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Report of the Comptroller and Auditor General of India on Assessment of Environmental Impact due to Mining Activities and its Mitigation in Coal India Limited and its Subsidiaries

लोकहितार्थ सत्यनिष्ठा
Dedicated to Truth in Public Interest

Union Government (Commercial)
Ministry of Coal
No. 12 of 2019
(Performance Audit)

Report of the
Comptroller and Auditor General of India
On
Assessment of Environmental Impact due to Mining Activities and its Mitigation in Coal India Limited and its Subsidiaries

for the year ended March 2018

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Laid on the table of Lok Sabha and Rajya Sabha on …….

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Preface

This Report of the Comptroller & Auditor General of India contains the results of the Performance Audit on "Assessment of Environmental Impact due to Mining Activities and its Mitigation in Coal India Limited and its Subsidiaries". The impact on environment due to large scale extraction of coal from opencast as well as underground mines along with compliance to various environmental mitigation rules and regulations has assumed significance warranting a study to examine and to ensure that coal mining, as an economic activity, is carried out in a socially responsible and environmentally sustainable manner, with due consideration and compliance to requisite environmental stipulations.

The audit has been conducted in conformity with the Auditing Standards issued by the Comptroller & Auditor General of India. The Report highlights deficiencies of the public sector coal companies to mitigate the environmental hazards of mining and adherence to various statutory compliances related to environmental stipulations. Based on the audit findings, several recommendations are made in the Report which would serve as an aid to the better environmental management in the coal mines. The Report has been prepared under the provisions of Section 19-A of the Comptroller & Auditor General's (Duties, Powers and Conditions of Service) Act, 1971.

Audit wishes to acknowledge the cooperation received from Coal India Limited, its Subsidiaries and the Ministry of Coal at each stage of audit process.

Executive Summary

Indiscriminate utilisation of natural resources to meet development demands, rapid industrialisation and unplanned urbanisation adversely impact the environment. Dumping of wastes into rivers and lakes, diverting forest land for other purposes and increased emission of harmful pollutants into the environment contribute to degradation of environment.

Over the last few decades in India, protection and conservation of the environment and sustainable development have become increasingly important, in the light of climate change which had devastating consequences on the survival of humanity. Effective environmental governance is, therefore, of utmost importance. Accordingly, the thrust of this Audit Report is to highlight issues relating to the adequacy and effectiveness of the efforts made by the public sector coal companies to address important environmental issues like air pollution, water pollution, land degradation, *etc*.

Coal, a fossil fuel, is composed mainly of carbon. It is extracted predominantly through open cast mining (OCM). OCM disfigures the countryside and tends to pollute the atmosphere within the locality. The main activities involved in coal mining are drilling of bore holes, blasting and loosening of coal seams, extraction of coal reserve and transportation of coal from mines to railway siding or to washeries. Extraction of coal, therefore, involves serious environmental and social concerns, including, air, noise, water pollution, land degradation and far reaching consequences on local bio-diversity. Most of the coal reserves in India are located in river basins which are rich in forest cover and are habitats of precious wild life and indigenous tribal communities. In view of the above factors, a Performance Audit on "Assessment of environmental impact due to mining activities and its mitigation in Coal India Limited and its Subsidiaries" was conducted. The Report on the Performance Audit contains nine specific recommendations. The significant audit findings are discussed below:

Environment Management System

i. The National Environmental Policy (NEP) was formulated by the Government of India in September 2006. The NEP enjoined upon all concerned - Central, State/UT and local - to prepare action plans on identified themes and formulate their own strategies to be consistent with the NEP. However, Coal India Limited (CIL) amended its original Corporate Environment Policy (CEP) and formulated a comprehensive Environment Policy only in March 2012, followed by a revised policy in December 2018 (Para 3.1.1).

ii. Ministry of Environment, Forest and Climate Change (MoEF&CC) while according environment clearance (EC) for the projects of the subsidiaries from time to time, stipulated that a well laid down Environment Policy duly approved by the Board of Directors (BoD) of the subsidiaries needs to be in place. Six out of seven coal producing subsidiaries of CIL did not formulate a policy as mandated. Further, although guidelines containing the responsibility and delegation at different levels in environment discipline were formulated by CIL, the same were not dovetailed in their operating manual by the subsidiaries. (Para 3.1.2 & Para 3.1.3).

Air Pollution and Control Measures

iii. According to the Environment Impact Assessment – Environment Management Plan of the mines, requisite number of air quality monitoring stations as specified in EC were to be established in core zone (within 3 km of the mining area) and buffer zone (within 10 km of the mining area) of each mine for monitoring air quality. In 12 of the sampled 30 operating mines/washeries, against 96 monitoring stations, only 58 (60 *per cent*) were established (Para 4.1.1).

iv. Continuous Ambient Air Quality Monitoring Stations were to be installed and equipped with connectivity to the server of State Pollution Control Boards (SPCB) to facilitate online monitoring of ambient air quality. 12 mines of four subsidiaries did not comply with these directives (Para 4.2).

v. The average ash content in the coal extracted by Hingula, Jagannath, Basundhara (W) and IB Valley mines of Mahanadi Coalfields Limited (MCL) ranged between 40.1 *per cent* and 43.8 *per cent*. Although MCL contemplated setting of four washeries as early as in March 2008 for supply of beneficiated coal to thermal plants, these have not been commissioned so far (November 2018). The ash content in the coal supplies executed by Central Coalfields Limited (CCL) also exceeded 34 *per cent*. (Para 4.3)

vi. The National Ambient Air Quality Standards, 2009 (NAAQS) notified by MoEF&CC in November 2009 mandated monitoring of Particulate Matters (PM_{10} and $PM_{2.5}$) on annual and 24 hour basis. Although these norms came into effect from November 2009, ambient air quality was monitored in Eastern Coalfields Limited (ECL) only from May 2015 for the cluster of mines. Further, six locations of ECL were monitored only till March 2015, although PM_{10} level in these stations always exceeded the prescribed norm (100 µg/cum) under NAAQS (Paras 4.4.1 & 4.4.2).

