the drainage. Ephemeral streams, Dhulia Nallah, 6 km North-East of the pit and Sundar river, 10 km South of the OCP constitute the definite surface drainage. They flow through the area during the monsoon, and eventually, tribute or terminate to the Ganges. Most of the first order drainage disappears seasonally and also due to the agricultural activity.

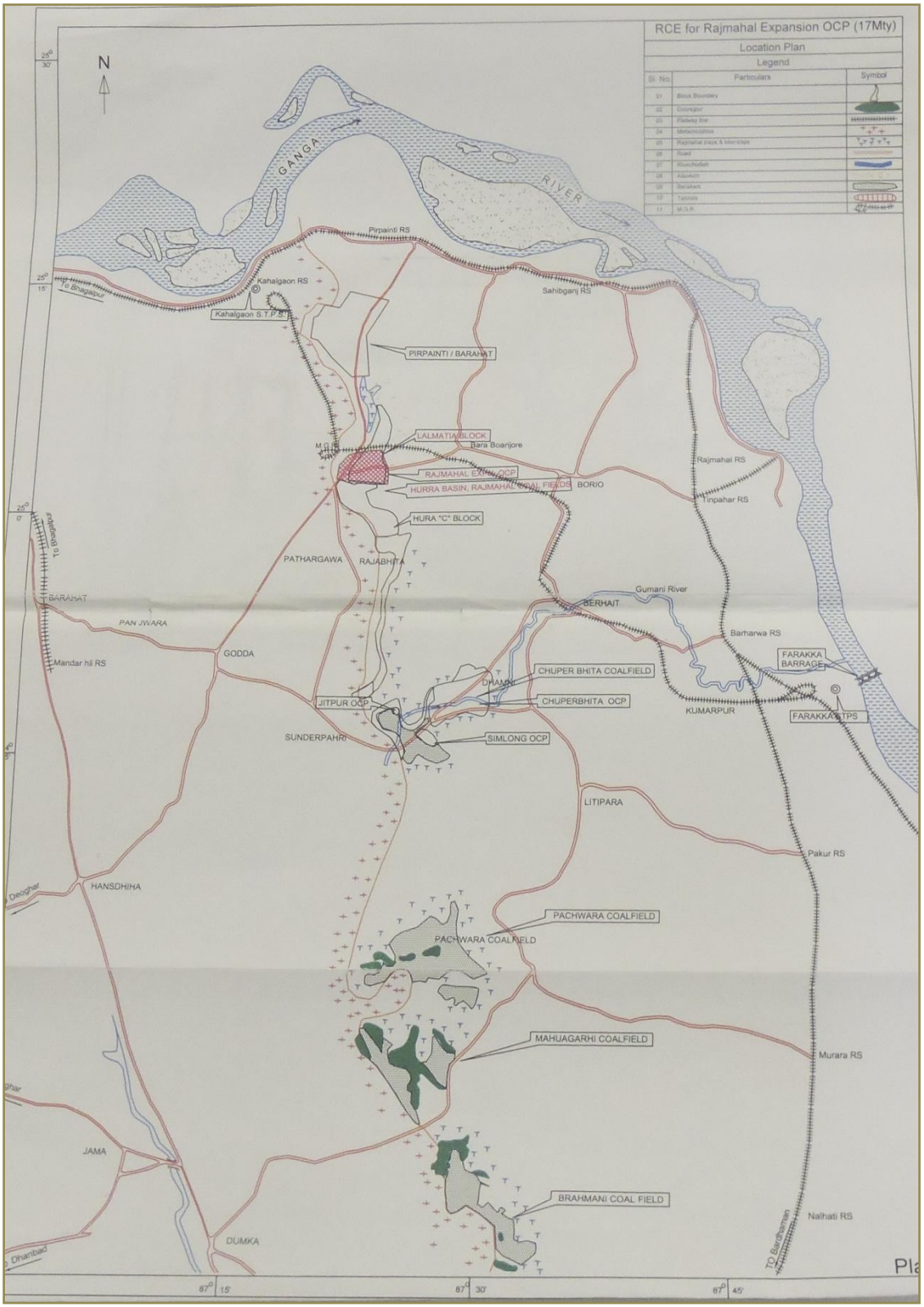

Figure 1.1: Location Plan of Rajmahal Open Cast Project

The project general climatic conditions are characterized with mild to moderate, tropical to subtropical climate, with cold winters and fairly hot and dry summers. During pre-monsoon, light rainfall is noticed, and during monsoon, 80% of annual rainfall occurs, and weather is cooler due to rains. During post-monsoon occasional thunderstorm is noticed, and the temperature of the weather is mild; however, winter season is dry and cool. The mean maximum temperature is 30.70ºC and the mean minimum temperature 18.92º C and the average of the maximum and the minimum 24.8ºC.

1.4.2 Geology and Exploration

The Rajmahal coalfields consist of a series of Lower Gondwana exposures aligned roughly in the North-South direction along the foot of the Rajmahal hills. The Rajmahal traps capping Rajmahal hills have receded considerably towards East in the areas towards North near Ganges exposing large areas of the coal bearing Barakars beneath. However, so far, five coal blocks have been identified, and these from the North are Hura, Chuperbhita, Pachwara, Mahuagarhi and Brahmani. The Barakars have been identified to be lying with a depositional contact on the Archeans which lie towards the West. In addition to these, lithostratigraphic units, Talchir (underlying the Barakars) and Dubrajpurs (underlying the Rajmahal traps) have also been found exposed as in parts of these coalfields.

Table 1.1: Stratigraphic Sequence of Lalmatia Block (Modified after SSI)

Group	Formation	Lithology	Thickness Range (m)
Recent to Sub-recent	Alluvium	UNCONFORMITY	0-15
Upper Gondwana	Rajmahal	Rajmahal volcanics and	50
	Traps	inter-trappean sand-	
		Stone and shales.	
		UNCONFORMITY	
Lower Gondwana	Barakar	Coarse to medium	25-350
		grained sandstone with	
		shale and coal	
		Coarse arkosic sand-	15-150
		stone, pebbly at places	
	Talchirs	Sandstones and shales	10-20
		Tillites	
		UNCONFORMITY	
		Granite gneisses, born-	
		Blende Schists and	
		pegmatites	

1.4.3 Coal Seams

Twelve coal seams have been deciphered from the borehole data within the block. These have been named as seam-I to seam-XII in ascending order. Out of these, five seams namely seam-V to seam-VIII and seam-XII show sporadic development seldom exceeding 1m in thickness. Seams IV to XII have been found only in areas south of Fault F8 which down throws southwards by 160 m whereby preserving additional thickness of sedimentary.

Table 1.2: Coal Seams, Parting and Thickness

Seam	Parting	Thickness range (m)
Seam-XII		1.27 – 2.10
	Parting	11.05 – 16.09
Seam-XI		1.75 – 5.74
	Parting	7.29 – 20.31
Seam-X		1.77 – 5.91
	Parting	3.85 – 21.93
Seam-IX		2.97 – 7.00
	Parting	2.97 – 9.70
Seam-VIII		0.68 – 2.99
	Parting	43.27 – 53.69
Seam-VII		0.56 – 3.28
	Parting	10.91 – 27.80
Seam	**Parting**	**Thickness range (m)**
Seam-VI		0.40– 4.20
	Parting	9.15 – 27.68
Seam-V		0.36– 2.97
	Parting	11.40– 41.50
Seam-IV		0.32– 2.57
	Parting	Nil to 10.88
Seam-III		1.35 – 17.87
	Parting	Nil to 44.70
Seam-II (top)		1.47 – 17.10
	Parting	Nil to 26.52
Seam-II (bot)		10.96– 26.53
	Parting	13.04– 33.66
Seam-I		2.00– 9.54

17 normal faults have been postulated within the block. Among these, five southwards heading faults, namely Fault F1, 6, 8, 11 and 15 are of major magnitude. Geological Survey of India (GSI) has explored three geological blocks, viz. Lalmatia Block, Hura Basin and Rajmahal Coalfields over an area of 14 sq.km with a density of 14 BH/ sq.km within blocks.

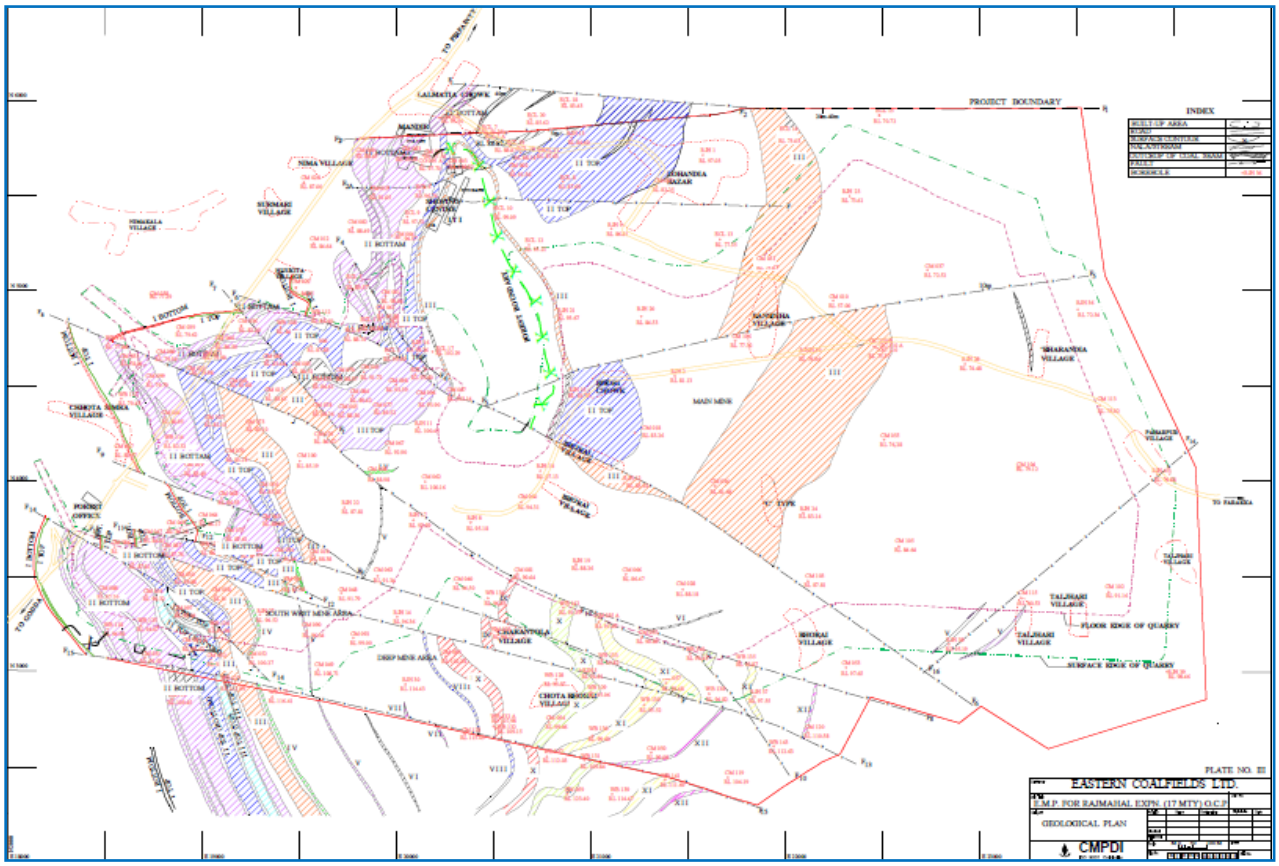

Figure 1.2: Geological map of the Rajmahal OCP

1.5 BASELINE INFORMATION OF RAJMAHAL OCP

1.5.1 Status of environmental clearances and coal production

The Original Project Report (PR) for Rajmahal OCP (5.00 MTY) was sanctioned in August, 1980. Subsequent to this it was expanded to a capacity of 10.50 MTY, the PR thereof was sanctioned in Nov. 1988. A Revised Cost Estimate of this PR was sanctioned in July, 1993. An Environmental Management Plan (EMP) for Rajmahal Open Cast Project for 10.50 MTPY was approved by MOEF through its approval communication letter no J-11015/34/84-Env.5/IA-II (M) dated 4th December 1992.

The project was further granted environmental clearance for expansion to 17 MTY from 10.5 MTY by MoEF through its approval letter No J-11015/30/2004-IA-II (M) dated 11th May 2005.

Forest land clearance for diversion of a total of 107.42 ha area was obtained on 26.10.1993 (for 17.64 Ha), 11.12.2002 (for 20.03 ha), and 27.08.2004 (for 69.75 ha).

The PR for Rajmahal opencast was originally sanctioned in August, 1980 for rated capacity of 5.0 MTY. The project was subsequently expanded to a rated capacity of 10.5 MTY, the PR for which was sanctioned in November, 1988. This PR was based on the project documents of Rajmahal–A OC Mine (10.5 MTY), prepared by METCHEM, Canada Inc. in Sept. 1987. Subsequently, a Revised Cost Estimate of Rajmahal OCP (10.5 MTY) was sanctioned by the government in July 1993. The PR for 17.0 MTY was approved by CIL board on 03.09.2003.

The combined consent under Air and Water is valid up to 30.01.2017 *vide* letter No JSPCB/HO/ RNC/ CTO-1112442/2017/86.

The unit possesses authorization under Bio-medical Waste (Management and Handling) Rules, 1989. Project also possesses the Directorate General of Mines Safety (DGMS) permissions for use of Heavy Earth Moving Machinery (HEMM) and deep hole drilling and blasting. Thus, Rajmahal OCP has all the relevant statutory approvals for operating at a capacity of 17 MTPA barring hazardous waste authorization.

1.5.2 Reserves and stripping ratio

The mining block has been divided into three areas as follows:

(i) Main mine area (North of Fault F11).
(ii) South-west mine area (South of Fault F11).
(iii) Deep mine area (South of Fault F8).

The geological reserves in the main mine area and south-west mine area have been estimated in details - considering the coal already mined and modifications made in the mine boundaries in the present PR. The reserves of the deep mine area was indicated as 97.27 MT by METCHEM in the project document of Rajmahal-A OCP which formed the basis of the approved PR. Table 1.3 gives the geological reserves of the mining block excluding coal lost in quarry batters.

Table 1.3: Geological Reserves of the mining block excluding coal lost in quarry batters

Particulars	Geological reserves of mining block (Mt)	Geological reserves of April '2003 mine-take (Mt)
Main Mine Area		
Excluding Seam-I	376.37	298.28
Seam-I	16.06	-

Particulars	Geological reserves of mining block (Mt)	Geological reserves of April '2003 mine-take (Mt)
Sub-total	**392.43**	**298.28**
South-west Mine Area	27.36	3.26
Deep Mine Area	97.27	14.74
Total	**517.06**	**316.28**

The mineable reserves of the mine (as on 1.4.2003) have been estimated as follows considering 95% recovery of the above geological reserves as taken in the approved PR.

Table1.4: Mineable Reserves of Present Mine take

Particulars	Mineable reserves of present mine-take (Mt)
Main mine area (Excluding seam-I)	283.37
Seam-I	-
South-west mine area	3.10
Deep mine area	14.00
Total	**300.47***

***** Out of this, 49.37 of coal have been mined out between years period of 2003-2008.

The mineable reserves as on 01/04/2008 has been estimated as 251.10 Mt requiring 504.81 Mcum of OB removals at an average stripping ratio of 2.01 m^3/te. These reserves include 14 Mt of coal from the deep pit area at an average stripping ratio of 1.6 cum/t.

The seam wise mineable reserves and parting wise OB volume as on 01/11/2016 is presented in the table 1.5.

Table 1.5: Seam wise Mineable Reserves, Parting wise OB and Stripping Ratio

Name of the Seam	Seam Thickness (m)	Average Grade	Average Gradient	Mineable Reserves	
				As per approved PR (10mty to 17MTY)	Balance Reserve as Revised Cost Estimates Oct 2016
Seam-III	5-10	G-13	North of fault F-8	29.78	24.59
Seam-II (Top)	7-13		$2\text{-}3^0$ Easterly	86.82	70.20
Seam-II (Bot)	10-16		South of fault F-8	94.95	85.89

Name of the Seam	Seam Thickness (m)	Average Grade	Average Gradient	Mineable Reserves	
				As per approved PR (10mty to 17MTY)	Balance Reserve as Revised Cost Estimates Oct 2016
Seam – IIT+IIB	24-36		$5\text{-}10^0$ Easterly	34.20	5.43
Seam-III+II	37-42			5.35	
Total Coal (Mt)				251.10	
Total OB(Mcum)				504.81	
Total Coal (Mt)(31.12.15)					186.11
Total OB (Mcum) (31.12.2015)					416.36
Coal Production (Mt) 01.01.2016 to 31.03.2016					5.98
OB Removal (Mcum) 01.01.2016 to 31.03.2016					9.36
Balance Coal (Mt)on 01.04.2016					180.13
Balance OB (Mcum) 01.041.2016					406.99
Stripping Ratio				2.01	2.26

S*ource: Revised Cost Estimate for 17 MTY for Rajmahal OCP*

1.5.3. Land Use

Table 1.6: Pre Mining and During Mining Land Use

S.	Pre-Mining Land Use			Land Use during Mining		
No.	**Particulars**	**Quantity (Ha)**	**%**	**Particulars**	**Quantity (Ha)**	**%**
1	Agriculture	1677.98	84.83	Quarry	1344	67.94
2	Forest	107.39	5.43	OB	276	13.95
3	Village	46.15	2.33	Township	120	6.08
4	Tanks	13.70	0.69	Rehabilitation	42	2.12
5	Danga	113.05	5.72	Industrial	196	9.91
6	Others	19.73	1.00			
	Total	**1978**	**100**	**Total**	**1978**	**100**

Source: EIA/EMP for 17 MTY Expansion Project

Out of 1978 ha of area of Rajmahal OCP, 1677.98 ha is agricultural land, 107.39 ha is forest land for which Stage-II clearance has already been obtained by project proponent. 113.05 is waste land, 13.70 ha is surface water body, 46.15 private land and 19.73 ha falls in others category such as infrastructure, coal stockyard and build up area.