vii. The concentration of PM_{10} and $PM_{2.5}$ in air exceeded the levels prescribed in NAAQS in six mines across three subsidiaries during 2013-18 (Para 4.4.3).

viii. Shortcomings were noticed in the implementation of prescribed CIL guidelines (March 2014), in 17 out of the 28 operating mines selected for scrutiny (Para 4.6.1).

ix. Construction of silo at Gevra OCM was completed belatedly in February 2016 at a cost of ₹ 138.85 crore. However, works relating to railway siding remained (November 2018) incomplete and coal produced from Gevra OCM continued to be transported through road, thereby contributing to dust generation. In Lingaraj and Lakhanpur projects of MCL, silo was not operationalised due to absence of railway connectivity and coal continued to be transported by road. In Block B mines of Northern Coalfields Limited, coal could not be dispatched through Coal Handling Plant due to absence of rail connectivity and, hence, coal continued to be transported by road beyond August 2016, thereby contributing to air pollution. (Paras 4.9.1, 4.9.2 and 4.9.3).

Water Pollution and Control Measures

x. During 2013-18, out of 28 mines selected for audit scrutiny, in eight mines across three subsidiaries, the pollutants exceeded the limits prescribed by Bureau of Indian Standards (BIS) (Para 5.1).

xi. During 2013-18, 62 lakh Kilo-litre (KL) of untreated water was discharged in nearby water bodies by Lakhanpur (2.95 lakh KL) and Basundhara (W) mines (59.05 lakh KL) of MCL thereby contaminating ground water. Further, CCL, Bharat Coking Coalfields Limited (BCCL) and South Eastern Coalfields Limited (SECL) continued to use ground water for their mining operations without obtaining No Objection Certificate (NOC) from Central Ground Water Authority (CGWA) (Paras 5.2.1& 5.8.1).

xii. The subsidiaries did not install Sewage Treatment Plant (STP) at the residential colonies of the collieries, thereby contaminating the ground water (Para 5.6).

xiii. Due to absence of mechanical brooming / industrial cleaner in Piparwar OCM, the spillage from overloaded trucks / dumpers accumulated along the sides of the bridge of Safi River, was not cleaned periodically. These eventually drained into the river thereby contaminating the river water. Further, rejects of Kathara washery of CCL was found to be contaminating Damodar River (Paras 5.7.1 & 5.7.2).

xiv. NCL did not get the coal seam samples analysed for mercury content on annual basis. Further, no analysis of coal seam samples was made beyond June 2016, thereby, thwarting the measures for occupational health and safety (Para 5.9).

Land Management – Mitigation of Land Degradation and Reclamation

xv. Out of 23 OC/mixed mines selected for audit, in 13 mines across five subsidiaries, though topsoil was stacked in the earmarked area and reported periodically, basic records of topsoil indicating the quantity and areas of stacking were not maintained. As at the end of March 2018, in three mines of Western Coalfields Limited (WCL), although 75.30 lakh cum of topsoil was stacked at earmarked sites, it remained unutilised since 2013-14 (Paras 6.1.1 & 6.1.2).

xvi. Director General of Mines Safety (DGMS) suspended (June 2017) operations in a patch of Rajmahal OCP as the Overburden (OB) benches in coal II and III seams did not conform to the norms specified in the Regulations. DGMS suspended (January 2017) operations in Quarry 3 of Sonepur Bazari OCP also as the height of the benches of R-VIII coal seam deviated from the Regulation (Para 6.2.1).

xvii. ECL did not set year-wise internal targets for biological reclamation of mined out area through plantation activities. Against the de-coaled area of 3922.85 ha, MCL biologically reclaimed only 2024.73 ha (51.61 *per cent*) as at the end of March 2018 (Para 6.3.1).

Adherence to Other Regulatory Conditions for Protection of Environment

xviii. 35 mines of ECL which were closed between April 1946 and July 2009 (including six mines which were closed prior to nationalization), did not have Mine Closure Status Report (Para 7.1.1).

xix. MCL did not adopt a uniform policy for the dumping of fly ash. Between April 2009 and December 2014, ECL permitted five thermal power plants to dump 201.26 lakh cubic meter of fly ash in eight abandoned mines without consideration. Further, fly ash generated in the process of power generation by Kathara Captive Power Plant of CCL was dumped in the open space, posing environmental hazard (Para 7.1.3.2, 7.1.3.3 & 7.1.3.4).

xx. Deputy Director of Mines, Odisha levied (June 2017) penalty of ₹ 50.97 crore invoking the provisions of the Mines and Mineral (Development and Regulation) (MMDR) Act for production of coal in excess of the mine plan. The violation of mining plan was affirmed (August 2017) by the Hon'ble Supreme Court (Para 7.2.2).

xxi. As at the end of March 2018, 16 units relating to two subsidiaries comprising mines (13) and washeries (3) were being operated without valid EC in 9 units, Consent to Establish (CTE) in 1 unit and Consent to Operate (CTO) in 6 units. Consequently, the adequacy of the mitigative measures in vogue to handle environmental pollution as prescribed under various rules / regulations could not be assessed (Para 7.2.3).

xxii. EC for Hurilong Underground (UG) coal project which was in close proximity to the Palamau tiger reserve, was rejected (August 1998) by MoEF. In advance of obtaining the EC, CCL acquired and destroyed 6.58 acre non forest land and constructed infrastructural facilities at a cost of ₹ 2.98 crore (Para 7.2.4).

xxiii. MCL did not install meters and submit waste water analysis report as stipulated under the Cess Act and hence could not avail of concessional rates of cess. The saving it had to forego on account of this non-compliance was in the amount of ₹ 2.48 crore during 2013-18 (Para 7.3.3).