1.5.4 Geo-mining Parameters:

Mainly three coal seams, seam-II (bot), seam-II (top) and seam-III in the OCP area apart from seam-I have been developed only in the central portion of the OCP. The seam-II (bot), II (top)

and II merge and split occasionally to form different combination. The seam particularly, seam-II (bot) are also banded in nature. The geological and mining characteristics of the deposit are given as under:

Table 1.7: Usual Thicknesses of Coal Seams

Seam	Thickness(m)
Seam-II	5-10
Seam –III+ II(Top)	15-18
Seam-III+II	37-42
Seam-II(Top)	7-13
Seam-II(Top)+II(Bot)	24-36
Seam-II(Bot)	10-16
Seam-I	2-6

Source:-PR OF 17MTY OF Rajmahal OCP

Table 1.8: Minimum & Maximum Thickness of Partings

Particulars	Minimum	Maximum
Alluvium + Weathered rock	15m	35m
Top hard cover	Nil	60m(approx)
Parting between seam-III & II(top)	1m	44.70m
Parting between seam-II(top) & II(bot)	1m	26.52m
Parting between seam-II(B) & I	13m	34m

Source: - PR OF 17MTY OF Rajmahal OCP

Dip of strata – Usually 2^0–3^0

Table 1.9: Category of Excavation

Coal	Cat-III
Alluvium and weathered rock or Unconsolidated OB	90% Cat-II+10% Cat-I
Hard OB Or consolidated OB or parting	50%Cat-III+ 50% Cat-IV

Table 1.10: Volume Weight

All Coal Seam Considered	1.76t/m^3
Alluvium	1.786t/m^3
Waste rock	2.10t/m^3

1.5.5 Departmental and Outsourced Operations

(a) Departmental operations are carried out for drilling and blasting in Rajmahal quarry.
(b) OB removal is being done partly departmental and partly by outsourcing.
(c) Entire production from quarry is outsourced

(d) Coal handling, transport to siding and loading in rake is outsourced.

1.6 MINING OPERATIONS

1.6.1 Description of Coal Seams

Seam-I (Combined)

The seam underlies seam-II (bot) after a parting of 13.04 m to 33.66 m and is the lower most seam in the area. The seam has been encountered in 92 boreholes, out of which, in 25 boreholes the seam attains workable thickness which varies from 2.0 m to 9.54 m generally being 3 m to 5.5 m.

Seam-II (combined)

The seam underlies seam-III with a parting of 1m to 33.59 m. The seam-II (comb.) has been intersected in 37 boreholes. The thickness of the combined seam including all bands varies from 21.03 m to 40.51 m. The thickness excluding combustible bands of more than 1m thickness and all non-combustible bands irrespective of thickness ranges from 15.35 m to 37.89 m generally being 24 m to 36 m.

Seam-II (bottom)

The seam underlies seam-II (top) with a parting from 1 m to 26.52 m. Seam-II (bot) has been intersected in 108 boreholes. The including band thickness of the seam varies between 10.96 m to 26.53 m. The thickness of the seam excluding bands of 1m and above generally varies between 10 m-16 m.

Seam-II (top)

The seam underlies seam-III with a parting varying from 1m to 44.70 m. The seam is intersected in 63 boreholes. The excluding band thickness of the seam usually varies from 7 m to 13 m.

Seam-III

The seam underlies seam-IV after parting of 1m to 10.88 m. The seam has been intersected in 78 boreholes. The including band thickness of the seam varies from 1.35 m to 17.87 m. The excluding band thickness of the seam usually ranges from 5 m to 10 m.

Seam-III and II (Combined)

As stated earlier, in south-western part of the block, the seam-II (comb) coalesce with overlying seam-III to form a single composite seam of thickness ranging from 36.64 m to 54.88 m including all bands. The usual excluding band thickness of the seam varies from 48 m to 52 m.

Seam-III and II (top) combined

Seam-II (top) in two small isolated patches combines with seam-III to form a combined seam which has been encountered in three boreholes namely, CM-049, CM-062 and CM-067. The thickness of the seam varies from 19.76 m to 25.38 m including all bands. The excluding band thickness ranges from 14.98 m – 22.21 m.

Seam – IV

The seam lies 114.6 m to 136.20 m below the next persistent overlying seam i.e. seam-IX. The seam has been encountered in 26 boreholes and its thickness varies from 0.32 m to 2.01 m though over major part, the seam is 1.5 m to 2.0 m thick. The seam has a very restricted occurrence towards southern part of the block. The seam is generally free from dirt band.

Seams IX, X and XI

These seams have limited occurrence in the deep mine area, i.e., in the area between faults F8 and F15 (Plate-3). Seam –IX lies 3.85 m to 21.43 m below seam-X which again lies 7.29 m to 20.31 m below seam-XI.

1.6.2 Brief Description of Mining Operation

The Rajmahal OCP is operated by departmental HEMM as well as contractual HEMM. Top OB above III Seam is being removed by departmental HEMM and coal along with OB parting present mining system deploys shovel-dumper combination for both coal production and OB removal is extracted by contractual HEMM. Shovel-dumper combination is used for departmental OCP and surface miners as well as shovel-dumper combination is used by contractual agency.

The HEMM deployed for the purpose are electric shovels, hydraulic shovels, surface miners, backhoe, dumpers, dozers, drills, front end loaders and graders of various capacities. The working of Rajmahal OCP is divided into three mining zones namely Dahernagi patch, departmental patch and contractual patch.

1.6.2.1 Dahernagi Patch

Presently OB re-handling work is being carried out by contractually. This part of the quarry is not in operation because of dump failure.

1.6.2.2 Departmental Patch

Top soil/OB is being removed from the departmental patch with the help of shovel-dumper combination up to III Seam.

1.6.2.3 RCML Patch (Contractual patch)

III Seam coal, II Seam coal Top and II bottom seam is being worked with surface miners as well as shovel-tippers combination, parting between the III seam and II Top seam is being removed by shovel-dumper combination and internal band varying up to 5 m thickness between the II Top seam and II bottom seam is removed by shovel-tipper combination. This is being carried out by outsourcing to M/s RCML.

1.6.3 Waste Dumping

As per the working plan prepared by the project management as well as physical verification of the mining lease (ML) area during filed visit, one external OB dump and one internal backfilled OB dump is observed.

External OB Dump

It is an encroached external OB dump located outside the ML area towards north-western side adjacent to the rehabilitated Lalmatia village. The area of this dump is about 46 ha and having 3-4 terraces. The height of the dump is varying from 30 to 35 m and its slope angle is about 35 to 40 degrees.

Internal Backfilling OB Dumps

As per details provided by the Project Proponent (PP), one internal backfilled OB dump has been noticed in the de-coaled area spreading from south-west to north-east direction. The area of this dump is 443.38 ha.

(1) Inactive Internal Backfilled Dump area

The height of the dump is about 110 m from the bottom of the pit and its slope angle is about 50 to 60 degrees. Few terraces/benches have been noticed but are not properly made.

(2) Active Internal Backfilled Dump area

The height is about more than 100 m from the bottom of the mine pit and its slope angle is 40-50 degrees. Several deep rills and gullies are noticed on the dump slope.

1.6.4 Haul Roads

- There is a central haul road (two way traffic) from coal handling plant (CHP) to departmental patch which caters the movement of coal to RCML patch. Gradient of this haul is maintained at 1 in 17.
- Separate haul roads are maintained from Dahernagi patch to dumping site, which is being worked by outsourced agency M/s MIPL-NKAS (JV).
- Separate haul roads are maintained from Daherngi Patch to their dumping which is being worked by outsourced agency M/s RCML.

- Separate light roads are maintained for light vehicle movement from zero point (near CHP) to department patch.

1.6.5 Design Parameters

i) Mine is operated for 3 shifts/day of 8 hrs each and all 365 days a year.

ii) Bench height permissible in OB 17 m (max) departmental and 6m x 8m in outsourced patch in coal.

iii) Parting between coal seams (III & II Top) varies from14 to 17 m.

iv) Yearly planned OB excavation: Departmental 11 Mm^3 and 12.84 Mm^3 outsourced.

v) Yearly planned coal extraction: Departmental nil and 17 M Te outsourced.

Figure 1.3: Working Plan of Rajmahal OCP

The details of the operations handled by the departmental and outsourced are given in Table 1.11:

Table 1.11: Details of Mining Operations of Rajmahal OCP

Activity	Departmental	Outsourced
Drilling	Departmental	Outsourced
Blasting	Departmental	Departmental
OB removal	Departmental up to III^{rd} seam Only	Parting between III^{rd} &II^{nd} Seam
Coal extraction by shovel-dumper	Departmental in Quarry-1 Barring Seam-VII	III^{rd} Seam & II^{nd} Seam
Coal extraction by Surface Miners		II^{nd} Seam

1.6.6 Drilling and Blasting Operations

Drilling and blasting operations are carried out for loosening of OB rock and coal. Two types of blast hole drills are used in different types of operations. 160 mm dia. drills are used for vertical drilling in benches with 4m x 5 m of burden and spacing in III seam, II seam and parting. 250 mm dia. drills are used for vertical drilling in overburden shovel benches up to III seam OB 7m x 8 m of burden and spacing.

Table 1.12: Mining system parameters

S. No.	Particulars	Unit	Overburden	Coal
1	Bench height	m	8-17	5-8
2	Working bench width	m	50	30
3	Non-working bench width	m	60	-
4	Bench slope	degree	70	80
5	Blast hole dia	mm	250/160	160

Blasting is carried out by using site mixed slurry (SMS) as bulk explosive supplied by approved explosive manufacturers such as M/s. IDL, M/s. IEL, M/s. Indian Oil, M/s. Premier Explosives, etc. Blasting accessories such as cord relays, boosters and Nonel are drawn from ECL explosive magazine located at Lalmatia, while charging of holes is done by bulk explosive suppliers. Blasting operations are carried out departmentally.

1.6.7. Coal Handling, Transport and Dispatches

The dumpers from the OCP were to carry coal to the receiving pit which have 3 operating crushers plus 1 stand by crusher each of 1200 TPH capacity. Crushed coal (-) 200mm from the crusher was to be conveyed to a surge silo of 1500 tonne storage capacity. From surge silo, two conveyors of 1800 TPH capacity were to take the coal to the ground bunker of 45,000 t self-flowing capacity. Provision of 20,000 t ground stacking capacity was also there. From the ground bunker, two reclaim conveyors of 1800 TPH capacity were to take the coal to the wagon loading silos each of 18m dia. and 4000 te capacity. The silos were to be fitted with pre-weigh hoppers and other gadgets for flood loading of wagons moving at creep speed. Coal was to be dispatched to STPS by wagon rakes working in merry-go-round system (MGR). Further coal extracted by surface miners are stockpiled at CHP area and transported to siding by tippers and is loaded in to rake by Pay-loaders.

1.7 Rehabilitation and Resettlement (R&R)

The R & R Policy of CIL is being followed for resettlement and rehabilitation of project affected families (PAFs).

19 villages are falling in the core zone. A total of 5931 PAFs have been identified in the area, out of which 2060 PAFs have been provided with R&R packages and 3871 PAFs are in the process of rehabilitation as detailed in the table below:

Table 1.13: Status of rehabilitation of project affected villages with their families

S. No.	Village	PAFs	PAFS Rehabilitated	Rehabilitation status/Period
1	Bara Simra	310	310	Completed/1992-94
2	Toyotola	34	34	Completed/1992-94
3	Dhowatanr	85	85	Completed/1995-96
4	Ghat Simra	45	45	Completed/1997-98
5	CharanTola	169	169	Completed/2003-07
6	**Bara Bhorai**			
	a. Kashi Tola	193	193	Completed/2001-02
	b. Pradhan Tola	261	261	Completed/2003-05
	c. Lohar Tola	272	272	Completed/2006-08
	d. Dahernangi	52	52	Completed/2008-09
	e. Charan Tola (Dip Mining Zone)	34	34	Completed/2013-14
	f. Dahar Tola, Mukhia Tola, Mem Tola, Bathan Tola and AbhiTola	220	220	Completed/2015-16
	g. Bhado Tola (Muslim)	828	274	To be completed in 2017-18
	h. Bhado Tola (Santhal)	130	51	To be completed in 2017-18
7	Chhota Bhorai	100	8	To be completed in 2018-19
8	Bansdiha (Approx.)	1000	0	To be completed after 2020
9	Taljhari (Approx.)	500	0	To be completed after 2020
10	Paharpur (Approx.)	300	0	To be completed after 2020
11	Bheranda (Approx.)	300	0	To be completed after 2020
12	Lohandiya	325	52	To be completed in 2018-19
13	Lohandiya Bazar	773	0	To be completed in 2019-20
Total		**5931**	**2060**	

Source: PR of Rajmahal R&R Department

CHAPTER 2

AUDIT METHODOLOGY

The audit methodology adopted include discussion with the personnel from the project authorities related to the project, desk review of documentation and copies of records provided by project proponent of Rajmahal OCP; working group meetings and site inspection to assess the level of compliance of environmental conditions stipulated by MoEF & CC. The audit process cover the scope of the work order provided by the CIL and are described in detail below:

2.1 OPENING MEETING

The audit process commenced with an opening meeting on 5th July 2017 with the General Manager (Mining) and other concerned officials of the Rajmahal OCP to introduce the audit scope and their responsibility in facilitating the process. The purpose, depth and the scope of the audit were outlined and the methods were explained. Further, requirement of documents to review such as various management plans, project report, mine closure plan and periodical reports submitted to various regulatory agencies to address specific compliance requirement particularly those relevant to address the scope of the study were discussed and deliberated.

2.1.1 Consultation

Interaction meetings were conducted with the concerned officials and staff dealing with the project to understand the regulatory and statutory process followed for the mine. During the process of consultation, in-depth discussion were held with Sh. A.K. Jha, GM (Mining), Rajmahal Area; Sh. D. K. Nayak, GM (Operation), Rajmahal Area; Sh. B. S. Chauhan, AGM (Mining); Sh. Kishore Kumar, GM (Mining); Sh. S. K. Jha, GM (Civil); Sh. S. C. Mitra, CM (Mining); Sh. A. Dutta, S. M. (Mining); Sh. S. Debar (Area Survey Officer); Sh. Tauseef . S. K., AM (CD) and Sh. Damodar Ram, SO, Rajmahal Area.

2.1.2 Desk Review

The available documents were exhaustively desk reviewed for generation of information and the gaps in compliance to environmental clearance conditions; relevant information generated was used for detailed discussion with the concerned officials.

2.2 DATA COLLECTION AND VERIFICATION

The team verified the documents, such as letter from the MoEF&CC according environmental clearance, forest clearance approved till date, Environmental Impact Assessment (EIA) and Environment Management Plan (EMP), project report prepared by Central Mine Planning and Design Institute Ltd., in December, 2009 and also all other statutory approvals like No Objection Certificate (NOC) from State Pollution Control Board (SPCB), Directorate General of Mines

Safety (DGMs) permission and all periodical reports submitted to various regulatory agency etc., were reviewed.

The documents were desk reviewed for collection of data prior to the onsite audit to verify the implementation process. Wherever the document was not available, detailed discussion was held with the relevant personnel and accordingly pointed out in the audit report for further implementation. In addition, the statements provided by the project personnel were also verified by desk reviewing the document and during site inspection. Wherever suitable verification could not be obtained, the same has been identified in the audit process and suitable suggestion has been provided for future course of action.

2.3 SITE INSPECTIONS

A detailed site inspection on 5th to 6th July, 2017 was carried out as part of the audit process. Following areas were inspected during the inspection:

- Mining Operation
- The haulage road
- Site facilities
- Coal crushing and conveyor system
- Coal Handling plant (CHP), and stockyard
- Coal Transport and Loading system
- Overburden dumps
- Check/Garland drains
- Corporate social responsibility (CSR)
- Employees protection measures
- Water management structure (ETP/STP)
- Greenbelt area and plantations

2.4 REVIEW OF STATUS OF STATUTORY COMPLIANCE

(a) Project approvals
(b) Environmental Impact Assessment
(c) **Health & Safety:** Regulations Nos. 6, 61, 106, 112 of Coal Mines Regulations, 1957 and its related DGMS Circulars;
(d) **Blast Monitoring**
(e) **Environment**
  (i) Water (Prevention & Control of Pollution) Act, 1974;
  (ii) Air (Prevention & Control of Pollution) Act, 1981;
  (iii) Environmental (Protection) Act, 1986 – approvals (EC, Haz Waste, BMW Authorizations)
(f) **Forest:** Forest (Conservation) Act, 1980.

(g) Environmental Management Strategy

1) Air Quality

i) Work zone –Standards for Coal Mines issued by MoEF, GSR-742 E dated 25.09.2000.

ii) Residential category – National Ambient Air Quality standards issued by CPCB, GSR 176 dated 02.04.1996- Air quality monitoring.

2) Noise Monitoring Plan – Noise monitoring programme.

3) Water Quality

i) Water licence

ii) Mine discharge / Workshop / Colony effluents – Standards for Coal Mines issued by MoEF, GSR-742 E dated 25.09.2000 and GSR-801 (E), EPA, 1986, dated 31.12.1993- Water Quality Management

iii) Ground Water – BIS 105000: 1991
iv) Surface Water – BIS 2296: 1982

2.5 WORKING GROUP MEETING AND REPORTING

After the completion of interview, document verification and site visit; the observation and suggestions by the audit team were compiled into a consent checklist and audit notes were prepared. This report has been prepared highlighting areas where action or improvement is required keeping in view the scope of the study.