Rehabilitation and Resettlement for Mine Fire

xxiv. Even after a lapse of nine years, since Jharia Master Plan was approved, BCCL did not formulate fire fighting activities as envisaged therein. Fire fighting activities commenced only in 25 projects (as against 45 projects identified). The fires thus continued to endanger the lives of the people residing in and around the fire area, besides adversely impacting the environment (Para 8.1.2).

Monitoring of Environmental Activities

xxv. While the deployment of executives exceeded the sanctioned strength at CIL Headquarters (HQ) in all the years, it fell short at mines, during the period 2013-18. The extent of excess deployment in CIL HQ ranged between 20 *per cent* and 120 *per cent* of the sanctioned strength during 2013-18. North Eastern Coalfield (NEC) mines experienced shortage of executives ranging between 33 *per cent* and 100 *per cent.* There were inconsistencies in deployment of manpower for environmental activities in the subsidiaries also. (Para 9.1.1 and 9.1.2).

xxvi. We observed that while the quality parameters relating to air and water were being monitored on fortnightly basis, the reports were prepared by Central Mine Planning and Design Institute Limited (CMPDIL) and reported to the subsidiaries on quarterly basis, thereby offering no scope for initiating remedial measures on the basis of adverse fortnightly readings recorded (Para 9.2).

Recommendations

1. The companies under coal sector may put in place an Environment Policy duly approved by their respective BoD as mandated by MoEF&CC.
2. The subsidiaries may adopt two-pronged strategy for pollution control. The capital works relating to pollution control measures may be completed expeditiously. The plantation works may also be taken up simultaneously and aggressively to increase green cover and restore ecological balance in and around the mines.
3. CIL should frame uniform and scientific policy towards use of fly ash in the mines so as to ensure environmental sustainability.
4. Corporate Social Responsibility (CSR) expenses may be dovetailed to ensure sustainable community development around specific mines as mandated under EC so as to avoid lopsided development.
5. Remedial actions for mitigating and arresting the adverse impact of subsidence and fire at Jharia Coalfields on the environment may be expedited**.**
6. Implementation of solar power project may be put on fast track so that the environmental benefits fructify as envisaged.
7. Manpower in the Environment Department of CIL and subsidiaries may also be rationalised and Environmental Manual be formulated to serve as a guide in the operations in specific mines under their control.
8. The monitoring mechanism in the subsidiaries may be strengthened by streamlining the existing reporting process for maintaining neutrality and to ensure proper checks and balances in the system of compliance mechanism. The oversight role of CIL be directed to ensure compliance to prescribed environmental standards.
9. Deficiencies observed in mitigation of environmental pollution were based on audit of sample mines which may be reviewed in other mines to ensure compliance of environmental rules and regulations.

CHAPTER 1

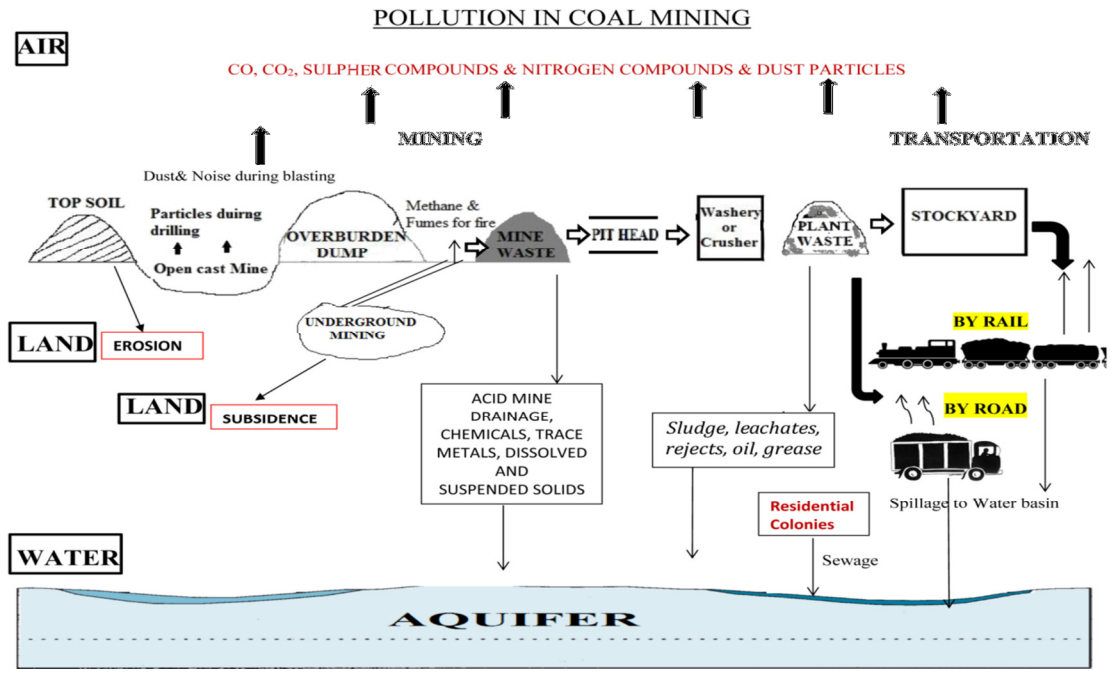
INTRODUCTION

Minerals are valuable natural resources which are finite and non-renewable. Mineral exploration and development is closely linked with the development of the country's economy. However, as it interferes with the environment and social structure, harmony and balance are to be maintained between extraction and conservation in the interest of sustainable development.

Article 48 A of the Constitution of India brings out that the State shall endeavour to protect and improve the environment. Further Article 51(A)(g) of the Constitution enjoins upon the citizens of India to protect and improve the natural environment. Also, the Government of India (GoI) enacted the Environment (Protection) (EP) Act, 1986 for protection and improvement of the environment.