CHAPTER 3
ENVIRONMENTAL AUDIT FOR RAJMAHAL OPEN CAST MINE

3.1 INTRODUCTION

Environmental audit is performed to assess the activities implemented by the project authority as per EC conditions and compliance as a set of criteria or standards recommended by the MoEF & CC, Govt. of India. The team conducted audit for Rajmahal OCP through exhaustive document review, site visit and interactions with the stakeholders. The status report on compliance to environmental clearance conditions submitted by the project authority to the respective regulatory agencies was also reviewed by the audit team for relevant input. Accordingly, a checklist of EC conditions by the MoEF & CC, status of environmental compliance and audit observation by the audit team prepared is provided in Table 3.1.

Table 3.1: Compliance to Environmental Conditions from production capacity of 17.0 MTPA in ML area of 1978 Ha. and Observations/Recommendations by ICFRE (*vide* letter J-11015/30/2004/I-A.II (M) dated 11th May 2005)

A. Specific Conditions

S. No.	Specific Conditions stipulated by MoEF & CC, Govt. of India	Project Proponent Compliance (till the end of March 2017)	Observations/Recommendations by ICFRE
i	The environmental clearance is subject to approval of the State land use department, Government of Jharkhand for diversion of agricultural land for non-agricultural use.	Mining operation at Rajmahal (10.5 MTY) OCP is being done after notification and acquisition of the respective land (Tenancy, Govt. and Forest) under Coal Bearing Areas (Acquisition & Development) Act 1957 in different phases. However, forestland is handed over after fulfilling the conditions as per Forest Conservation Act, 1980. According to Section 11 of CBA (A&D) Act, 1957 the land is automatically handed over to the Central Government and ultimately to the project authority by virtue of direct vesting. Rajmahal expansion (17 MTY) OCP covers the same mining block with an additional area of 149 ha of land, which will be acquired after notification under CBA (A&D) Act, 1957.	By and large this condition has been complied by the project proponent (PP) and is presently not facing any hindrance for production of 17.0 MTPA consented capacity of coal production. However, it is suggested that the land acquisition of 149 Ha under CBA Act, 1957 may be expedited for the smooth mining operation as per the provision, if any.
ii	Top soil should be stacked with proper slope at earmarked site(s) only with adequate measures and should be used for reclamation and rehabilitation of mined out areas.	Top soil is stacked over earmarked sites and is spread over internal OB dumps uniformly before plantation work.	The condition is being complied. Top soil has been stacked, preserved and maintained in the backfilled OB dump area of the mine lease (ML). It has been noticed that some of OB dump tops are not covered/ spread with top soil. Hence, The top soil has to be spread before onset of monsoon on the inactive OB dump areas after attaining the specified height, so that

S. No.	Specific Conditions stipulated by MoEF & CC, Govt. of India	Project Proponent Compliance (till the end of March 2017)	Observations/Recommendations by ICFRE
			the dormant seeds, grass rhizomes and other herbs and shrubs can regenerate and stabilize the OB dumps.
iii	OB dumps should be stacked at earmarked dump site(s) only and should not be kept active for long period. Proper terracing of OB dump should be carried out so that the overall slope comes down to 28 degree. The excavated area should be concurrently back filled with the mining operation. Monitoring and management of rehabilitated areas should continue until the vegetation becomes self-sustaining. Compliance status should be submitted to the Ministry of Environment & Forests on yearly basis.	OB is stacked at earmarked dump sites. With proper terracing for over all slopes comes down to 28 degree. OB is being concurrently backfilled into the de-coaled areas. Utmost care towards stability of OB dumps is being taken. Proper benching of OB is also ensured. However, since the internal dump is still active, plantation could be carried out only on 169 ha and the remaining backfilled area will be planted only after maximum dump capacity and height is reached.	The condition is partially complied. As per the working plan prepared by the project management as well as physical verification of the ML area during filed visit, one external OB dump and one internal backfilled OB dump is observed. The dump details provided by the PP are varying from one document to another. In future, the PP has to report the actual status of dump details in compliance to the EC. **External OB Dump:** It is an encroached external OB dump located outside the ML area towards north-western side adjacent to the rehabilitated Lalmatia village. The area of this dump is about 46 ha and have 3-4 terraces. The height of the dump is varying from 30 to 35 m and its slope angle is about 35 to 40 degrees. The dump has been kept idle since 35 years and no rehabilitation measures have been undertaken. Retaining/toe wall and garland drain has been observed at the bottom of the dump for a small area and is not continuous. The toe wall and garland drain is constructed as part of laying the road along the Lalmatia village rather than to provide protection to the waste dump. The garland drain is filled with OB boulders, silt and sediments. The dump is not

S. No.	Specific Conditions stipulated by MoEF & CC, Govt. of India	Project Proponent Compliance (till the end of March 2017)	Observations/Recommendations by ICFRE
			reclaimed biologically. However, it is covered with sparse natural weedy plant species. The dump slopes are severely breached and several deep rills and gullies are noticed. The OB materials are rolled down into the agriculture fields and rehabilitated Lalmatia village. Hence, it is strongly recommended that the PP has to take immediate action to reclaim and rehabilitate the OB dump without any further delay by making proper terraces spreading top soil and planting native/local grasses/herbs, shrubs and fast growing tall trees including fruit bearing plant species. **Internal Backfilled Dump area:** As per details provided by the PP, one internal backfilled OB dump has been noticed in the de-coaled area spreading from south-west to north-east direction. The area of this dump is 443.38 ha (active-42.56 ha and inactive-400.82 ha). Out of the 400.82 ha of inactive backfilled area, only 169 ha has been biologically reclaimed with both exotic and native plant species. **(1) Inactive Internal Backfilled Dump area:** The height of the dump is about 110 m from the bottom of the pit and its slope angle is about 50 to 60 degrees. Few terraces/benches have been noticed but are not properly made. No toe /retaining wall have been made. At few places, a kutcha garland drain has been observed at the bottom of the backfilled dump in order to protect the haul roads. The drain is filled with

S. No.	Specific Conditions stipulated by MoEF & CC, Govt. of India	Project Proponent Compliance (till the end of March 2017)	Observations/Recommendations by ICFRE
			OB wastes, silt and sediments. The inactive backfilled areas are not biologically stabilized, except at few places. Some part of the inactive dump slopes are vegetated with *Acacia catechu, Ailanthus excelsa, Alstonia scholaris, Cassia siamea, Dalbergia sissoo, Holoptelea integrifolia, Lannea coromandelica, Leucaena leucocephala, Pongamia pinnata*. Even though some part is biologically reclaimed, the dump slopes have several deep rills and gullies and severely eroded and the OB waste materials breeched down due to unscientific dump management. **(2) Internal Backfilled Dump (Active area):** The height is about more than 100 m from the bottom of the mine pit and its slope angle is 40-50 degrees. Several deep rills and gullies are noticed on the dump slope. The dump slope has been severely eroded and OB materials breached and flown down into the mine pit. No toe wall/retaining wall, catch/garland drains have been made.

S. No.	Specific Conditions stipulated by MoEF & CC, Govt. of India	Project Proponent Compliance (till the end of March 2017)	Observations/Recommendations by ICFRE
iv	Catch drains and siltation ponds of appropriate size should be constructed to arrests silt and sedimentation flows from soil, OB and mineral dumps. The water so collected should be utilized for watering the mine area, roads, green belt development, etc. The drain should be regularly de-silted and maintained properly. Garland drains of appropriate size should be constructed, to collect surface run off from the OB and waste dump site(s) and taken to settling pond before discharge.	Catch drains and siltation pond is under proposal. Garland drains are provided along the toe of dump for collecting and discharging rain water. Yearly cleaning of the drains is carried out under monsoon preparation. Storm water flowing through garland drains is collected in a pond which is de-silted as and when required. Some more garland drains and settling pond is under execution and will be ready soon.	The condition is partly complied. A kutcha catch/garland drain is made to protect the mine pit from the surface runoff water and at some places at the bottom of the internal backfilled OB areas to protect the haul roads. The drains are completely filled with OB boulders, silt and sediments. Hence, the PP has to strengthen the catch/garland drains and properly de-silt the drains before and during the monsoon season. Further, it is suggested to construct the catch/garland drains all along the toe of all the OB dumps and it is to be connected to the settling tanks (STs) and finally drained into the mine sump. **Sedimentation ponds:** Two nos. of sedimentation ponds are made near sub-station, Simra. After settling the water from the mine sump, it is pumped into sedimentation ponds. After proper settlement, the water is used for industrial as well as agricultural purpose. **Water recharge Pond:** After treatment, the Effluent Treatment Plant (ETP) water is drained into the water recharge Pond (Kendva pond) which is located opposite to PET office at Kendva village. This pond is completely filled with aquatic weedy plant species. The PP has to de-silt the pond periodically and also remove all the aquatic weeds for better management.

S. No.	Specific Conditions stipulated by MoEF & CC, Govt. of India	Project Proponent Compliance (till the end of March 2017)	Observations/Recommendations by ICFRE
v	Dimension of retaining wall at the toe of dumps and OB benches within the mine to check run off and siltation should be based on the rainfall data.	Proper benching in OB dumps is being done in order to maintain slope stability to check run-off and siltation.	The condition is not complied. No retaining/toe-walls have been made on both external (except a small patch) and internal backfilling OB areas. Hence, the PP has to construct retaining/toe walls at the bottom of both the external and internal backfilled OB dumps with proper catch/garland drains. The garland drains of internal backfilled areas are to be connected to the mine sump after passing through the settling tank, so that the silt and sediments can be arrested.
vi	Greenbelt should be raised by planting the native species around the ML Area, OB dump sites, colony, etc. in consultation with the local DFO/Agriculture Department. The density of trees should be around 2500 plants per ha.	Green belt has been developed in the colony. In the rehabilitation sites and also along the road side to the extent of 88.8 ha of land (other than OB dump plantation as mentioned in Sl No. iii above). The year-wise plantation developed in the mine is as under : 2009-10 to 2012-13 – Nil 2013-14– 20000 2014-15 – Nil 2014-15 – Nil 2016-17 – Nil (work order for 3- tier roadside plantation (9000 plants) is given to DFO Bhagalpur. Also proposal for plantation over 17 ha of OB dump area is also forwarded to DFO, Godda).	The condition is partly complied. No greenbelt/safety zone plantation has been undertaken by the PP all along the lease boundary. Out of the 400.82 ha of inactive backfilled area, only 169 ha has been biologically reclaimed with both exotic and native plant species. Plantation has been made in an area of 88.8 ha in the township, degraded waste lands and at few places all along the haul/transportation roads. Hence, the PP has to raise the thick greenbelt/safety zone plantation within the lease all around the boundary with tall, fast growing including fruit bearing native plant species as suggested in **Annexure-IV**.

<table>
<tr><th>S. No.</th><th>Specific Conditions stipulated by MoEF & CC, Govt. of India</th><th>Project Proponent Compliance (till the end of March 2017)</th><th>Observations/Recommendations by ICFRE</th></tr>
<tr><td>vii</td><td>The project authority should implement suitable conservation measures to augment ground water resources in the area in consultation with the Regional Director, Central Ground Water Board, Patna.</td><td>Rajmahal project area falls under non-critical zone as indicated by Central Ground Water Authority, Delhi. However, mine discharge water after settling tank is totally utilized for water spraying on transport roads, CHP, workshop and remaining water is fed to ponds, within our notified area, as well acts as a ground water recharge.</td><td>The project authorities have constructed two groundwater recharge structure at Rajmahal guest house area to augment groundwater resources. Such structures should also be constructed at area office and also explore the possibility at GM Office for construction of such structures for augmenting groundwater resources.</td></tr>
<tr><td>viii</td><td>Regular monitoring of ground water level and quality should be carried out by establishing a network of existing wells and constructing new piezometers during the mining operation. The monitoring should be carried out four times in a year: - pre- monsoon (April-May), monsoon (August), post-monsoon (November) and winter (January) and the data thus collected may be sent regularly to MOEF, Central Ground Water Authority and CGWB, Patna.</td><td>Regular monitoring of ground water level in five designated wells in vicinity of OCP is carried out on fortnightly basis (earlier on quarterly basis) by CMPDI, Asansol.
The report is being submitted regularly as desired.
<table>
<tr><th>Site (Date of sampling)</th><th>Well water level from ground (m)</th></tr>
<tr><td>Bara Simra Rehab Site (16/11/2016)</td><td>5.80</td></tr>
<tr><td>Hijukitta Village (16/11/2016)</td><td>5.50</td></tr>
<tr><td>Lalmatia Chawk (16/11/2016)</td><td>6.15</td></tr>
<tr><td>Lohandia Bazar Village (16/11/2016)</td><td>5.40</td></tr>
<tr><td>Paharpur Village (16/11/2016)</td><td>2.40</td></tr>
</table>
For the installation of piezometer the study has been done by CMPDIL and accordingly the locations were identified.</td><td>The project authorities are monitoring the groundwater levels at six different localities. The monitoring results do not show any deterioration in groundwater levels attributable due to mining activities. However, the piezometers which are not restored till now should be expedited judiciously as the clearance letter is 12 years old, hence significant time has elapsed. Therefore, this project should be completed immediately.</td></tr>
</table>

S. No.	Specific Conditions stipulated by MoEF & CC, Govt. of India	Project Proponent Compliance (till the end of March 2017)	Observations/Recommendations by ICFRE
ix	The project authorities should obtain prior approval of the competent authority for withdrawal of requisite quantity of ground water.	A letter in this regard had been received from Central Ground Water Authority, Delhi which indicates that the land cover under Rajmahal project area falls under non-critical zone from Central Ground Water Authority, Delhi. Copy of the said letter was given to Director, CGWB, Patna by project authority for intimation. Further, it is being pursued with the CGWB, Patna for grant of withdrawal of required water.	It was found that the proponent is drawing groundwater for its domestic consumption without any prior approval. The PP should expedite the required permission from concerned authority to comply with the EC condition.
x	The project authorities should meet the water requirement of nearby village(s), in case the village wells go dry due to de- watering of the mine.	The Rajmahal do meet the water requirement of nearby needy villages regularly through (i) water tankers, (ii) supply water by bore hole pumping and (iii) channelizing the dewatered supply to village ponds. Financial help is also provided on opening of new wells, their maintenance and installation of hand pumps.	The condition is being complied. The project authorities are supplying potable drinking water through tankers in eight peripheral villages of mining lease for water needs round the year. A water treatment plant at Lalmatia village has been established for treatment of mine water having a capacity of 5000 GPH for this purpose. Further, at Kendua village a pond has been connected with the ETP/sedimentation pond discharge for the augmentation of groundwater and for agriculture purposes.

S. No.	Specific Conditions stipulated by MoEF & CC, Govt. of India	Project Proponent Compliance (till the end of March 2017)	Observations/Recommendations by ICFRE
xi	Coal handling plant should be provided with adequate number of high efficiency dust extraction system. Loading and unloading areas including all the transfer points should also have efficient dust control arrangements. These should be properly maintained and operated.	Sufficient numbers of high efficiency dust extraction and suppression system have been provided at input hopper, loading and unloading areas including all the transfer points maintained and operated at coal handling plant. Mobile water sprinklers (28 KL capacity) have been provided for dust suppression at haul roads.	The coal handling plant is not connected with any stack; therefore there is no provision of dust extraction system. The coal production from shovel dumper combination is transported through tippers and fed to directly crushers through grizzly. The grizzly is fitted with pressurized water sprinkling system to suppress the fugitive emissions arising out due to unloading of coal. The crushed coal is directly conveyed through covered conveyors. All the transfer points are fitted with mist type of dust control arrangements and are properly maintained. However, the coal stock pile yard of surface miner does not have any dust suppression system. It is suggested that fixed water sprinkling system all around the coal stockyard should be erected for controlling the fugitive emissions especially during summer time.
xii	Consent to operate should be obtained from SPCB before starting mining activities for expanded quantity of coal.	Consent to operate has been obtained for 05 years (30.01.2017 to 31.12.2021) *vide* letter no JSPCB/HO/RNC/CTO-1112442/2017/86 dated 31.01.2017 from Jharkhand State Pollution Control Board, Ranchi.	The condition is complied.

S. No.	Specific Conditions stipulated by MoEF & CC, Govt. of India	Project Proponent Compliance (till the end of March 2017)	Observations/Recommendations by ICFRE
xiii	Vehicular emissions should be kept under control and regularly monitored. Vehicles are regularly checked during their "Daily Check" and "Preventive Maintenance" to monitor and control the vehicular emissions. A separate "CBM Cell" is also functioning at the project for the purpose.	Vehicles are regularly checked for valid emission certificate on routine basis and reports are being maintained.	This is also complied. However, few of the tippers were found emitting very high exhaust. It is advised that they should be properly checked.
xiv	The project proponent should take all precautionary measures during mining operations for conservation and protection of endangered fauna such as bear, python, etc. spotted in the study area in consultation with the concerned forest officials. Action plan for conservation of endangered fauna should be prepared and submitted to the Ministry and its Regional Office within 3 months.	Full efforts are being made during mining operation for conservation and protection of endangered fauna spotted in the study area in consultation with forest officials. Action plan for conservation of endangered fauna will be done by Forest Department, Govt. of Jharkhand. In this respect follow up action is being taken up at our end and the same will be submitted to the Ministry and its Regional Office at the earliest.	The condition is partly complied. Action plan for conservation of endangered fauna has been prepared and submitted to the RCCF, Dumka, Jharkhand on 26th June 2017. The PP has to submit the same after vetting by the RCCF, Dumka to the MoEF & CC and its Regional Office.
xv	Land oustees and land losers should be compensated as per the State Government norms.	Land losers are paid land compensation as per norms. The last five years payment details are as under: 2009-10: Rs 67.74 Lakhs 2010-11: Rs 127.31 Lakhs 2011-12: Rs 20.25 Lakhs 2012-13: Rs 44.55 Lakhs 2013-14: Rs 235.94 Lakhs 2014-15: Rs 714.48 Lakhs 2015-16: Rs 125 Lakhs 2016-17: Rs 217.7 Lakhs	Land oustee are given due compensation as per CIL's Policy, which is better than State Govt. norms.