1.1 Sources of Pollution

Coal, a fossil fuel, composed mainly of carbon, is extracted predominantly through open cast mining (OCM). OCM disfigures the countryside and tends to pollute the atmosphere within the locality. . The main activities involved in coal mining are drilling of bore holes, blasting and loosening of coal seams, extraction of coal reserve and transportation of coal from mines to the washeries or to railway siding. Extraction of coal, therefore, involves serious environmental and social concerns, including air, noise and water pollution, land degradation and far reaching consequences on local bio-diversity. The concerns are further compounded in the Indian context as most of the coal reserves are located in river basins which are rich in forest cover and are habitats of precious wild life and indigenous tribal communities.



The life cycle of a coal mine involves phases viz. prospecting, exploration, development, exploitation, and finally closure. The impact of coal mining on environment is maximum during the exploitation phase. In the process of coal mining, transportation and other allied operations, different types of mining pollutants are generated. Mining must, therefore, be carried out in a wise, socially responsible and environmentally sustainable manner.

1.2 Regulatory Framework

Ministry of Environment, Forest and Climate Change

1.2.1 Ministry of Environment, Forest and Climate Change (MoEF&CC) is the nodal agency for planning, promoting, coordinating and overseeing the implementation of India's environmental and forestry policies and programmes. Mining of coal is to be carried out in conformity with stipulated environmental standards as prescribed under the relevant Acts and statutes. For new and existing mines (involving capacity augmentation), Environment Impact Assessment[1] and Environment Management Plan[2] (EIA-EMP) are formulated as per approved Terms of Reference (ToR) and involve public consultations. On the basis of EIA-EMP Environment Clearance (EC) is granted by the MoEF&CC. Where mining involves forest land, Forest Clearance (FC) is required to be obtained from the MoEF&CC for diversion of forest land for non-forest purposes.

State Pollution Control Board

1.2.2 Prior to establishment of the mining project, all new intending project proponents are required to obtain 'No Objection Certificate' (NOC) from the jurisdictional State Pollution Control Board (SPCB) in the form of 'Consent to Establish' (CTE). Subsequently, for carrying out operations, the units are required to obtain 'Consent to Operate' (CTO) from the respective SPCBs. SPCBs are expected to play oversight role through periodical inspections in order to ensure compliance of standards prescribed under the Acts / statutes.

1.3 Coal India Limited and its subsidiaries

Consequent to the nationalization of coal mines in May 1973, Coal India Limited (CIL) was incorporated in November 1975 as a Central Public Sector Enterprise under GoI with its Headquarters (HQ) in Kolkata. North Eastern Coalfields (NEC), Margherita, Assam, is directly under the control of CIL. CIL has seven coal producing subsidiary companies (subsidiaries) under its fold as detailed below.

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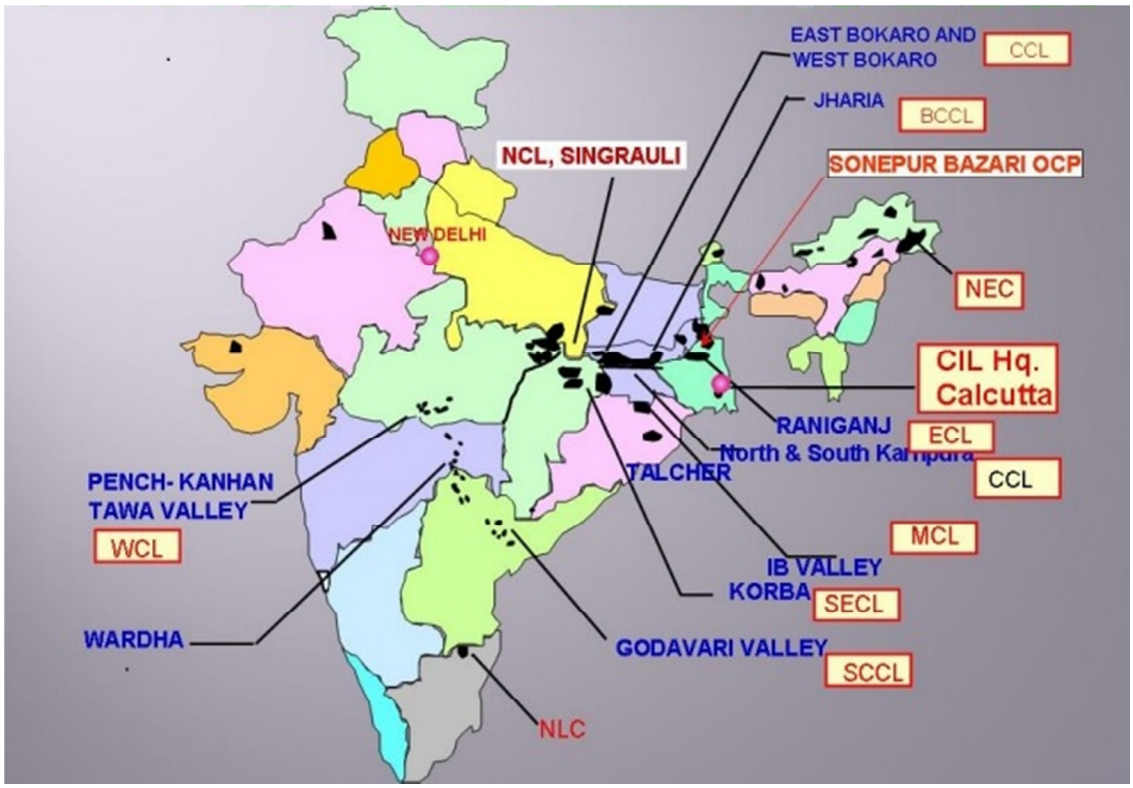
1 EIA highlights the beneficial and adverse effects of coal mining on the environmental system.