S. No.	Specific Conditions stipulated by MoEF & CC, Govt. of India	Project Proponent Compliance (till the end of March 2017)	Observations/Recommendations by ICFRE
xvi	A final mine closure plan along with details of corpus fund should be submitted to the Ministry of Environment & Forests, 5 years in advance of final mine closure for approval.	For financial assurance ECL had already a fixed deposit escrow account with Union Bank of India, with the Coal Controller Organization as exclusive beneficiary. The annual mine closure cost for 2015-16, Rs 1435.32 Lakh have been deposited in the mine closure escrow account of Rajmahal OCP.	After careful verification of the mine closure plan, it is revealed that the plan is inadequate, Hence, the PP has to prepare a detailed final mine closure plan with site specific bio-engineering measures for reclamation and restoration of degraded areas and OB dumps and the same has to be submitted to MoEF & CC within 6 months.
xvii	Digital processing of the entire lease area using remote sensing technique should be done regularly, once in three years for monitoring land use pattern and report submitted to MOEF and its regional office.	Digital processing of the entire lease area using remote sensing technique is annually done by CMPDI, Ranchi. From the report of 2012-13, analysis of satellite data indicates that 65.26% areas have been reclaimed in Rajmahal OCP.	The condition is being complied.

B. General Conditions

S. No.	General conditions stipulated by MoEF & CC	Project proponent Compliance	Observations/Recommendations by ICFRE
i	No change in mining technology and scope of working should be made without prior approval of the Ministry of Environment and Forests.	Till today there is no change in mining technology and scope of working; before changing, prior approval of the Ministry of Environment and Forests will be taken.	Partially complied. EC provides open cast mining using shovel dumper combination. However, surface miners were engaged at a later date by outsourcing agency for extraction of - 100 mm raw coal. The surface miner is a better, safe and environment friendly technology. It may be intimated to the MoEF&CC for record.
ii	No change in the calendar plan including excavation, quantum of	Till today there is no change in the calendar plan including excavation, quantum of	Complied. There is no change in calendar plan. However,

<table>
<tr><th>S. No.</th><th>General conditions stipulated by MoEF & CC</th><th>Project proponent Compliance</th><th>Observations/Recommendations by ICFRE</th></tr>
<tr><td></td><td>mineral coal and waste should be made.</td><td>mineral coal and waste.</td><td>quantum of waste excavation is varied to cover the backlog.</td></tr>
<tr><td>iii</td><td>At least four ambient air quality monitoring stations should be established in the core zone as well as the buffer zone for RPM, SPM, SO_2, NO_x, and CO monitoring. 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. Data on ambient air quality (RPM, SPM, SO_2, NO_x, and CO) should be regularly submitted to the Ministry including its Regional Office at Bhubaneswar and to the State Pollution Control Board/Central Pollution Control Board once in six months.</td><td>Fortnightly AAQ monitoring is done by CMPDI, RI- I, Asansol at 4 stations in core and buffer zone. The monitoring location of the station had been decided on the based on the meteorological data, topographical features and environmentally and ecological sensitive targets, in consultation with the representatives of JSPCB, Ranchi. The stations are as under:
1. Mine dispatch Building
2. CISF camp
3. Urjanangar hospital
4. ECL rest house at Pirpainti market
Monitoring is carried out on fortnightly basis and submitted regularly to the regional office of MoEF&CC, Bhubaneswar once in six months and to the JSCPB, Ranchi once in three months and also once in a year with the Environment Statement. Photocopy of environmental monitoring report for Second fortnight ending Feb-17 is enclosed with.
Ambient air quality data in microgram per cubic meter for above quarter ending is as follows:
<table>
<tr><th>Parameter</th><th>Min</th><th>Max</th></tr>
<tr><td>$PM_{2.5}$</td><td>29.4</td><td>40.4</td></tr>
<tr><td>PM_{10}</td><td>78.6</td><td>117.5</td></tr>
<tr><td>SO_2</td><td><10.0</td><td></td></tr>
<tr><td>NO_x</td><td>18.0</td><td>25.8</td></tr>
</table></td><td>The monitoring of air quality is being done at locations/stations in consultation with State Pollution Control Board (SPCB). Reports of these monitoring is submitted to the SPCB as specified. The reports are also submitted on six monthly basis to the Ministry of Environment, Forest & Climate Change and also uploaded on the site of the company. These reports were examined by the audit team.

The parameters monitored are SPM, RPM, SO_2 and NO_X as prescribed by Gazette Notification (GSR 742/E) dated - 25th September 2000. The said notification prescribes these parameters for monitoring stations to be laid within 500 m of the dust generating sources. However, CMPDI has carried out monitoring as per the parameters irrespective of their location vis-a-vis dust generating sources.

The report specifies the location of the monitoring stations but do not specify the distances and the dust generating sources. The provisions of GSR 742/E dated - 25th September 2000 states that if any residential, commercial or industrial place falls within 500 m of any dust generating sources, National Ambient Air Quality Standard (NAAQS) standards will be applicable for monitoring.
The monitoring at these stations should be</td></tr>
</table>

S. No.	General conditions stipulated by MoEF & CC	Project proponent Compliance	Observations/Recommendations by ICFRE
			carried out as per NAAQS. The standard prescribed by GSR 724/E have two values for each parameter, *viz.*, 24 hourly average and annual average. The reports give only 24 hourly values in periodical report. The annual report and annual averages values are provided. The values of parameters monitored vary over a narrow range. Even seasonal variations, due to change of wind directions are not reflected in the measured values. The analyses of 12 parameters prescribed *vide* gazette notification no. GSR 826(E) dated-16.11.2009 has been carried out. The EC prescribes that once in a year certain heavy metals like Hg, As, Ni, Cr etc. are to be monitored. The same are also being monitored. The general guideline of MoEF & CC is that at least one station should be monitored on the upwind side of the wind direction and two stations on the downwind side. This is being followed as stations have remained constant throughout the year.
iv	Drills should either be wet operated or with dust extractors.	Dust extractors are provided with drills and they are fully functional during drilling operation.	The condition is being complied.
v	Fugitive dust emissions from all the sources should be controlled regularly monitored and data recorded properly. Water spraying arrangements on haul	The practices of control, monitoring and recording of the dust emission are followed at the project. 1. Water spraying through mobile water	The fugitive emission data are not recorded. The mechanism should be evolved to capture the data as stipulated. In the mine premises, it is observed that the coal transport road up to the

S. No.	General conditions stipulated by MoEF & CC	Project proponent Compliance	Observations/Recommendations by ICFRE
	roads, wagon loading, dumps, loading and unloading points should be provided and properly maintained.	sprinklers is being used regularly on haul roads, wagon loading and dumps, loading and unloading points. 2. IC engines are maintained properly and overhauled regularly. 3. Dust suppression devices (dust collectors and water sprinkling on coal feed) have been installed in the CHP. 4. Employees and villagers residing in colony or surrounding villages respectively are provided LPG connections instead of coal to prevent smoke nuisance. The total no. of connections provided are 1282 from our co-operative store namely Lalmatia Colliery Karmachari Sahakari Upbhokta Bhandar, Urjanagar colliery. Afforestation has been done around the project site and colony. Plantations are being done according to approved EMP.	stock pile do not have any water sprinkling system to arrest the fugitive emissions arising out due to movement of tippers. Further, the coal stockyard from surface miner also has no sprinkling system to arrest emissions. However, the conveyors of CHP have mist type of effective dust suppression system in place. It is suggested that to arrest fugitive emissions at coal stock yard and at coal transpiration route should be provided with fixed type of water sprinkling system.
vi	Adequate measures should be taken for control of noise levels within prescribed standards. Workers engaged in blasting and drilling operations, operations of HEMM, etc., should be provided with ear plugs/muffs.	To control of noise levels within prescribed standards the following steps are being taken up: 1. Noise monitoring is being carried out regularly and found to be within permissible levels. Noise level reports for 2nd fortnight Feb'17 are appended below and photo copy is attached. Feb'17 Minimum – 46 dB(A) Maximum – 67 dB(A) 2. All HEMM and light vehicles are provided with silencers.	Adequate ear muffs/plugs are provided to the workers in the blasting, drilling and HEMM operations. It was found that no case of Noise Impaired Hearing Loss (NIHL) has been reported among the workers occupied in the above operations.

S. No.	General conditions stipulated by MoEF & CC	Project proponent Compliance	Observations/Recommendations by ICFRE
		3. Workers engaged in blasting and drilling operations of HEMM, etc exposed to high sound levels are provided with ear muffs and their working hours are reduced to prevent long exposure time.	
vii	Industrial wastewater (workshop and waste water 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. Oil and grease trap should be installed before discharge of effluents from workshop.	Industrial wastewater (workshop and waste water from the mine) is being properly collected and analyzed regularly and found conforming with the MoEF Schedule – VI standards for discharge of mine effluents. Analysis results of CHP discharge for 2nd fornight-Feb'2017 are within permissible limit. Quality report for four parameters area as under : Feb;17 (14.02.2017) Location : Discharge from CHP pH 8.0 TSS (mg/L) 12.0 TDS (mg/L) 192.0 Oil and grease (mg/L) <2.0 COD(mg/L) 72.0 Oil and grease trap is in use and properly maintained regularly. A proposal for enhancement of its design for better efficiency is to be made shortly.	The mine water is drained through a network of concrete channels and is collected at sedimentation tank near DG set. The overflow from sedimentation tank is discharged into Kendua pond from where it is used for spraying and fire fighting at CHP premises and also at CHP. The workshop effluent is collected through two sedimentation tanks followed by oil and grease trap. The clear water from this is again discharged to Kendua pond. It is suggested that the sedimentation tank at oil and grease trap assembly should be installed with a flocculator and aerator for effective separation of oil, grease, sediment and water.
viii	Acid mine water, if any has to be treated and disposed off after conforming to the standard prescribed the competent authority.	The sample of effluent mine water is collected to the intervals of three months for analyzing purpose by CMPDI- RI, Asansol and all the parameters are found within prescribed limit, till date no acid mine water is found in our mines.	The Rajmahal area coal do not contain any pyrite and other acid producing substances, hence there is no acid mine drainage. Further, the analytical reports of mine water also do not indicate any such abnormalities.
ix	Personnel working in dusty areas should wear protective respiratory	A personnel working in dusty areas is being given adequate training and information on	Though the PP has provided adequate number of Personel Protective Equipment (PPE) to the

S. No.	General conditions stipulated by MoEF & CC	Project proponent Compliance	Observations/Recommendations by ICFRE
	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 coal dust and take corrective measures, if needed.	safety and health aspects. They use protective respiratory devices judiciously. Periodical Medical Examination (PME) is being done to each worker at an interval of 5 years under occupational health surveillance program as per norms at central hospital, Kalla, ECL. If it is observed any contractions due to exposures to coal dust will be taken corrective measures as per need. PME of workers is being carried out at 5 year intervals in which audiometric tests are carried out. During the period of reporting is 1897 from 2010, year wise details are as under: 2010 – 463 2011 – 479 2012 – 455 2013 – 437 2014 – 457 2015 – 456 2016 – 455 2017 – 67 (upto March).	workforce, but the PPE compliance is poor. Therefore, a training and awareness programme should be launched for better PPE compliance. The hospital situated at Rajmahal area is carrying out occupational health surveillance programme as per statute and is equipped with all necessary infrastructures for audiometry, spriometry, X-ray, etc. Till date, no cases of Pneumocosis have been reported. It is suggested that the occupational health check of selected workers from mining zone be checked by a third party like National Institute of Occupational Health under occupational health surveillance programme.
x	Environmental laboratory should be established with adequate number and type of pollution monitoring and analysis equipment in consultation with the State Pollution control Board.	Environmental laboratory with latest equipments has been established at CMPDI-RI, Asansol. This lab is equipped with AAS, weather monitoring system, BOD incubator, photometer and other necessary equipments. Quarterly monitoring report for air, water, noise and Ground Water level and quality is prepared at above laboratory and sent to JSPCB with environmental statement (Form V) monthly and six monthly compliance report.	This is complied. CMPDI is carrying out monitoring work which has all the necessary infrastructure for carrying out monitoring and analysis works.

S. No.	General conditions stipulated by MoEF & CC	Project proponent Compliance	Observations/Recommendations by ICFRE
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 organization.	**Company Level:** Separate Environmental Management Cell with suitable qualified personnel is set up under the control of General Manager of ECL, who reports directly to the head of the organization. **Project Level:** A separate Environmental Management Cell with suitable environmental officer from ECL HQ (looking only for environmental matters) at control of project level is set up for clearing the task of exclusively environmental matters at Rajmahal Opencast Project who reports to Area Environmental Department, Rajmahal Area.	Environment Management Cell has been established at headquarter level by the project authority. It is observed that suitable qualified personnel have been recruited at junior level only and not at the level of the Senior Executive in the field of Environmental Management at the project area. Hence, it is suggested that the project authorities should take necessary steps to strengthen the Environment Management Cell with suitable qualified manpower with a background of Environment Management at Senior Executive level in the project area for better execution of works related to environment protection and pollution control.
xii	The funds earmarked for environmental protection measures should be kept in separate account and should not be directed for other purposes. Year-wise expenditure should be reported to the Regional Office, Bhubaneswar of the MOEF and to the Ministry.	The funds earmarked for environmental protection measures are kept in separate account. Total Rs. 21.24 crores had been allocated till the end of mine life for environmental management.	Unit does not have any separate budgeting system for environment protection. The entire budget is centrally controlled and unit wise funds are allocated from the central fund. Hence, it is suggested that the PP should allocate separate budget at the project and the same has to be utilized only for the purpose defined. Accordingly, the year wise expenditure details are to be submitted to MoEF & CC.
xiii	The Regional Office of this Ministry located at Bhubaneswar shall monitor compliance of the stipulated conditions. The project authorities should extend full cooperation to the	The project authorities are extending full cooperation to the officer(s) of the Regional Office of MoEF & CC Bhubneswar and Ranchi by furnishing requisite date/ information/ monitoring reports whenever the	This is complied.

S. No.	General conditions stipulated by MoEF & CC	Project proponent Compliance	Observations/Recommendations by ICFRE
	officer(s) of the Regional Office by furnishing requisite date/information/ monitoring reports.	office monitors compliance of the stipulated conditions.	
xiv	A copy of the clearance letter will be marked to the concerned Panchayat/local NGO, if any, from whom any suggestions/ representation has been received while processing the proposal.	A copy of the clearance letter has been marked to the concerned Panchayat/ local NGO from whom suggestions/ representation has been received.	This is complied.
xv	The project authorities should inform to the Regional Office located at Bhubaneswar regarding date of financial closures and final approval of the project by the concerned authorities and the date of start of land development work.	The Rajmahal Opencast Project (17 MTY) has been approved on 6th Feb, 2006 *vide* Letter No. 43011-28-2003-CPAM from Ministry of Coal, Govt. of India. Copy of which had been submitted to RO MoEF, Bhubneswar. Land development work is a continuous job which is being done from the inception of the Rajmahal Opencast Project.	This is complied.
xvi	State Pollution Control Board should display a copy of the clearance letter at the Regional Office, District Industry Centre and Collector's/ Tehsildar's office for 30 days.	The information regarding environmental clearance has been conveyed to JSPCB, Ranchi.	This is not under the purview of the project proponent.
xvii	The project authorities should advertise at least in two local newspaper widely circulated, one of the which shall be in the vernacular language of the locality concerned, within 7 (seven) days of the issue of the clearance letter informing that the project has been accorded environmental clearance and a copy of	Advertisement regarding "Notices of information of Environmental Clearance of Rajmahal 17 MTY OCP" had been done in two local newspapers i.e. "Deoghar publication of Prabhat Khabar" and "Bhagalpur publication of Dainik Jagaran" on 23.02.2006 for wide circulation.	This is complied.

S. No.	General conditions stipulated by MoEF & CC	Project proponent Compliance	Observations/Recommendations by ICFRE
	the clearance letter is available with the State Pollution Control Board and may also be seen at website of Ministry of Environment & Forests at http://envfor.nic.in		
3	The Ministry or any other competent authority may alter/modify the above conditions or stipulate any further condition in the interest of environment protection.	Proponent has not responded.	The PP should agree to this condition.
4	Failure to comply with any of the conditions mentioned above may result in withdrawal of this clearance and attract action under the provisions of Environment (Protection) Act, 1986.	Proponent has not responded.	The PP should agree to this condition.
5	The above conditions will be enforced *inter-alia*, under the provisions of the Water (Prevention & Control of Pollution) Act, 1974, the Air (Preventions & Control of Pollution) Act, 1981, the Environment (Protection) Act 1986 and the Public Liability Insurance Act, 1991 along with their amendments and rules.	Proponent has not responded.	The PP has obtained necessary approvals under Air and Water Acts, EP Act, but is ignorant about Public Liability Insurance act and other Court orders. To facilitate the proponent the relevant clause of Public liability Insurance Act is re-casted as under: ***The Public Liability Insurance Act,1991*** ***Obligation for Owners*** ➢ Provide relief in case of death or injury or damage to property from an accident on the principle of no fault. ➢ Draw insurance policies more than the paid – up capital* but less than Rs 50 Crores. ➢ Or for 1 Year Insurance Policy: 15 Crores.

S. No.	General conditions stipulated by MoEF & CC	Project proponent Compliance	Observations/Recommendations by ICFRE
			➢ Pay additional amounts as contribution to the Environment Relief Fund. ➢ Provide any information required for ascertaining compliances with the provisions of the Act. ➢ Allow entry and inspection to ascertain compliance with the provisions of the Act. ➢ Pay the amount of an award as specified by the Collector. ➢ Comply with the directions issued in writing by the Central Government, direction may include i) ***Prohibition or regulations of handling of any hazardous substances or*** ii) ***stoppage or regulation of the supply of electricity, water, or any other service.*** ****" Paid-up Capital" is the market value of all assets and stocks on the date of insurance.*** Further, Hon'ble Supreme court directives for the industries producing hazardous waste is also explained as under: **<u>Supreme Court order for Hazardous Industries (October, 2003)</u>** **"---** ***all industries involved in the hazardous chemicals and generating hazardous wastes display on – line data outside the factory gate, on quantity and nature of hazardous chemicals being used in the plant, as well as water and air emissions and solid wastes generated within***

S. No.	General conditions stipulated by MoEF & CC	Project proponent Compliance	Observations/Recommendations by ICFRE
			factory premises. If such data is not made available, the unit should be asked to show cause or even be asked to close down". It is suggested that the PP should draw an action plan and implement with the condition.

CHAPTER 4
AUDIT FINDINGS

This chapter deals with the audit findings of compliance status of EC clearance conditions to the Rajmahal OCP. The ICFRE team has audited each and every point of EC condition and provided comment on the Project Proponent's response to the compliance (Table 3.1). In addition, following are the points under the areas identified for enhancing the environmental performance of mine with adequate remedial measures.

4.1 MINING

- The benches in the mine have not been developed with proper height and width. The bench height is much more than the prescribed limit and width is quite narrow. It is suggested that mine benches may be rectified and formed as per the norms for sustainable and scientific mining.

- Persons deployed at the mine through department as well as contractor should be enforced to wear the protective equipments such as helmets and dust masks. Management must insist on usage of protective equipments by all the persons deployed in the mine especially dust masks to protect themselves from inhaling microfine coal and siliceous dust. Awareness programme should be held and concerned supervisory officials should be held responsible for non compliance of the EC conditions.

4.2 HEALTH

- All the persons deployed in the mine (Departmental as well as Contractor) may be subjected to complete health check-up periodically by National Institute of Miner's Health to ascertain ill effects of micro-fine coal dust and carbonaceous gases emitted due to spontaneous heating (burning) of coal in the mine.

4.3 COAL TRANSPORTATION

- It is observed that coal production from surface miner is transported to siding through open trucks causing spillages during transport and it should be attended. Coal bunker and silo area needs improvement as spillages are observed. Regular maintenance is to be undertaken for providing clean work zone environment.

- The haul roads are being maintained reasonably well. Dust suppression is being carried out with tankers. Haul roads, with a reasonably long life should be equipped with fixed water sprinklers on both sides.

4.4 LAND AND SURFACE WATER MANAGEMENT

The area is said to have been received an annual average rainfall of 1554 mm (2011-12) and indicates that the area is prone to erosion. Though the protective measures for surface water management have been implemented in the lease area, it is suggested that, strict measures such as adequate and effective protection to the OB dumps back filled areas, barren lands and not properly levelled mine pits, transport roads, stockyards, etc., should also be taken to protect the soil and surface water.

Mine sump Water

The backfilled OB dump and mine run-off water is draining into mine sump. After settlement of silt and sediments in the mine sump, the water is pumped into the siltation pond. The siltation pond water is passed through sedimentation pond and finally the water is pumped out and used for industrial purpose and also for agricultural purpose.

Catch/Garland drains

A kutcha catch/garland drain is made to protect the mine pit from the surface runoff water. At few places, kutchha garland drain is made at the bottom of the internal backfilled OB areas to protect the haul roads. The drains are completely filled with OB boulders, silt and sediments. Hence, the PP has to strengthen the catch/garland drains and de-silt the drains before and during the monsoon season. Further, it is suggested to construct the catch/garland drains all along the toe of all the OB dumps and is to be connected to the Settling Tanks (STs) and finally drained into the mine sump.

Sedimentation ponds

Two numbers of sedimentation ponds are made near sub-station, Simra. After settling the water in the mine sump, it is pumped into sedimentation ponds. After proper settlement, the water is used for industrial as well as agricultural purpose.

Water recharge Pond

After treatment, the ETP water is drained into the water recharge Pond (Kendva pond) which is located opposite to PET office at Kendva village. This pond is completely filled with aquatic weedy plant species and it is unusable for desired purpose. The PP has to de-silt the pond periodically and remove all the aquatic weeds for better management.

Nallahs

There are few primary and secondary seasonal nalas are originating from the ML area.

4.5 DUMP MANAGEMENT

As per the physical features of the terrain, dumping should be carried out by adopting retreating method starting from bottom and reaching to the top by creating terraces of 20 m height and 15 m width and the overall slope of the OB dump should not exceed 28 degrees. Berms should be provided at the toe of each terrace to avoid water flow over the dump slopes. Wherever necessary, retaining/toe walls and garland drains should be provided on every terrace and the drains have to be connected to the vertical drains and finally the water has to be drained into the mine sump for proper settlement. After completion of each terrace (bottom to top), plantation has to be carried out immediately by using the plant species as suggested in **Annexure-IV**.

As per the working plan prepared by the project management as well as physical verification of the ML area during filed visit, one external OB dump and one internal backfilled OB dump area is observed.

External OB Dump

It is an external OB dump located towards north-western side adjacent to the rehabilitated Lalmatia village. The area of this dump is about 46 ha and has 3-4 terraces. The height of the dump is varying from 30 to 35 m and its slope angle is about 35 to 40 degrees. The dump has been kept idle since 35 years and no rehabilitation measures have been done. Retaining/toe wall and garland drain has been observed at the bottom of the dump for a small area and it is not continuous. The toe wall and garland drain is constructed as part of protecting the road laid adjacent to the Lalmatia village rather than to protect the waste dump. The garland drain is filled with OB boulders, silt and sediments. The dump is partially reclaimed biologically. However, it is covered with sparse natural weedy plant species. The dump slopes are severely breached and several deep rills and gullies are noticed. Hence, it is strongly recommended that the PP has to take immediate action to reclaim and rehabilitate the OB dump without any further delay by making proper terraces spreading top soil and planting native/local grasses/herbs, shrubs and fast growing tall trees including fruit bearing plant species.

Internal Backfilling OB Dumps

As per details provided by the PP, one internal backfilled OB dump has been noticed in the de-coaled area spreading from south-west to north-east direction. The area of this dump is 443.38 ha (active area: 42.56 ha and inactive area: 400.82 ha). Out of the 400.82 ha of inactive backfilled area, only 169 ha has been biologically reclaimed.

(1) Inactive Internal Backfilled Dump area

The height of the dump is about 110 m from the bottom of the pit and its slope angle is about 50 to 60 degrees. Few terraces/benches have been noticed but are not properly made. No toe /retaining wall have been made. At few places, a kutcha garland drain has been observed at the bottom of the dump in order to protect the haul roads. The drain is filled with OB wastes, silt and sediments. The inactive backfilled areas are not biologically stabilized, except at few places. Some part of the inactive dump slopes are vegetated with *Acacia catechu, Ailanthus excelsa, Alstonia scholaris, Cassia siamea, Dalbergia sissoo, Holoptelea integrifolia, Lannea coromandelica, Leucaena leucocephala, Pongamia pinnata.*

Even though some part of backfilled area is biologically reclaimed, the dump slopes have several deep rills and gullies and severely eroded and the OB waste materials breached down due to unscientific dump management.

(2) Active Internal Backfilled Dump area

The height is about 100 m from the bottom of the mine pit and its slope angle is 40-50 degrees. Several deep rills and gullies are noticed on the dump slope. The dump slope has been severely eroded and OB materials are breached and flown down into the mine pit. No toe wall/retaining wall, catch/ garland drains have been made.

Retaining/Toe walls

No retaining/toe-walls have been made on both external (except a small patch) and internal backfilling OB areas Hence, the PP has to construct retaining/toe walls at the bottom of both the external and internal backfilled OB dumps with proper catch/garland drains. The garland drains of internal backfilled areas are to be connected to the mine sump after passing through the settling tank, so that the silt and sediments can be arrested.

4.6 Top soil management

Top soil has been stacked, preserved and maintained on the backfilled OB dump area of the mine lease. It has been noticed that some of OB dump tops are not covered/ spread with top soil. Hence, the PP has to preserve the top soil in a predetermined area as per land use plan. The top soil has to be spread before onset of monsoon on the inactive OB dumps after attaining the specified height, so that the dormant seeds, grass rhizomes and other herbs and shrubs can regenerate and stabilize the OB dumps.

4.7 GREENBELT

The greenbelt plantation has to be raised in safety zone area within the mine lease all along its boundary, which acts as a protective barrier to reduce the dust and noise emanating from mining activities. No greenbelt/safety zone plantation has undertaken by the PP all along the lease boundary. Hence, the PP has to raise the thick greenbelt/safety zone plantation within the lease area with tall, fast growing including fruit bearing native plant species as suggested in **Annexure-IV.**

4.7.1 PLANTATIONS

4.7.1.1 Transport/Service Roads:

Avenue plantation has been observed at few places all along the haul/transportation roads, but it is not continuous. The plantation includes both exotic and native plant species such as *Alstonia scholaris, Azadirachta indica, Bombax ceiba, Cassia fistula, C. siamea, Dalbergia sissoo, Delonix regia, Eucalyptus* spp., *Melia azaderach, Mitragyna parvifolia, Parkinsonia aculeata* and *Terminalia arjuna.* Hence, the PP has to raise the thick 3-tier plantation all along the haul roads/ transport/ service roads as suggested in **Annexure-IV**.

4.7.1.2 Plantations on degraded waste lands and in township

Plantation has been done on degraded waste lands and in the township area with both exotic and native plant species like *Acacia auriculiformis, Albizia lebbeck, A. procera, Ailanthus excelsa, Aegle marmelos, Alstonia scholaris, Annona squamosa, Artocarpus heterophyllus, Azadirachta indica, Bauhinia purpurea, Bauhinia variegata, Bougainvillea spectabilis, Callistemon viminalis, Cassia fistula, C. siamea, Dalbergia sissoo, Delonix regia, Eucalyptus* spp., *Ficus benghalensis, F. racemosa, F. religiosa, Gliricidia sepium, Gmelina arborea, Holoptelea integrifolia, Lannea coromandelica, Leucaena leucocephala, Litchi chinensis, Mangifera indica, Madhuca longifolia, Melia azaderach, Moringa oleifera, Murraya paniculata, Nerium odorum, Neolamarckia cadamba, Peltophorum pterocarpum, Plumeria rubra, Polyalthia longifolia, Pongamia pinnata, Phyllanthus emblica, Psidium guajava, Roystonea regia, Samanea saman, Syzygium cumini, Swietenia macrophylla, Tectona grandis, Terminalia arjuna, Thuja orientalis, Trema orientalis, Vitex negundo, Zizyphus mauritiana,* etc.

4.7.1.3 External and internal backfilled OB dump Plantation species

There is only one external OB dump located adjacent to the rehabilitated Lalmatia village. The dump top and slopes are not biologically stabilized. On the dump slopes, few plant species like *Calotropis gigantea* and *Prosopis juliflora* have been noticed. The other side of the external OB dump is stabilized with natural vegetation like *Calotropis gigantea, Phoenix sylvestre, Prosopis juliflora*, etc.

Some parts of the internal backfilled OB dump area is biologically stabilized with natural grasses like *Saccharaum munja, S. spontaneum* and weeds like *Calotropis gigantea, Lantana camara* and planted with both exotic and native tree species such as *Acacia auriculaeformis, Ailanthus excelsa, Alstonia scholaris, Azadirachta indica, Cassia siamea, Dalbergia sissoo, Eucalyptus* spp,. *Gmelina arborea, Lannea coromandelica, Leucaena leucocephala, Peltohorum pterocarpum, Pongamia pinnata, Prosopis juliflora, Ziziphus mauritiana,* etc.

4.7.1.4 Railway siding

Railway siding has been established within the lease area. The approach road to railway siding is very poor condition. Hence, the PP has to maintain proper roads and also create a thick 3 tier greenbelt/ plantation using local tall, fast growing, fruit bearing tree species all along the approach roads as well as all around the railway siding in order to control the dust and noise pollution on the surrounding environment.

All the future afforestation/plantation activities on the backfilled OB dumps, on the external OB dumps, degraded areas, township, railway sidings, transport/service roads are to be undertaken by using only native plant species as suggested in Annexure-IV.

4.8 ENVIRONMENT MANAGEMENT PLAN AND MONITORING

Monitoring of pollution through related environmental parameters is an essential requirement of EC granted by MoEF & CC. The project has been regularly carrying out such monitoring as under

i. Ambient air quality
ii. Water and effluent quality
iii. Noise levels

The above monitoring is carried out by laboratory of Central Mine Planning and Design Institute Ltd. (CMPDIL) which is approved by MoEF & CC.

4.8.1 Monitoring of Air quality

The monitoring of air quality is done at locations/stations decided in consultation with State Pollution Control Board. Reports of these monitoring is submitted to the State Pollution Control Board as specified and also submitted on six monthly basis to the Ministry of Environment, Forests & Climate Change. The reports are also uploaded on the website.

On examination of the reports revealed that: The analyses of 12 parameters prescribed *vide* gazette notification No.-GSR 826(E) dated- 16.11.2009 has been carried out.

The parameter monitored are SPM, RPM, SO_2 and NOx as prescribed by (GSR 742/E) dated- 25th September 2000. The said notification prescribes that these parameters for monitoring

stations should be laid within 500 m of the dust generating sources. The monitoring agency, CMPDIL has carried out monitoring for the parameters, in accordance with notification.

There are 4 fixed air sampling locations in the mine area. It is noticed that mine despatch building and CISF CAMP are showing high concentration of PM_{10} and have exceeded the prescribed limit on some occasions. Adequate dust suppression system should be installed to arrest the fugitive emission and regular cleaning of the roads is undertaken.

The guideline of MoEF & CC states that at least one station should be monitored on the upwind side of the wind direction and two stations on the downwind side. This guideline has been followed for the cluster. Sampling and the reported stations remained constant throughout the year.
The EC prescribes that once in a year certain heavy metals like Hg, As, Ni, Cr etc. are to be monitored. The same has been monitored.

There is a mechanism for monitoring of fugitive emission and respirable dust particles. The PP should increase the frequency of water sprinkling for arrest of fugitive emissions by installing fixed water sprinklers, especially on coal transportation road. Coal transporting tippers should move through instant shower system. It is suggested that the monitoring should be carried only at such station which are approved in EIA/EMP and there should not be any deviation.

4.8.2 Water Environment

There are five monitoring stations for water regime of mine water and CHP discharge. The analytical reports of CMPDIL do not show any deterioration in water quality.

4.8.3 Noise measurement

Monitoring reports of Rajmahal OCP were audited and it reveals that stations where monitoring has been carried out are well within specified limit. Noise levels are not monitored on the roads, within lease or outside the lease area, which carry coal to the receiving pits. It is suggested that monitoring of noise level may also be conducted in these areas.

4.8.4 Monitoring of soil

Monitoring of soil is done as base line data while preparing the EIA/EMP. The EC does not prescribe soil sampling during working of the mine. For good environmental practice, the top soil has to be stacked at an earmarked area and it has to be used for reclamation of degraded areas and plantation.

4.8.5 Environment Management

The project authority has established environment cell in the project having junior level executive qualified in Environment Management, but suitable qualified personnel at senior executive level in the field of Environmental Management are not present. All senior executives are from mining or from allied discipline through lateral appointment so far. Hence, the project authorities should take necessary steps to strengthen the Environment Management Cell.
It is observed that the project authority has not earmarked a separate budget for environment protection measures. Hence, it is suggested that the same should be implemented at the earliest. Accordingly, the year wise expenditure details to be submitted to MoEF & CC.

4.9 GENERAL RECOMMENDATIONS

- Spontaneous heating of coal (burning of exposed coal) was observed only at one place in the disused cool face. At some other places it might have got quenched due to rain in the last one week. However, it is likely to take place during dry season mainly at inactive coal faces and edges of coal bench, where coal is exposed for more than a month as well as inactive coal depot (stockyard). It was informed that spontaneous heating of coal is avoided / controlled by blanketing of inactive exposed coal face, avoiding loose coal face stock for a longer period and pressurized water spraying.
- Dust suppression system in the mine for OB and coal haulage as well as at mine faces is quite inadequate as during the field inspection on 06.07.2017, the coal transportation route up to the receiving pit was having lot of air borne dust. Dust suppression system needs considerable improvement. Persons deployed in the mine through department as well as contractors must use protective equipments especially dust masks to protect themselves from inhaling of micro fine dust.
- Hazardous waste (spent oil) is stored without proper signage and transported to underground mines of ECL without the consent of SPCB. This practice should be legalized by taking proper consent/Authorization from State Pollution Control Board. Public liability Insurance Policy should be taken across ECL to comply with the condition as laid in EC letter.
- The mine sump water is pumped into ETP along with CHP, both the water is treated and clear water is reused. Thus, zero discharge is maintained. The HEMM washing facility with oil and grease traps is working satisfactorily. However, certain improvement have been suggested in compliance audit report at Chapter-3 at Table 3.1 may be implemented.
- Water cess filed by proponent is calculated based on pump running hours. This is a faulty practice. It is advised to install flow meters at intake points and returns to be filed based on flow meter readings
- No catch/garland drains have been made all along the haul/approach/service roads, and at the bottom of OB dump areas except at few places. Hence, the PP has to construct proper

catch drains, garland drains all along the roads as well as at the bottom of internal backfilled OB dump areas and are to be connected to the settling tanks (STs) and finally drained into the mine sump. These drains are to be regularly de-silted before and during the monsoon season.