2 EMP details all mitigation measures to be undertaken for item-wise activity during the construction, operation and the entire life cycle of the coal mines to minimise adverse environmental impacts.

Table 01: Coal producing subsidiaries of CIL

Sl. No.	Name of the subsidiary
1.	Bharat Coking Coal Limited (BCCL), Dhanbad
2.	Central Coalfields Limited (CCL), Ranchi
3.	Eastern Coalfields Limited (ECL), Sanctoria
4.	Mahanadi Coalfields Limited (MCL), Sambalpur
5.	Northern Coalfields Limited (NCL), Singrauli
6.	South Eastern Coalfields Limited (SECL), Bilaspur
7.	Western Coalfields Limited (WCL), Nagpur

The major coalfields of India are depicted in the following map:



(Source: Energy Statistics 2015, Central Statistics Office, National Statistical Organisation, Ministry of Statistics and Programme Implementation)

With an average consolidated annual production of 523.38[3] million tonnes (MT) of coal during 2013-14 to 2017-18, CIL operates through 82 mining areas spread over eight provincial states of India, besides owning and operating 15 coal washeries through its subsidiaries. About 95 *per cent* of coal production in India is through OCM. The choice of the particular method of mining, *i.e.* underground (UG) or opencast (OC), depends on the depth, extent, quality and geology of the deposit. While OCM is much safer than

[3] Source: Computed based on the data available in the Annual Report of CIL for the year 2017-18.

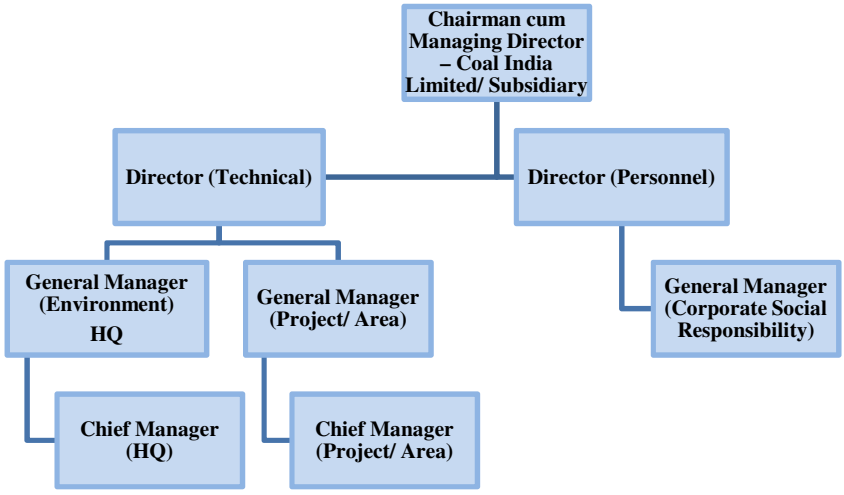
UG, it creates much more pollution. CIL was accorded Maharatna status in April 2011 and six of the coal producing subsidiaries (except ECL) enjoy Miniratna status.

1.3.1 Role of Central Mine Planning & Design Institute Limited

Central Mine Planning & Design Institute Limited (CMPDIL), Ranchi, established (November 1975) as a subsidiary of CIL, is an agency accredited by Quality Council of India for carrying out environmental monitoring as specified in the EP Act. CMPDIL functions through seven[4] Regional Institutes (RIs) each catering to one of the seven coal producing subsidiaries. CIL and its subsidiaries avail of the technical expertise of CMPDIL for environmental monitoring, processing and award of works relating to environmental monitoring, selection of monitoring stations and compliance of statutory requirements.

1.4 Organizational Structure for Environmental Activities

CIL and subsidiaries implement their environmental activities at their HQ and at project sites where mining and related activities are actually carried out. The organization chart relating to the environment activities is as follows:



1.5 Audit Framework

1.5.1 Audit Objectives

The objectives of the Performance Audit were to:

(i) examine whether CIL / subsidiaries adhered to the relevant laws, rules and regulations as prescribed for environmental protection under the EP Act for prevention of pollution;

[4] RI (Asansol), RI-II (Dhanbad), RI-III (Ranchi), RI-IV (Nagpur), RI-V (Bilaspur,), RI-VI (Singrauli) and RI-VII (Bhubaneswar).

(ii) assess the implementation and effectiveness of sustainable development measures taken up by CIL / subsidiaries for environment protection in the mining area; and

(iii) assess whether adequate monitoring mechanism existed in CIL / subsidiaries for taking up remedial measures to control environmental degradation.

The Performance Audit also sought to examine the effectiveness of measures adopted for mitigation of land degradation, land reclamation, hazardous substance management, Corporate Social Responsibility (CSR) and occupational health and safety that impinge on environmental aspects.

1.5.2 Audit Criteria

The performance of CIL and its subsidiaries was evaluated with reference to the following criteria:

1. EP Act 1986 and related Rules, Notifications and Circulars
2. Water (Prevention and Control of Pollution) Cess Act, 1977.
3. Public Liability Insurance Act, 1991.
4. Standards prescribed by Bureau of Indian Standards in 2012.
5. Environmental Policy 2012 of CIL.
6. CIL guidelines issued in March 2014 for personnel of Environment Department deployed in mines and guidelines issued in November 2015 by Central Ground Water Authority.
7. Mine closure guidelines 2009 and 2013
8. Environment Impact Assessment and Environment Management Plan.
9. EC of Mines and washery projects and conditions attached to EC accorded by MoEF&CC.
10. Conditions stipulated by SPCB / CPCB for CTE and CTO.
11. Approved Raniganj and Jharia Action Plans (2009).