- No retention/toe wall and garland drains are made at the bottom of internal backfilled OB dump areas except at few places. Hence, the PP has to construct retention/toe wall and garland drains at the bottom of these dumps and it has to be connected to the mine sump after passing through the settling tank.
- The water recharge pond located at Kendva village is completely filled with aquatic weedy plants such as *Typha angustifolia, Ipomea cornea, Lantana camara* etc. The Project Proponent has to de-silt the pond periodically and also remove all the aquatic weeds and other plants for better management.
- During the inspection, it has been observed that no protective measures such as helmets, ear plugs, etc., has been used by the mine officials and mine labourers.
- Avenue plantation has made at few places but it is not continuous. Hence, the PP has to create 3-tier avenue plantations using tall, fast growing, including fruit bearing local tree species on both sides of the roads.
- The PP has to take appropriate action to make proper terracing and spread the geo-textile coir mat at vulnerable areas followed by broad casting of seeds of local grasses and legumes for proper stabilization of dump slopes.
- Top soil has stacked, preserved and maintained in the backfilled OB dump area of the mine lease. The top soil has to be spread before onset of monsoon on the inactive OB dumps after attaining the specified height, so that the dormant seeds, grass rhizomes and other herbs and shrubs can regenerate and stabilize the OB dumps.
- All the future afforestation/plantation activities on the backfilled OB dumps, on the external OB dumps, degraded areas, township, railway sidings, transport/ service roads are to be undertaken by using only native plant species as suggested in **Annexure-IV**.
- Gap plantation should be undertaken wherever possible in the township area, road side areas, wastelands, OB dumps and other degraded areas.
- No greenbelt/ safety zone plantation has made so far. The PP has to raise a thick greenbelt/ safety zone plantation all along within the ML boundary including railway siding area, coal stock yard/coal handling areas as per EC and FC conditions by using fast growing, native, fruit bearing plant species as suggested in **Annexure –IV.**
- Environmental awareness week and similar kind of celebrations related to nature and environment has to be organized in the mine areas among the officers and staff at par with safety week.

CHAPTER 5

POST AUDIT CLARIFICATIONS AND FINAL CONCLUSIONS

Draft audit report was submitted to CIL *vide* ICFRE letter dated 02.11.2017 and the same was shared with concerned subsidiary (ECL) for their comments on the audit observation and findings from the CIL. The comments from ECL were received and the said issues/comments were further discussed in a joint meeting of ICFRE and concerned officials of CIL and ECL in the office of CIL at SCOPE Complex, New Delhi on 16th and 17th August 2018. The content of issues discussed and final point wise clarifications/remarks of ICFRE audit team to comply with the EC condition is presented at **Table 5.1.**

Table 5.1: Post Audit comments of PP on Draft audit report of ICFRE and clarification and final comments from ICFRE

A. Specific Conditions

S. No.	Specific Conditions stipulated by MoEF & CC, Govt. of India	Project Proponent Compliance (till the end of March 2017)	Observations/Recommendations by ICFRE	Comment by Project Proponent	Clarification over comments of PP by ICFRE
(iii)	OB dumps should be stacked at earmarked dump site(s) only and should not be kept active for long period. Proper terracing of OB dump should be carried out so that the overall slope comes down to 28 degree. The excavated area should be concurrently back filled with the mining operation. Monitoring and management of rehabilitated areas should continue until the vegetation becomes self-sustaining. Compliance status	OB is stacked at earmarked dump sites. With proper terracing for over all slopes comes down to 28 degree. OB is being concurrently backfilled into the de-coaled areas. Utmost care towards stability of OB dumps is being taken. Proper benching of OB is also ensured. However, since the internal dump is still active, plantation could be carried out only on 169 ha and the remaining backfilled area will be planted only after maximum dump capacity and height is reached.	The condition is partially complied. As per the working plan prepared by the project management as well as physical verification of the ML area during filed visit, one external OB dump and one internal backfilled OB dump is observed. The dump details provided by the PP are varying from one document to another. In future, the PP has to report the actual status of dump details in compliance to the EC. **External OB Dump:** It is an old external OB dump located outside the ML area towards north-western side adjacent to	Plantation has been done over an area of about 20 Ha on the external OB dump. Efforts to biologically reclaim (in three tier fashion i.e. native/local grasses/herbs, shrubs and fast growing tall trees including fruit bearing plant species) the dumps will be taken in consultation with the Forest department. Toe wall and Garland drains will be constructed in addition to the existing ones to ensure proper check on run-off from slopes. Technical reclamation (terracing) of dumps are regularly being done. Use of geo-textile coir mat for proper stabilization of dump slopes in the mine will be first assessed based	The PP has agreed the ICFRE recommendations to comply the EC condition.

S. No.	Specific Conditions stipulated by MoEF & CC, Govt. of India	Project Proponent Compliance (till the end of March 2017)	Observations/Recommendations by ICFRE	Comment by Project Proponent	Clarification over comments of PP by ICFRE
	should be submitted to the Ministry of Environment & Forests on yearly basis.		the rehabilitated Lalmatia RR site as per existing Land Use Plan. The area of this dump is about 46 ha and has 3-4 terraces. The height of the dump is varying from 30 to 35 m and its slope angle is about 35 to 40 degrees. The dump has been kept idle since 35 years and no rehabilitation measures have been undertaken. Retaining/toe wall and garland drain has been observed at the bottom of the dump for a small area and is not continuous. The toe wall and garland drain is constructed as part of laying the road along the Lalmatia RR site rather than to provide protection to the waste dump. The garland drain is filled with OB boulders, silt and sediments. The dump is not reclaimed biologically. However, it is covered with sparse natural weedy plant	on the site specific conditions. It will be implemented afterwards in phase wise manner, targeting the vulnerable areas first.	

S. No.	Specific Conditions stipulated by MoEF & CC, Govt. of India	Project Proponent Compliance (till the end of March 2017)	Observations/Recommendations by ICFRE	Comment by Project Proponent	Clarification over comments of PP by ICFRE
			species. The dump slopes are severely breached and several deep rills and gullies are noticed. The OB materials are rolled down into the agriculture fields and rehabilitated Lalmatia village. Hence, it is strongly recommended that the PP has to take immediate action to reclaim and rehabilitate the OB dump without any further delay by making proper terraces spreading top soil and planting native/local grasses/herbs, shrubs and fast growing tall trees including fruit bearing plant species. **Internal Backfilled Dump area:** As per details provided by the PP, one internal backfilled OB dump has been noticed in the de-coaled area spreading from south-west to north-east direction. The area of		

S. No.	Specific Conditions stipulated by MoEF & CC, Govt. of India	Project Proponent Compliance (till the end of March 2017)	Observations/Recommendations by ICFRE	Comment by Project Proponent	Clarification over comments of PP by ICFRE
			this dump is 443.38 ha (active-42.56 ha and inactive-400.82 ha). Out of the 400.82 ha of inactive backfilled area, only 169 ha has been biologically reclaimed with both exotic and native plant species. **(1) Inactive Internal Backfilled Dump area:** The height of the dump is about 110 m from the bottom of the pit and its slope angle is about 50 to 60 degrees. Few terraces/benches have been noticed but are not properly made. No toe /retaining wall have been made. At few places, a kutcha garland drain has been observed at the bottom of the backfilled dump in order to protect the haul roads. The drain is filled with OB wastes, silt and sediments. The inactive backfilled areas are not biologically		

S. No.	Specific Conditions stipulated by MoEF & CC, Govt. of India	Project Proponent Compliance (till the end of March 2017)	Observations/Recommendations by ICFRE	Comment by Project Proponent	Clarification over comments of PP by ICFRE
			stabilized, except at few places. Some part of the inactive dump slopes are vegetated with *Acacia catechu*, *Ailanthus excelsa*, *Alstonia scholaris*, *Cassia siamea*, *Dalbergia sissoo*, *Holoptelea integrifolia*, *Lannea coromandelica*, *Leucaena leucocephala*, *Pongamia pinnata*. Even though some part is biologically reclaimed, the dump slopes have several deep rills and gullies and severely eroded and the OB waste materials breeched down due to unscientific dump management. **(2) Internal Backfilled Dump (Active area):** The height is about more than 100 m from the bottom of the mine pit and its slope angle is 40-50 degrees. Several deep rills and gullies are noticed on the dump		

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			slope. The dump slope has been severely eroded and OB materials breached and flown down into the mine pit. No toe wall/retaining wall, catch/garland drains have been made.		
(iv)	Catch drains and siltation ponds of appropriate size should be constructed to arrests silt and sedimentation flows from soil, OB and mineral dumps. The water so collected should be utilized for watering the mine area, roads, green belt development, etc. The drain should be regularly de-silted and maintained properly. Garland drains of appropriate size should be	Catch drains and siltation pond is under proposal. Garland drains are provided along the toe of dump for collecting and discharging rain water. Yearly cleaning of the drains is carried out under monsoon preparation. Storm water flowing through garland drains is collected in a pond which is de-silted as and when required. Some more garland drains and settling pond is under execution and will be ready soon.	The condition is partly complied. A kutcha catch/garland drain is made to protect the mine pit from the surface runoff water and at some places at the bottom of the internal backfilled OB areas to protect the haul roads. The drains are completely filled with OB boulders, silt and sediments. Hence, the PP has to strengthen the catch/garland drains and properly de-silt the drains before and during the monsoon season. Further, it is suggested to construct the catch/garland drains all along the toe of all the OB	Garland drains are present in the mine to prevent entering of surface runoff water into the mine. Also, there exist catch drains around OB dumps & along haul roads to check the runoff. Regularly as well as under monsoon preparation planning, de-silting of the drains is being done, as required. Mine water is passed through 02 nos. of sedimentation tanks before its discharge into Kendua pond for its re-use in fire fighting and sprinkling (closed-circuit usage of	The condition is being complied.

S. No.	Specific Conditions stipulated by MoEF & CC, Govt. of India	Project Proponent Compliance (till the end of March 2017)	Observations/Recommendations by ICFRE	Comment by Project Proponent	Clarification over comments of PP by ICFRE
	constructed, to collect surface run off from the OB and waste dump site(s) and taken to settling pond before discharge.		dumps and it is to be connected to the settling tanks (STs) and finally drained into the mine sump. **Sedimentation ponds:** Two nos. of sedimentation ponds are made near sub-station, Simra. After settling the water from the mine sump, it is pumped into sedimentation ponds. After proper settlement, the water is used for industrial as well as agricultural purpose. **Water recharge Pond:** After treatment, the Effluent Treatment Plant (ETP) water is drained into the water recharge Pond (Kendva pond) which is located opposite to PET office at Kendva village. This pond is completely filled with aquatic weedy plant species. The PP has to de-	water). Cleaning of Kendua Pond is done twice a year. Strengthening of drains and other recommendations as suggested will be considered and implemented.	

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			silt the pond periodically and also remove all the aquatic weeds for better management.		
(v)	Dimension of retaining wall at the toe of dumps and OB benches within the mine to check run off and siltation should be based on the rainfall data.	Proper benching in OB dumps is being done in order to maintain slope stability to check run-off and siltation.	The condition is partly complied. No retaining/toe-walls have been made on both external (except a small patch) and internal backfilling OB areas. Hence, the PP has to construct retaining/toe walls at the bottom of both the external and internal backfilled OB dumps with proper catch/garland drains. The garland drains of internal backfilled areas are to be connected to the mine sump after passing through the settling tank, so that the silt and sediments can be arrested.	At several locations there exists retention/toe wall to capture the silt flow from surface run-off. Construction of toe wall will be done around internal inactive OB dumps along with catch drains in a phase wise manner as per requirement.	The condition is being complied.
(vi)	Greenbelt should be raised by planting the native species around the ML Area, OB dump sites, colony,	Green belt has been developed in the colony. In the rehabilitation sites and also along the road side to the extent of 88.8 ha of land (other than OB dump	The condition is partly complied. No greenbelt/safety zone plantation has been undertaken by the PP all along the lease boundary.	Green belt of about 88 Ha has been raised till now in areas like residential complex, CHP, DG set, Area Office, along road from Gangasagar to Area	The condition is being complied by the PP. The PP has to raise the thick greenbelt/safety zone plantation within the lease all around the

S. No.	Specific Conditions stipulated by MoEF & CC, Govt. of India	Project Proponent Compliance (till the end of March 2017)	Observations/Recommendations by ICFRE	Comment by Project Proponent	Clarification over comments of PP by ICFRE
	etc. in consultation with the local DFO/Agriculture Department. The density of trees should be around 2500 plants per ha.	plantation as mentioned in Sl No. iii above). The year-wise plantation developed in the mine is as under : 2009-10 to 2012-13 – Nil 2013-14– 20000 2014-15 – Nil 2014-15 – Nil 2016-17 – Nil (work order for 3- tier roadside plantation (9000 plants) is given to DFO Bhagalpur. Also proposal for plantation over 17 ha of OB dump area is also forwarded to DFO, Godda)	Out of the 400.82 ha of inactive backfilled area, only 169 ha has been biologically reclaimed with both exotic and native plant species. Plantation has been made in an area of 88.8 ha in the township, degraded waste lands and at few places all along the haul/transportation roads. Hence, the PP has to raise the thick greenbelt/safety zone plantation within the lease all around the boundary with tall, fast growing including fruit bearing native plant species as suggested in **Annexure-IV**.	Office etc. Roadside plantation along transportation road from Barahat to Pirapainti has been done. For the safety zone, cost for developing green-belt has already been provided to Forest Department. A proposal of plantation over 17 Ha (15 Ha on backfilled OB dump & 2.0 Ha near railway siding) has been forwarded to DFO for consideration.	boundary with native plant species as per the EC condition.
(viii)	Regular monitoring of ground water level and quality should be carried out by establishing a network of existing wells and	Regular monitoring of ground water level in five designated wells in vicinity of OCP is carried out on fortnightly basis (earlier on quarterly basis) by CMPDI, Asansol.	The project authorities are monitoring the groundwater levels at six different localities. The monitoring results do not show any deterioration in groundwater levels	Piezometer installation is under process.	Compliance is under process.

<table>
<tr><th>S. No.</th><th>Specific Conditions stipulated by MoEF & CC, Govt. of India</th><th>Project Proponent Compliance (till the end of March 2017)</th><th>Observations/Recommendations by ICFRE</th><th>Comment by Project Proponent</th><th>Clarification over comments of PP by ICFRE</th></tr>
<tr><td></td><td>constructing new piezometers during the mining operation. The monitoring should be carried out four times in a year: - pre- monsoon (April-May), monsoon (August), post-monsoon (November) and winter (January) and the data thus collected may be sent regularly to MOEF, Central Ground Water Authority and CGWB, Patna.</td><td>The report is being submitted regularly as desired.

<table><tr><th>Site (Date of sampling)</th><th>Well water level from ground (m)</th></tr><tr><td>Bara Simra Rehab Site (16/11/2016)</td><td>5.80</td></tr><tr><td>Hijukitta Village (16/11/2016)</td><td>5.50</td></tr><tr><td>Lalmatia Chawk (16/11/2016)</td><td>6.15</td></tr><tr><td>Lohandia Bazar Village (16/11/2016)</td><td>5.40</td></tr><tr><td>Paharpur Village (16/11/2016)</td><td>2.40</td></tr></table>
For the installation of piezometer the study has been done by CMPDIL and</td><td>attributable due to mining activities. However, the piezometers which are not restored till now should be expedited judiciously as the clearance letter is 12 years old, hence significant time has elapsed. Therefore, this project should be completed immediately.</td><td></td><td></td></tr>
</table>

S. No.	Specific Conditions stipulated by MoEF & CC, Govt. of India	Project Proponent Compliance (till the end of March 2017)	Observations/Recommendations by ICFRE	Comment by Project Proponent	Clarification over comments of PP by ICFRE
		accordingly the locations were identified.			
(xi)	Coal handling plant should be provided with adequate number of high efficiency dust extraction system. Loading and unloading areas including all the transfer points should also have efficient dust control arrangements. These should be properly maintained and operated.	Sufficient members of high efficiency dust extraction and suppression system have been provided at input hopper, loading and unloading areas including all the transfer points maintained and operated at coal handling plant. Mobile water sprinklers (28 KL capacity) have been provided for dust suppression at haul roads.	The coal handling plant is not connected with any stack; therefore there is no provision of dust extraction system. The coal production from shovel dumper combination is transported through tippers and fed to directly crushers through grizzly. The grizzly is fitted with pressurized water sprinkling system to suppress the fugitive emissions arising out due to unloading of coal. The crushed coal is directly conveyed through covered conveyors. All the transfer points are fitted with mist type of dust control arrangements and are properly maintained. However, the coal stock pile yard of surface miner does not have any dust suppression system. It is	Dust suppression system arrangements at present : Mobile sprinklers: • Two 34 KL • Six 28 KL • Five 14KL There are multiple fixed type and mist sprinklers installed in around CHP To suppress the air borne dust, additional fixed type sprinklers will be installed in the Haul Road and near coal depot in coming six months.	The condition is being complied.

S. No.	Specific Conditions stipulated by MoEF & CC, Govt. of India	Project Proponent Compliance (till the end of March 2017)	Observations/Recommendations by ICFRE	Comment by Project Proponent	Clarification over comments of PP by ICFRE
			suggested that fixed water sprinkling system all around the coal stockyard should be erected for controlling the fugitive emissions especially during summer time.		
(xiv)	The project proponent should take all precautionary measures during mining operations for conservation and protection of endangered fauna such as bear, python, etc. spotted in the study area in consultation with the concerned forest officials. Action plan for conservation of endangered fauna should be prepared and submitted to the Ministry and its Regional Office within 3 months.	Full efforts are being made during mining operation for conservation and protection of endangered fauna spotted in the study area in consultation with forest officials. Action plan for conservation of endangered fauna will be done by Forest Department, Govt. of Jharkhand. In this respect follow up action is being taken up at our end and the same will be submitted to the Ministry and its Regional Office at the earliest.	The condition is partly complied. Action plan for conservation of endangered fauna has been prepared and submitted to the RCCF, Dumka, Jharkhand on 26th June 2017. The PP has to submit the same after vetting by the RCCF, Dumka to the MoEF & CC and its Regional Office.	Conservation plan of endangered flora and fauna (WLMP) has already been prepared and approved by CWLW.	The condition is complied.