1.5.3 Audit Scope, Coverage and Methodology

We conducted Performance Audit of CIL and its subsidiaries for the period from 2013-14 to 2017-18. Out of 500 mines and 15 washeries, 41 mines and 2 washeries (representing 8 *per cent* and 13 *per cent* of mines and washeries respectively) were taken up for detailed scrutiny based on random sampling, keeping in view the type of mines which are more prone to environmental damage, geographical locations and availability of audit resources. The share of the sampled operating mines to the total production of the respective subsidiaries during 2017-18 ranged between 10 *per cent* and 65 *per cent*. The sample selected was heterogeneous and comprised of UG, OC,

mixed and closed mines. The total production of sampled mines was 226.03 million tonne and the total production of CIL and its subsidiaries was 567.37 million tonne during the year 2017-18. Besides, we also reviewed the records of CMPDIL relating to the technical support services provided to CIL / subsidiaries.

We conducted (April / June 2018) Entry Conference with the Managements of CIL / subsidiaries wherein the Audit objectives and scope of audit were explained. We examined the records maintained at their HQ, operating mines and washeries. Based on the examination of records, preliminary observations were issued to the Management. Their replies and the deliberations in the Exit Conference held with them in November 2018 have been considered in firming up the report. The draft PA Report was issued to the Ministry in December 2018 and the reply received in April 2019 were incorporated in the draft PA Report. The Exit Conference with MoC was held on 21 May 2019 wherein Audit observations and recommendations of the draft PA Report were discussed and views expressed in the Exit Conference have been duly considered while finalising the Report.

1.6 Acknowledgement

We acknowledge the co-operation provided by CIL and the subsidiaries which facilitated the completion of this Performance Audit.

1.7 Audit Findings

Audit findings are discussed in the succeeding paragraphs.

CHAPTER 2

GOOD PRACTICES AND GREEN INITIATIVES

2.1 Good Practices

We have observed that CIL and its subsidiaries have undertaken considerable eco-restoration works in some mines/nearby places as described below:

Sl. No	Name of the Subsidiary	Good Practice observed	Pictures
1.	MCL	MCL developed green belt and park at South Balanda, a closed mine.	
2.	NCL	Nigahi mines of NCL are ecologically restored with bamboo plantations.	
3.	WCL	WCL restored Saoner UG Closed Mine ecologically.	

4.	CCL	CCL developed Kayakalp Vatika, a unique mine reclamation initiative for eco-balancing with sustainable development through rain water harvesting, drip irrigation, plantation activities, nursery development, mixed forestry development, and development of vermin compost unit.	
5.	BCCL	BCCL converted Jhunkundar closed OC mine into a lake for rain water harvesting thereby recharging the ground water level.	
6.	ECL	The closed mine of Dalmiya OC was filled with water and pisci-culture and water treatment plant has been initiated.	
7.	SECL	SECL converted an old abandoned overburden dump in Rajnagar OCP of Hasdeo Area into Ananya Vatika, an exotic park.	

2.2 Renewable Energy

Solar energy is environment friendly as it has zero emission while generating electricity or heat. GoI launched Jawaharlal Nehru National Solar Mission (Mission) in June 2008. The Mission adopted a three phase approach to achieve the targeted generation of 20000 megawatt (MW) by March 2022.

The mission envisaged an achievement of 32 *per cent* of the targeted generation by March 2018.

As a sequel to the launch of the Mission by GoI, CIL intended to invest in the development of 1000 MW solar power project in a phased manner. Based on the level of achievement projected by the Mission by March 2018, CIL's proposal envisaged savings in energy charges of ₹ 55.50 crore[5] annually. As it had no expertise in power generation and power related business, it retained the services of Solar Energy Corporation of India (SECI) and concluded (October 2014) MoU with SECI for the development of 250 MW in the first phase, which was subsequently ratified (November 2014) by its BoD.

In February 2015, CIL confirmed to GoI its commitment to develop 1000 MW Renewable Energy projects by March 2019. Based on the assurance received from Government of Madhya Pradesh on allotment of land in solar park of Neemuch and open access, SECI floated (November 2015) tender for setting up 2 X 100 MW solar power plants (one each for SECL and NCL) at an estimated cost of ₹ 1300 crore. SECI also firmed up DPR and recommendations for the award of work. Subsequently, SECI advised (December 2016) scrapping the tender on the plea that substantial time elapsed since price discovery of these tenders and that solar power tariff witnessed declining trend. The tender floated in November 2015 was eventually cancelled. Notwithstanding this, SECI claimed (December 2015) an amount of ₹ 7.44 crore as their fee for preparation of DPRs for these plants and CIL settled the claim in December 2015. Payment to SECI was thus without rendering service.

CIL stated (November 2018) that implementation of solar power project involved liaising with external agencies for statutory approvals which were beyond its control. However, we observed that CIL failed to align the pace of progress of its phases of development of 1000 MW to be *co-terminus* with the progress of the Mission.

[5] {320x1000x24x365/1000000x0.18 Million kWh x ₹ 1.10 per kWh (Rs.4.94/kWh *minus* 3.84/kWh)}

CHAPTER 3

ENVIRONMENT MANAGEMENT SYSTEM

A well documented Environmental Management System in the form of Policy / Manual acts as a tool in implementing and improving various environmental programmes through judicious allocation of manpower, assignment/ delegation of responsibilities and optimum utilization of resources.

3.1 Corporate Environmental Policy

3.1.1 The Corporate Environment Policy (CEP) of CIL was originally approved by its Board of Directors (BoD) in December 1995. The National Environmental Policy (NEP) was formulated by the GoI in September 2006. The NEP enjoined upon all concerned – Central, State/UT and local – to prepare action plans on identified themes and formulate their own strategies for environment protection to be consistent with the NEP. However, CIL amended its original CEP and formulated a comprehensive Environment Policy (Policy) only in March 2012. No reason was found on record for the delay of six years in its revision to be in line with NEP.

We also observed that the Policy in vogue in CIL was due for revision in March 2017. However, this was reviewed and revised policy was put in place only in December 2018 after a delay of 20 months.

3.1.2 While according EC for the projects of the subsidiaries from time to time, MoEF&CC stipulated that a well laid down Environment Policy duly approved by the BoD of the subsidiaries needs to be in place. We observed that six[6] out of its seven coal producing subsidiaries did not formulate a policy as mandated, on the plea that they followed the policy formulated by CIL. We further observed that the policy of CIL was not even put up to the BoD of these subsidiaries except BCCL for consideration, thereby disregarding the mandatory conditions stipulated in the EC. We also observed that the Policy approved by BoD of BCCL for adherence, was not revised as it followed the policy formulated by CIL.

In the absence of an approved policy, different subsidiaries dealt with similar issues in different manner as discussed in paras 7.1.3.2, 7.1.3.3 and 7.3.1.2 *infra.* This also offered scope for discretion in the implementation of environmental activities. In the Exit Conference, the subsidiaries stated (November 2018) that the revised Policy of CIL would be referred to their respective BoD. Further developments are awaited (November 2018).

[6] ECL, CCL, WCL, SECL, NCL and MCL

3.1.3 We further observed that although guidelines containing the responsibility and delegation at different levels in environment discipline were formulated by CIL, the same were not dovetailed in their operating manual by the subsidiaries.

Audit Summation

Coal India Limited (CIL) amended its original Corporate Environment Policy (CEP) and formulated a comprehensive Environment Policy only in March 2012, followed by a revised policy in December 2018. However, six out of seven coal producing subsidiaries of CIL did not formulate a policy as mandated by MoEF&CC which stipulated that a well laid down Environment Policy duly approved by the Board of Directors of the subsidiaries needs to be in place. Further, guidelines containing the responsibility and delegation at different levels in Environment discipline were formulated by CIL, but the same were not dovetailed in their operating manual by the subsidiaries.

CHAPTER 4

AIR POLLUTION & CONTROL MEASURES

In coal mines, air pollution starts with removal of massive overburden[7] (OB) which discharges fine particles. It is followed by drilling/ extraction of coal and movement of extracted coal to the washery/ crusher/ Coal Handling Plant (CHP)[8] and finally transportation of coal to the consumer. These operations generate Suspended Particulate Matter (PM_{10}) and Respirable Particulate Matter ($PM_{2.5}$) in the surroundings which are the main sources of air pollution. Emissions of some fugitive gases like carbon dioxide, carbon monoxide, sulphur dioxide and oxides of nitrogen are also caused by automotive, generators and blasting operations.

Various means used by the coal companies to reduce air pollution are installation of monitoring stations to assess the level of pollutants in the air, installation of CHP, piped conveyor belt system, use of SILO for rapid and dust free loading of coal into wagons, installation of Merry-Go-Round, dust suppression by water sprinklers, mist blowers, mechanical brooming, plantation of trees along the route of transportation *etc*.

4.1 Inadequate / absence of air quality monitoring stations

4.1.1 According to the EIA – EMP of the mines, requisite number of air quality monitoring stations (AQMS) as specified in EC were to be established in core zone (within 3 km of the mining area) and buffer zone (within 10 km of the mining area) of each mine/washery for monitoring air quality. While granting EC, MoEF&CC also affirmed the proposals contained in EIA-EMP.

Out of the 28 sampled (operating) mines and 2 washeries, we observed that in 12 mines/washeries of three subsidiaries, against 96 monitoring stations to be established, only 58 monitoring stations (60 *per cent*) were established as detailed below, thereby rendering the process of air quality monitoring ineffective.

[7] Overburden is the natural rock and soil that sits above and around the ore body

[8] Coal Handling Plant (CHP) is the facility used in the coal mining industry for crushing, cleaning and transportation of coal.

Table 02: Status of installation of Air Quality Monitoring Stations

Company	No. of mines/ washeries	No. of monitoring stations to be installed			No. of monitoring stations actually installed			Shortfall		
		Core Zone	Buffer Zone	Total	Core Zone	Buffer Zone	Total	Core Zone	Buffer Zone	Total
CCL	5[9]	20	20	40	4	16	20	16	4	20
SECL	4[10]	16	16	32	11	15	26	5	1	6
WCL	3[11]	12	12	24	6	6	12	6	6	12
TOTAL	**12**	**48**	**48**	**96**	**21**	**37**	**58**	**27**	**11**	**38**

The subsidiaries attributed (November 2018) the shortfall to overlapping monitoring stations wherein the core zone of one project could fall within the buffer zone of adjacent project. While endorsing the above views of the management, the Ministry also stated (April 2019) that as per Standard EC conditions and EIA Guidance Manual for Mining of Minerals of MoEF&CC, sampling stations are fixed in core zone and in buffer zone based on environmentally and ecologically sensitive receptors in consultation with concerned SPCB and that this gave a fairly representative picture of pollution generation in the core zone and impact on the surrounding.

While admitting the contentions of the Ministry that monitoring stations are installed based on standard EC conditions and guidelines of MoEF&CC in consultation with concerned SPCB, the fact remains that audit highlighted only those instances where the number of monitoring stations required to be installed as per the approved EC conditions of MoEF&CC differ with the monitoring stations actually installed in the sample mines.

In the Exit Conference, the Ministry stated (May 2019) that the recent ECs have not indicated regarding number of monitoring stations to be set up and these were installed based on consultation with the concerned SPCB, which grants Consent to Operate (CTO) to the respective mines on annual basis.

Audit observed that EC was not revised to reflect the reduced requirement of monitoring stations due to overlapping of core and buffer zones.. Besides, in absence of necessary records made available to Audit, it could not be substantiated that the number of monitoring stations were established in concurrence with the requirements of SPCBs for the particular projects during 2013-18.

[9] Piparwar OC, Rajrappa OC, Kathara OC, AKK OC and Kathara Washery
[10] Gevra, Kusmunda, Baroud, Rajendra,
[11] New Majri IIA, Penganga, Gokul,

Audit observations mentioned above are restricted to the sampled mines only. CIL subsidiaries need to review the position internally regarding installation of AQMS in all other mines under their operation to comply with the EC conditions and control air pollution.