S. No.	Specific Conditions stipulated by MoEF & CC, Govt. of India	Project Proponent Compliance (till the end of March 2017)	Observations/Recommendations by ICFRE	Comment by Project Proponent	Clarification over comments of PP by ICFRE
(xvi)	A final mine closure plan along with details of corpus fund should be submitted to the Ministry of Environment & Forests, 5 years in advance of final mine closure for approval.	For financial assurance ECL had already a fixed deposit escrow account with Union Bank of India, with the Coal Controller Organization as exclusive beneficiary. The annual mine closure cost for 2015-16, Rs 1435.32 Lakh have been deposited in the mine closure escrow account of Rajmahal OCP.	After careful verification of the mine closure plan, it is revealed that the plan is inadequate, Hence, the PP has to prepare a detailed final mine closure plan with site specific bio-engineering measures for reclamation and restoration of degraded areas and OB dumps and the same has to be submitted to MoEF & CC within 6 months.	CMPDIL RI-I has been asked for preparation of a detailed final mine closure plan	Compliance is under process.

B. General Conditions

S. No.	General conditions stipulated by MoEF & CC	Project proponent Compliance	Observations/Recommendations by ICFRE	Comment by Project Proponent	Clarification by ICFRE over the comments by PP
(i)	No change in mining technology and scope of working should be made without prior approval of the Ministry of Environment and Forests.	Till today there is no change in mining technology and scope of working; before changing, prior approval of the Ministry of Environment and Forests will be taken.	Partially complied. EC provides open cast mining using shovel dumper combination. However, surface miners were engaged at a later date by outsourcing agency for extraction of - 100 mm raw coal. The surface miner is a better, safe and environment friendly technology.	The mining method for coal extraction is still is opencast. In addition of shovel dumper combination, surface miner was engaged with a vision to promote safe, efficient and	The condition is being complied with by intimating to MoEF & CC for approval on 07-08-2018.

S. No.	General conditions stipulated by MoEF & CC	Project proponent Compliance	Observations/Recommendations by ICFRE	Comment by Project Proponent	Clarification by ICFRE over the comments by PP
			It may be intimated to the MoEF&CC for record.	environment friendly mining.	
(iii)	At least four ambient air quality monitoring stations should be established in the core zone as well as the buffer zone for RPM, SPM, SO_2, NO_x, and CO monitoring. 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. Data on ambient air quality (RPM, SPM, SO_2, NO_x, and CO) should be regularly submitted to the Ministry including its Regional Office at Bhubaneswar and to the State Pollution Control Board/Central	Fortnightly AAQ monitoring is done by CMPDI, RI- I, Asansol at 4 stations in core and buffer zone. The monitoring location of the station had been decided on the based on the meteorological data, topographical features and environmentally and ecological sensitive targets, in consultation with the representatives of JSPCB, Ranchi. The stations are as under: 5. Mine dispatch Building 6. CISF camp 7. Urjanangar hospital 8. ECL rest house at Pirpainti market Monitoring is carried out on fortnightly basis and submitted regularly to the regional office of MoEF&CC, Bhubaneswar once in six months and to the JSCPB, Ranchi once in three months and also once in a year with the Environment Statement.	The monitoring of air quality is being done at locations/stations in consultation with State Pollution Control Board (SPCB). Reports of these monitoring is submitted to the SPCB as specified. The reports are also submitted on six monthly basis to the Ministry of Environment, Forest & Climate Change and also uploaded on the site of the company. These reports were examined by the audit team. The parameters monitored are SPM, RPM, SO_2 and NO_X as prescribed by Gazette Notification (GSR 742/E) dated - 25th September 2000. The said notification prescribes these parameters for monitoring stations to be laid within 500 m of the dust generating sources. However, CMPDI has carried out monitoring as per the parameters irrespective of their location *vis-a-vis* dust generating sources. The report specifies the location of the monitoring stations but do not specify the distances and the dust generating sources. The	The monitoring locations in Core and buffer zone have already been approved by JSPCB. Hence the condition is complied with.	The condition is being complied.

<table>
<tr><th>S. No.</th><th>General conditions stipulated by MoEF & CC</th><th>Project proponent Compliance</th><th>Observations/Recommendations by ICFRE</th><th>Comment by Project Proponent</th><th>Clarification by ICFRE over the comments by PP</th></tr>
<tr><td></td><td>Pollution Control Board once in six months.</td><td>Photocopy of environmental monitoring report for Second fortnight ending Feb-17 is enclosed with.
Ambient air quality data in microgram per cubic meter for above quarter ending is as follows:
<table>
<tr><th>Parameter</th><th>Min</th><th>Max</th></tr>
<tr><td>$PM_{2.5}$</td><td>29.4</td><td>40.4</td></tr>
<tr><td>PM_{10}</td><td>78.6</td><td>117.5</td></tr>
<tr><td>SO_2</td><td colspan="2"><10.0</td></tr>
<tr><td>NO_x</td><td>18.0</td><td>25.8</td></tr>
</table></td><td>provisions of GSR 742/E dated - 25th September 2000 states that if any residential, commercial or industrial place falls within 500 m of any dust generating sources, National Ambient Air Quality Standard (NAAQS) standards will be applicable for monitoring.
The monitoring at these stations should be carried out as per NAAQS.
The standard prescribed by GSR 724/E have two values for each parameter, viz., 24 hourly average and annual average. The reports give only 24 hourly values in periodical report. The annual report and annual averages values are provided.

The values of parameters monitored vary over a narrow range. Even seasonal variations, due to change of wind directions are not reflected in the measured values.

The analyses of 12 parameters prescribed vide gazette notification no. GSR 826(E) dated- 16.11.2009 has been carried out.
The EC prescribes that once in a</td><td></td><td></td></tr>
</table>

S. No.	General conditions stipulated by MoEF & CC	Project proponent Compliance	Observations/Recommendations by ICFRE	Comment by Project Proponent	Clarification by ICFRE over the comments by PP
			year certain heavy metals like Hg, As, Ni, Cr etc. are to be monitored. The same are also being monitored. The general guideline of MoEF & CC is that at least one station should be monitored on the upwind side of the wind direction and two stations on the downwind side. This is being followed as stations have remained constant throughout the year.		
(v)	Fugitive dust emissions from all the sources should be controlled regularly monitored and data recorded properly. Water spraying arrangements on haul roads, wagon loading, dumps, loading and unloading points should be provided and properly maintained.	The practices of control, monitoring and recording of the dust emission are followed at the project. 5. Water spraying through mobile water sprinklers is being used regularly on haul roads, wagon loading and dumps, loading and unloading points. 6. IC engines are maintained properly and overhauled regularly. 7. Dust suppression devices (dust collectors and water sprinkling on coal feed) have been installed in the CHP. 8. Employees and villagers	The fugitive emission data are not recorded. The mechanism should be evolved to capture the data as stipulated. In the mine premises, it is observed that the coal transport road up to the stock pile do not have any water sprinkling system to arrest the fugitive emissions arising out due to movement of tippers. Further, the coal stockyard from surface miner also has no sprinkling system to arrest emissions. However, the conveyors of CHP have mist type of effective dust suppression system in place. It is suggested that to arrest fugitive emissions at coal stock yard and at coal transpiration route should be provided with fixed type of water	Water sprinkling is regularly done by mobile sprinklers multiple times shift-wise in the coal transportation roads. Also, number of fixed type sprinklers is also present at places along coal transportation road near CHP to arrest the fugitive dust generation.	Condition is being complied. However, the PP should evolve the mechanism for recording the fugitive emission data and its control.

S. No.	General conditions stipulated by MoEF & CC	Project proponent Compliance	Observations/Recommendations by ICFRE	Comment by Project Proponent	Clarification by ICFRE over the comments by PP
		residing in colony or surrounding villages respectively are provided LPG connections instead of coal to prevent smoke nuisance. The total no. of connections provided are 1282 from our co-operative store namely Lalmatia Colliery Karmachari Sahakari Upbhokta Bhandar, Urjanagar colliery. Afforestation has been done around the project site and colony. Plantations are being done according to approved EMP.	sprinkling system.		
(vii)	Industrial wastewater (workshop and waste water 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. Oil and grease trap should be installed	Industrial wastewater (workshop and waste water from the mine) is being properly collected and analyzed regularly and found conforming with the MoEF Schedule – VI standards for discharge of mine effluents. Analysis results of CHP discharge for 2nd fornight-Feb'2017 are within permissible limit. Quality report for four parameters area as under :	The mine water is drained through a network of concrete channels and is collected at sedimentation tank near DG set. The overflow from sedimentation tank is discharged into Kendua pond from where it is used for spraying and fire fighting at CHP premises and also at CHP. The workshop effluent is collected through two sedimentation tanks followed by oil and grease trap. The clear water from this is again discharged to Kendua pond. It is	ETP already exists and the quality of mine water confirms the effluent discharge standard and the condition is complied with.	The condition is being complied.

S. No.	General conditions stipulated by MoEF & CC	Project proponent Compliance	Observations/Recommendations by ICFRE	Comment by Project Proponent	Clarification by ICFRE over the comments by PP
	before discharge of effluents from workshop.	Feb;17 (14.02.2017) Location : Discharge from CHP pH 8.0 TSS (mg/L) 12.0 TDS (mg/L) 192.0 Oil and grease (mg/L) <2.0 COD(mg/L) 72.0 Oil and grease trap is in use and properly maintained regularly. A proposal for enhancement of its design for better efficiency is to be made shortly.	suggested that the sedimentation tank at oil and grease trap assembly should be installed with a flocculator and aerator for effective separation of oil, grease, sediment and water.		
(ix)	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	A personnel working in dusty areas is being given adequate training and information on safety and health aspects. They use protective respiratory devices judiciously. Periodical Medical Examination (PME) is being done to each worker at an interval of 5 years under occupational health surveillance program as per norms at central hospital,	Though the PP has provided adequate number of Personnel Protective Equipment (PPE) to the workforce, but the PPE compliance is poor. Therefore, a training and awareness programme should be launched for better PPE compliance. The hospital situated at Rajmahal area is carrying out occupational health surveillance programme as per statute and is equipped with all necessary infrastructures for audiometry, spriometry, X-ray,	PPEs such as dust masks have been provided to departmental as well as contractual worker. Proper records are being maintained in the office of the Safety Officer. PPEs have been provided to all the mine workers and	The condition is being complied.

S. No.	General conditions stipulated by MoEF & CC	Project proponent Compliance	Observations/Recommendations by ICFRE	Comment by Project Proponent	Clarification by ICFRE over the comments by PP
	periodically to observe any contractions due to exposure to coal dust and take corrective measures, if needed.	Kalla, ECL. If it is observed any contractions due to exposures to coal dust will be taken corrective measures as per need. PME of workers is being carried out at 5 year intervals in which audiometric tests are carried out. During the period of reporting is 1897 from 2010, year wise details are as under: 2010 – 463 2011 – 479 2012 – 455 2013 – 437 2014 – 457 2015 – 456 2016 – 455 2017 – 67 (upto March)	etc. Till date, no cases of Pneumocosis have been reported. It is suggested that the occupational health check of selected workers from mining zone be checked by a third party like National Institute of Occupational Health under occupational health surveillance programme.	officials. Action is being taken against defaulters. Training sessions on OH&S is provided to workers under ISO certification guidelines. More efforts will be made to ensure awareness about use of PPEs and related OH&S guidelines The condition is being complied with	
(xii)	The funds earmarked for environmental protection measures should be kept in separate account and should not be directed for other purposes. Year-wise expenditure should be reported to the Regional Office,	The funds earmarked for environmental protection measures are kept in separate account. Total Rs. 21.24 crore had been allocated till the end of mine life for environmental management.	Unit does not have any separate budgeting system for environment protection. The entire budget is centrally controlled and unit wise funds are allocated from the central fund. Hence, it is suggested that the PP should allocate separate budget at the project and the same has to be utilized only for the purpose defined. Accordingly, the year	This is a policy issue to be taken up at the appropriate level in the company. However, appropriate expenditure under EMP implementation head is made as part of Capital Expenditure	No separate account of budgeting system at Area level. However, the PP has budget allocation at HQ level for environmental protection measures.

S. No.	General conditions stipulated by MoEF & CC	Project proponent Compliance	Observations/Recommendations by ICFRE	Comment by Project Proponent	Clarification by ICFRE over the comments by PP
	Bhubaneswar of the MOEF and to the Ministry.		wise expenditure details are to be submitted to MoEF & CC.	provided in Project Report. Besides revenue budget is also provided for various environmental activities including Plantation.	

Plate -1: Top soil stacked on the inactive backfilled OB dump area

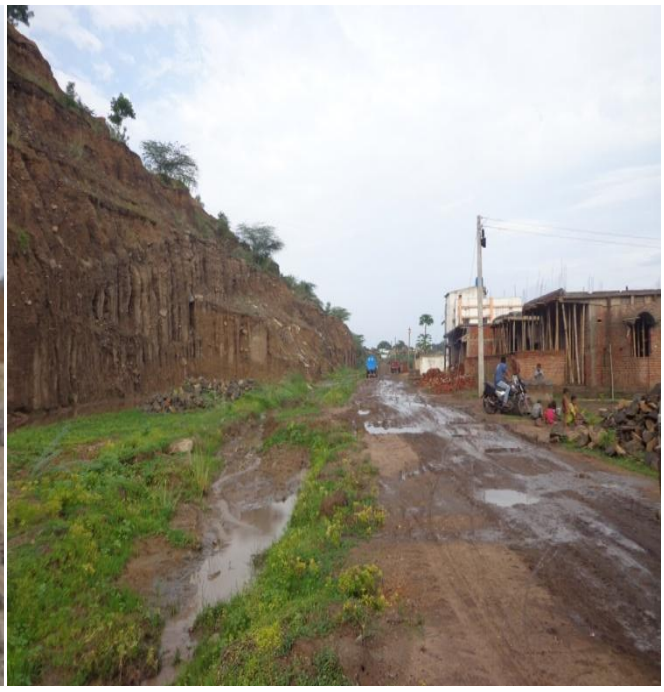

Plate -2: 35 years old inactive encroached OB dump adjacent to rehabilitated Lalmatia village

Plate -3: Part of internal backfilled OB dump area stabilized with vegetation

Plate -4: Severely eroded with deep rills and gullies on the slope of the inactive back filled OB dump area

Plates Showing Different Components of Rajmahal OCP

Plate -5: Catch drain all along the approach road

Plate -6: View of sedimentation pond

Plate -7: Water recharge pond near Kendua village

Plate -8: Afforestation of ecologically degraded area in the ML area

Plates Showing Different Components of Rajmahal OCP

Plate -9: Scientifically backfilled active OB dump area

Plate -10: Lohandia basti adjacent to the mine pit

Plate -11: A view of Lalmatia resettled village of Rajmahal OCP

Plate -12: Library constructed under CSR activities at Ishwar Marandi Nagar, Bara Simra

Plates Showing Different Components of Rajmahal OCP

Annexure – I

03/08 2015 13:06 91 33 22435542 CIL-PROJECT MONITORING #5255 P.001

Telefax No : 033-23244044
e-mail : gmpm@coalindia.in

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कोल इण्डिया लिमिटेड
COAL INDIA LIMITED
परियोजना प्रबोधन विभाग
PROJECT MONITORING DIVISION
एक्शन एरिया - १ए न्यु टाउन ,कोलकता -700156
Action Area- 1A, New Town, Kolkata- 700156

Noted & discuss.
ADG (EM)
03/08/15.
उप महा० नि० (विस्तार)

पत्रांक: CIL/PMD/ 36/241 दिनांक: 31.07.2015

Environment Management Division
Dy.No. 378
Dated 5/8/15
ICFRE

Indian Council of Forestry Research & Education
Director General Office
03 AUG 2015
001437
P.O.New Forest, Dehradun

सेवा में,
The Director General
Indian Council Forestry Research and Education
Ministry of Environment, Forests and Climate Change
Govt of India
Dehradun

विषय: ***Environmental Audit of 20 OC Mines of CIL***

महोदय,

The Indian Council Forestry Research and Education (ICFRE) is hereby entrusted to carry out an environmental audit of 20 OC Mines (list enclosed) as per following terms & conditions :-

कार्यालय उप महानिदेशक (विस्तार)
डाक में 563
दिनांक 3/8/2015
फाईल में
भारतीय वन अनुसंधान एवं शिक्षा परिषद, देहरादून

Scope of Work :

1. *To review conditions laid down in the EC approval for mitigation of environmental pollution.*
2. *To assess the compliance with the project approval conditions and other approval of the mines vis-à-vis progress of development of the mine.*
3. *To conduct site inspection, verify the existing levels of pollution vis-à-vis the laid down standards; review on-site documentation, monitoring data, mechanism in place for sampling and analysis that are relevant to the audit.*
4. *Discussion/consultation with the concerned project staff on the development consent, other approval condition, infrastructure and operation to comply the EC.*
5. *To assess environmental performance based on the development with the requirements of the approval of the EC and mining lease conditions (including any assessment , plans or programs required under these consents /approvals).*
6. *To assess the progressive mine closure vis-à-vis technical, green belt development, biological reclamation of over burden (OB) , top soil management and review the adequacy of the strategies , plans or programs prepared for its effectiveness.*
7. *To assess the status of final mine closure for the mines that have exhausted the reserves.*
8. *To assess the change detection of Open/ UG mining activities and reclamation based on a machine learning approach through imagery, advancement in assessment and monitoring.*
9. *Provisions of recommendations , if considered necessary for implementation of measures or actions to improve environmental performance of the development and /or any assessment , plan or program required under the mine approvals.*

For kind perusal
3/8
DG, ICFRE.
DDG. Extn.
3/8
DG.

(165)

10. *Preparation of individual Environmental Audit Report providing assessment of compliance against each approval condition and provision of recommendations or actions considered appropriate to improve the environmental performance of the development, and/or the environmental management and monitoring systems.*
11. *After completion of environment audit of each subsidiary, ICFRE shall present an interim report at CIL or any other place as advised and*
12. *ICFRE shall submit final report after incorporating the comments of CIL and/or its subsidiaries on the draft report.*

Financial involvement :

Rs 259.35 Lakhs (Rs Two Hundred Fifty Nine Lakhs and Thirty Five Thousands only) plus taxes as per rules.

Terms of payments are :

On acceptance of work order	:	*50%*
On completion of field work & submission of Final Environmental Audit Report of 15 mines	:	*25%*
On completion of field work & submission of Final Environmental Audit Report of balance 5 mines	:	*25%*

At the time of final payment , a self certification would be submitted by ICFRE that due norms of the Institute had been followed for deployment of manpower and TA/DA expenses.

Duration :

The time schedule for completion of the task would be 20 months from the date of issue of the work order. However, the time frame is subject to the field condition and requirement of data from the individual mines.

The earlier Work Order No. CIL/PMD/36/138 dt 01.06.2015 & subsequent Corrigendum No. CIL/PMD/36/184 dt 26.06.2015 on the subject matter may be treated cancelled. Acceptance of the job may kindly be communicated at the earliest.

This issues with the approval of the competent authority.

भवदीय,

11.7.2015

(तापस कुमार सिंहा)
महा प्रबंधक,
परियोजना प्रबोधन विभाग

संलग्न : यथोपरि

03/08 2015 13:07 91 33 22435542 CIL-PROJECT MONITORING #5255 P.003

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Share of individual subsidiaries to be paid to Indian Council of Forestry Research and Education (ICFRE), Dehradun for Environmental Audit of the mines of different subsidiaries of Coal India Limited.

O/SL	SL	SUB	Name of Mines	Subs. Share
1	1	MCL	Lakhanpur	Rs 39.00lakhs plus taxes as per Rules
2	2	MCL	Samleswari	
3	3	MCL	Bhubaneswari	
4	1	NCL	Nigahi	Rs 39.00lakhs plus taxes as per Rules
5	2	NCL	Jayant	
6	3	NCL	Amlohri	
7	1	CCL	Piparwar	Rs 39.00lakhs plus taxes as per Rules
8	2	CCL	Ashok	
9	3	CCL	Rohini	
10	1	SECL	Gevra	Rs 52.00lakhs plus taxes as per Rules
11	2	SECL	Dipka	
12	3	SECL	Kusmunda	
13	4	SECL	Manikpur	
14	1	ECL	Rajmahal	Rs 26.00 lakhs plus taxes as per Rules
15	2	ECL	Sonepur Bazari	
16	1	WCL	Kamptee	Rs 26.00 lakhs plus taxes as per Rules
17	2	WCL	Ukni Deep	
18	1	BCCL	Tetulmari	Rs 38.35 lakhs plus taxes as per Rules
19	2	BCCL	Dahibari Basantimata	
20	3	BCCL	Damoda	

Annexure- II

(94)

No.516/1-81/2015-ADG(EM)/EA-CIL/ICFRE
Indian Council of Forestry Research & Education,
(An Autonomous Body of Ministry of Environment, Forests & Climate Change, Govt. of India)
Environment Management Division,
P.O. New Forest, Dehradun-248006 (Uttarakhand)

Dated: 30,01.2015

To,

Shri N. Kumar,
Director, Technical,
M/s Coal India Limited,
Project Monitoring Division,
Kolkatta (West Bengal)

Sub: Environmental Audit of Coal Mines operated by Coal India Limited and Subsidiary Coal Companies – reg.

Sir,

Please refer to your letter No.CIL/PMD/14/367 dated 22.09.2014 on the above mentioned subject.

In this connection, please find enclosed a copy of the proceedings of the meeting held on 16.01.2015 with officials of Coal India Limited at Indian Council of Forestry Research & Education (ICFRE), Dehradun for finalization of proposed Environmental Audit of Coal Mines for information and necessary action.

As discussed in the said meeting, if agreed, ICFRE would submit the technical and financial proposal to start with for 20 open cast mines and would subsequent submit for rest of the 5 underground mines. It is, requested that necessary consent for the same may be conveyed at an early date for further necessary action in the matter.

Yours faithfully,

30/01/2015

Encl: As above

(Sudhir Kumar)
Asstt. Director General (EM)
Telefax-0135-2753882

Copy with a copy of above enclosure to:-

1. DDG (Extn.), ICFRE
2. Shri K. Chakraborty, General Manager (Env.), Western Coalfields Limited (HQ.)
3. Shri JI.N. Biswal, General Manager (Env.), Eastern Coalfields Limited (HQ.)
4. Shri S.R. Tripathi, Sr. Manager (Env/Mining), South Eastern Coalfields Limited (HQ.)

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Proceedings of the meeting held on 16.01.2015 with Coal India limited officials at Indian Council of Forestry Research and Education (ICFRE), Dehra Dun for finalization of proposed Environmental Audit of Coal Mines

Meeting with officials from Coal India Limited was held on 16.01.2015 in the committee room of ICFRE, Dehra Dun. The overall objective of the meeting was to discuss and workout the modalities and plan for undertaking the proposed Environmental Audit study in the coal mines operated by Coal India and Subsidiary coal companies.

Following officer and scientists attended the meeting:

Sh. Sudhir Kumar Asstt. Director General (EM)- ICFRE
Sh K. Chakraborty, General Manager, (Env) Western Coalfields Limited (HQ)
Sh J.N Biswal General Manager, (Env) Eastern Coalfields Limited, (HQ)
Sh S.R Tripathi , Sr Manager (Env/ Mining),South Eastern Coalfields Limited(HQ)
Dr. V. Jeeva, Scientist-E- ICFRE
Dr. A.N. Singh Scientist –E- ICFRE
Dr . Vishavjit Kumar Scientist-C- ICFRE
Dr. Om Kumar Scientist –C- ICFRE
Sh. Alok Yadav - Scientist C- ICFRE

The meeting started with warm welcome and an introductory remark on the purpose of the meeting by, ADG (EM), ICFRE.

The Terms of Reference (ToR) provided by the Coal India limited and the scope proposed by ICFRE were discussed in details. Deliberation was held on selection of sample mines to be identified by Coal India. The study should adequately address the environmental and community security, keeping in view the year, size of mine area, and area of the cluster that has composition of various other parameters that contributes to risk. Deliberation on corporate social responsibility and other issues related to social environment were also discussed to address the environmental risk. After the detailed discussion on the proposed objectives, following issues were discussed and agreed upon:

1. Awaited mines details (name, location, lease period, total area, and copies of EC & FC etc) related information from the following four subsidiaries of CIL will be provided by end of this month.
   (i) Central Coalfield Limited (CCL)
   (ii) South Eastern Coalfield Ltd (SECL)
   (iii) Eastern Coalfield Ltd (ECL)
   (iv) North Eastern Coalfield Ltd (NECL)

(90)

2. Study will be carried out based only on actual field verification, do cuments, spatial& temporal data documented for the environmental parameters and the satellite surveying data available at CMPDI, Ranchi. In addition selective sampling will also be made to assess the environmental performance where ever required.
3. Mining Plan, Mining Scheme, EIA/EMP, EC, FC, PFR, Mine Closure Plan, R&R Plan, CTO, Violations if any and their compliance, Progress Reports, EC and FC Compliance Reports, reclamation monitoring reports, spatial & temporal data (including shape files and satellite imageries) in softcopy and any other study report for the concern mines proposed will be required . The same will be provided by CIL to ICFRE, once the mines are identified and the work order is awarded.
4. During the meeting, it was discussed and suggested to undertake the work in phased ma nner. To start with ICFRE may submit the technical and financial proposal for the proposed study to undertake 20 open cast mines which have comparatively more environmental ramifications compared to underground.
5. The study in the proposed five underground mining which may involve Directorate General of Mine Safety (DGMS) in respect of underground environment, shall be carried out in the next phase. For which specific subject expert would be required and ICFRE may identify Central Institute of Mining and Fuel Rese arch (CIMFR) Dhanbad and subject matter experts for underground mine.
6. Further, the Officials from Coal India Limited invited ICFRE team to visit any mine to understand the level of documents, information available to further identify the gaps and to work out the methodology and time line.
7. The Officials from CIL also met the Deputy Director General (Extension), ICFRE and briefed the discussion held during the meetings.

30/01/2015

Assistant Director General (EM)
Environment Management Division
Indian Council of Forestry Research and Education
P.O. New Forest
Dehradun - 248 006 (Uttarakhand)

Annexure – III

(114)

By Speed Post/Fax

No. 1-81/2015-ADG(EM)/EA-CIL/ICFRE
Indian Council of Forestry Research & Education,
(An Autonomous Body of Ministry of Environment, Forests & Climate Change, Govt. of India)
Environment Management Division,
P.O. New Forest, Dehradun-248006 (Uttarakhand)

Dated: 01.04.2015

To,

Shri T.K. Sinha, ,
General Manager (PMD),
M/s Coal India Limited,
Project Monitoring Division,
10, N.S Road,
Kolkata-700001 (West Bengal)

Tele Fax No.033-22435542

Sub: Environmental Audit of Coal Mines operated by Coal India Limited and Subsidiary Coal Companies – Submission of Technical and Financial proposal reg.

Sir,

Please refer to your letter No.CIL/PMD/02/53 dated 27.02.2015 on the above mentioned subject.

In continuation to this office letter No.123/1-81/2015-ADG(EM)/EA-CIL/ICFRE dated 23.03.2015, it is intimated that Shri Saibal Dasgupta, IFS, Dy. Director General (Extn.), ICFRE accompanied by the undersigned reaching Kolkatta on 10.04.2015 and would like to meet and discuss the matter at **4.00 P.M.** on the said date.

You are, therefore, requested to kindly make it convenient to have discussion in your office on the aforesaid date and time for finalization of work modality for environmental auditing of 20 open cast mines.

A line in confirmation by fax shall be highly appreciated.

Yours faithfully

01/04/2015

(Sudhir Kumar)
Asstt. Director General (EM)
Tel. & Fax No.0135-2753882
E-mail ID: sudhir@icfre.org

Copy to DDG (Extn.), ICFRE for information please.

O/C

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From: GM CIL PMD - TAPAS KUMAR SINHA <gmpm@coalindia.in>
To: "sudhir@icfre.org" <sudhir@icfre.org>
Cc: DT CIL - Nagendra Kumar <dtcil@coalindia.in>

Date: Thursday, March 26, 2015 03:16PM
Subject: RE: Technical & Financial for Environmental Audit - Meeting at CIL, HQ

History: This message has been replied to and forwarded.

Dear Sir,

Thanks for your response.

This is to inform you that the meeting may be scheduled at 4.00 PM on 9th April 2015 at CIL, HQ, at 10 N S Road, Kolkata-700001.
However, if you have any difficulty with this date, it may be fixed on 10th April 2015 also.

Director (Tech), CIL may also like to participate in the discussion.

Thanking you,

Yours,
TK Sinha, GM (PMD), CIL

From: sudhir@icfre.org [sudhir@icfre.org]
Sent: 26 March 2015 13:26
To: GM CIL PMD - TAPAS KUMAR SINHA
Cc: DT CIL - Nagendra Kumar; saibaldasgupta@hotmail.com
Subject: RE: Technical & Financial for Environmental Audit

Dear Sir,

The Terms and Reference, as mentioned below of the letter dated 22.09.2014 are acceptable to ICFRE and if required may also be mentioned in your work order. As intimated vide my earlier mail, we are likely to visit Kolkata tentatively on 9th or 10th April 2015. During the visit, we may like to have discussion on the proposal submitted for environmental auditing to schedule our action plan. Please confirm your convenience for the above mentioned dates.

Thanking you,

Annexure-IV

RECOMMENDED LOCAL PLANT SPECIES

Rajmahal OCP

The local plant species are recommended for plantation in the mined out backfilled areas, OB dumps, degraded areas, greenbelt and avenue plantation along the approach/transportation roads based on climate, rainfall and natural vegetation found in and around the mine lease area of Rajmahal OCP of ECL. These plant species can stabilize the degraded areas very successfully.

Afforestation/Avenue plantation/Greenbelt:

Avenue plantation along the approach/transport roads are made at few places and it is not continuous. The development of greenbelt along the safety zone area has not been made all around the mine lease area to prevent the dust and noise pollution by the project authorities.

Following native plant species are suggested/recommended to plant in the project area and proposed township, greenbelt, gap plantation areas and avenue plantation all along the approach/transport roads (**Table 1**).

Table 1: Species suggested for Plantation

S. No.	Plant Species
1.	*Acacia nilotica* (Babul)
2.	*Aegle marmelos* (Bel)
3.	*Ailanthus excelsa* (Maha neem)
4.	*Albizia lebbeck* (Siris)
5.	*Albizia odoratissima (*Kala siris)
6.	*Alstonia scholaris* (Sathpathri)
7.	*Artocarpus heterophyllus* (Jack fruit)
8.	*Azadirachta indica* (Neem)
9.	*Bombax ceiba* (Semal)
10.	*Cassia fistula* (Amaltas)
11.	*Dalbergia sissoo* (Shisham)
12.	*Ficus benghalensis* (Bargat)
13.	*Ficus racemosa* (Gular)
14.	*Ficus religiosa* (Pipal)
15.	*Gmelina arborea* (Ghamar)
16.	*Haldina cordifolia* (Haldu)
17.	*Holoptelea integrifolia* (Papidi)
18.	*Lannea coromandelica* (Moin)
19.	*Madhuca indica* (Mahua)

20.	*Mangifera indica* (Aam)
21.	*Neolamarckia cadamba* (Kadamba)
22.	*Phyllanthus emblica* (Amla)
23.	*Pongamia pinnata* (karanj)
24.	*Syzygium cumini* (Jamun)
25.	*Tamarindus indica* (Imli)
26.	*Terminalia arjuna* (Arjun)
27.	*Trema orientalis*

Greenbelt:

No greenbelt/safety zone plantation has made by the PP all along the lease boundary. Hence, the PP has to raise thick greenbelt around within the lease area with tall, fast growing, fruit bearing native plant species as suggested in **Table-1**.

OB dumps:

As per the physical features of the terrain, dumping should be carried out by adopting retreating method starting from bottom and reaching to the top by creating terraces of 20 m height and 15 m width and the overall slope of the OB dump should not exceed 28 degrees. Berms should be provided at the toe of each terrace to avoid water flow over the dump slopes. Wherever necessary, retaining/toe walls and garland drains should be provided on every terrace and the drains have to be connected to the vertical drains and finally the water has to be drained into the mine sump for proper settlement. After completion of each terrace (bottom to top), plantation has to be carried out immediately using the plant species suggested in **Annexure-IV**.

The PP has to undertake massive afforestation activities on the internal backfilled OB dump area in the de-coaled quarry areas and also on the external OB dump after spreading the top soil by using native plant species immediately as suggested in **Table-2**.

Table 2: Plant species recommended for stabilization of backfilled OB dumps in the de-coaled areas

S. No.	Plant species
1.	*Acacia nilotica* (Babul)
2.	*Aegle marmelos* (Bel)
3.	*Ailanthus excelsa* (Maharuk)
4.	*Albizia lebbeck* (Siris)
5.	*Albizia odoratissima (*Kala siris)
6.	*Alstonia scholaris* (Sathpathri)
7.	*Annona squamosa* (Sitaphal)

8.	*Artocarpus heterophyllus* (Jack fruit)
9.	*Azadirachta indica* (Neem)
10.	*Bambusa arundinacea* (Kata Bans)
11.	*Bombax ceiba* (Semal)
12.	*Butea monosperma* (Palas)
13.	*Cassia fistula* (Amaltas)
14.	*Dalbergia sissoo* (Shisham)
15.	*Dendrocalamus strictus* (Bans)
16.	*Ficus benghalensis* (Bargat)
17.	*Ficus racemosa* (Gular)
18.	*Ficus religiosa* (Pipal)
19.	*Gmelina arborea* (Ghamar)
20.	*Haldina cordifolia* (Haldu)
21.	*Holoptelea integrifolia* (Papidi)
22.	*Lannea coromandelica* (Moin)
23.	*Mangifera indica* (Aam)
24.	*Neolamarckia cadamba* (Kadamba)
25.	*Phyllanthus emblica* (Amla)
26.	*Pongamia pinnata* (Karanj)
27.	*Syzygium cumini* (Jamun)
28.	*Tamarindus indica (*Imli)
29.	*Tectona grandis* (Shagun)
30.	*Terminalia arjuna* (Arjun)
31.	*Trema orientalis*
32.	*Vitex negundo* (Nirgindi)
33.	*Ziziphus mauritiana (Ber)*

Grasses and leguminous species recommended for stabilization of OB dumps and backfilled areas

The grasses/legumes help in stabilizing the OB dumps and backfilled areas and play an important role increasing the soil nitrogen status through nitrogen fixation. Also, these plants are associated with beneficial microbes like mycorrhizal fungi (VAM and Ectomycorrhizal fungi) and Plant Growth Promoting Rhizobacteria (PGPR). When these plants die, fixed nitrogen and other essential plant nutrients are released to the soil and helps in increasing fertility of the soil. Following species of local grasses and legumes are suggested for broadcasting the seeds on the slopes of the OB dumps and backfilled areas for further strengthening and stabilizations (**Table 3**).

Table 3: Grasses and leguminous species recommended for stabilization of OB dumps and backfilled areas

S. No.	Species	Propagation method
1.	*Apluda mutica*	Slips/seeds
2.	*Aristida setacea*	Slips
3.	*Cajanus scarabaeoides*	Seeds
4.	*Crotalaria juncea*	Seeds
5.	*Cymbopogon flexuosus*	Slips/seeds
6.	*Cymbopogon martinii*	Slips/seeds
7.	*Cynodon dactylon*	Rhizome
8.	*Dactyloctenium aegyptium*	Seeds/slips
9.	*Eragrostis viscosa*	Slips
10.	*Heteropogon contortus*	Seeds
11.	*Macrotyloma uniflorum*	Seeds
12.	*Saccharum munja*	Slips
13.	*Saccharum spontaneum*	Slips
14.	*Stylosanthes fruticosa*	Seeds
15.	*Stylosanthes hamata*	Seeds
16.	*Tephrosia purpurea*	Seeds
17.	*Themeda quadrivalvis*	Slips/seeds
18.	*Vetiveria zizanioides*	Slips/ seeds