4.2 Absence of Continuous Ambient Air Quality Monitoring Stations in some mines

With a view to strengthen the monitoring mechanism for effective compliance through self-regulatory mechanism, the SPCBs exercising jurisdictional control over the mines of the subsidiaries, directed while issuing the certificate of CTE / CTO or its renewal from time to time, that Continuous Ambient Air Quality Monitoring Stations (CAAQMS) be installed. The CAAQMS were to be equipped with connectivity to the server of SPCBs to facilitate online monitoring of ambient air quality.

We observed that out of 28 operating mines taken up for detailed scrutiny, 12 mines of four subsidiaries did not comply with these directives as detailed below:

Table 03: Status of installation of CAAQMS in the mines of subsidiaries

Subsidiary	Directives issued		Mines that did not comply with the directives
	By	In	
ECL	Jharkhand State Pollution Control Board (JSPCB)	August 2014/ January 2017	Rajmahal OCP
NCL	Madhya Pradesh Pollution Control Board (MPPCB)	December 2013	Nigahi, Jayant, Block-B, Khadia mines
MCL	Orissa State Pollution Control Board (OSPCB)	July/ September 2016	Bharatpur OCP, Lingaraj OCP, Lakhanpur OCP and Basundhara (W) OCP
WCL	Maharashtra Pollution Control Board (MPCB)	October 2015/ March 2017/ August 2017	Penganga OC, Majri II A OC and Gokul OC

ECL stated (November 2018) that action was on hand to adhere to these stipulations. We observed that the process in ECL was mired in administrative delay.

Although the procurement of CAAQMS was approved (March 2017) by NCL, it placed orders for their supply only in September 2018, attributing the delay to implementation of Goods & Services Tax (GST). We observed that there was time lag of 42 months from the issue (December 2013) of directives by MPPCB for installation of CAAQMS and the roll out (July 2017) of GST, and, hence, the delay attributed to implementation of GST is not tenable. We also observed that after a lapse of 18 months from the date of approval of the proposal, MCL retained (March 2018) CMPDIL as consultants for the work relating to procurement, maintenance and monitoring of CAAQMS for a consideration of ₹ 19.88 crore without following the tender process, which was

financially imprudent. The avoidable delay in initiating action for procurement of CAAQMS by 60 months is a pointer to deficiency in monitoring.

WCL stated (November 2018) that action was on hand to install CAAQMS as directed. Further developments are awaited (November 2018).

Thus, absence of CAAQMS is a pointer to the fact that scope existed for further strengthening of monitoring mechanism for effective compliance through self-regulatory mechanism.

Audit observations mentioned above are restricted to the sampled mines only. CIL subsidiaries need to review the position internally regarding installation of CAAQMS in all other mines under their operation to comply with the EC conditions and control air pollution.

4.3 Beneficiation of coal: non-establishment of washeries in MCL

MoEF&CC mandated (January 2014) that coal based thermal power plants be supplied with coal having ash content not exceeding 34 *per cent.* The coal companies were also advised (April 2015) to adhere to this stipulation. Beneficiation of coal was to be taken up for reduction of ash content. It involves washing of coal through a washery which produces clean coal by separation of ash or extraneous material as well as associated impurities like shale, sand, stones *etc*. of the raw coal.

We observed that the ash content in the coal supplied by ECL and NCL was less than 34 *per cent.* Therefore, beneficiation of coal in respect of ECL and NCL is not required. In case of mines of MCL i.e. Hingula, Jagannath, Basundhara (W) and IB Valley mines, average ash content in coal ranged between 40.1 *per cent* and 43.8 *per cent*. Though MCL contemplated setting of four washeries as early as in March 2008 for supply of beneficiated[12] coal to thermal plants, these have not been commissioned so far (November 2018). The delay was due to belated receipt of forest clearance and EC for setting up of washeries, besides delay in firming up the method of project financing.. MCL stated (November 2018) that action was on hand to establish the washeries as contemplated. Further developments are awaited (November 2018).

It was observed that in the sample mines of CCL the ash content exceeded 34 *per cent* despite beneficiation of coal carried out in its washeries. Relevant information/ records relating to other subsidiaries (BCCL, SECL and WCL) were not made available to audit till date.

[12] Beneficiated coal means coal containing higher calorific value but lower ash than the original ash content in the raw coal obtained through physical separation or washing process.

4.4 Deviation from the prescribed standards

The National Ambient Air Quality Standards, 2009, (NAAQS) notified by MoEF&CC in November 2009 mandated monitoring of PM_{10} and $PM_{2.5}$ on annual basis and on 24 hours basis. The monitoring is carried out by the seven subsidiaries of CIL through the RIs of CMPDIL.

4.4.1 Although these norms came into effect from November 2009, ambient air quality was monitored in all the seven subsidiaries except ECL, which started monitoring only from May 2015 for their cluster of mines[13]. Further, ECL monitored the ambient air quality of the standalone projects only from September 2016.

4.4.2 We observed that six locations of ECL at Sonepur Bazari (two), Kunustoria (one) and Jhanjra (three) were monitored only till March 2015 and discontinued thereafter on the plea that the monitoring stations were rationalised to reflect the entire cluster. The monitoring in the stations should not have been discontinued as PM_{10} level in these stations always exceeded the prescribed norm (100 µg/cum[14]) under NAAQS as detailed below:

Table 04: Monitoring of air pollution discontinued at ECL Mines

Sl. No.	Mine	Name of monitoring Station	Period of monitoring	Level of PM_{10} in excess level prescribed in NAAQS (*per cent*)
1.	Sonepur Bazari	Training Centre	May 2013 to February 2015	100
		CISF Camp		56
2.	Kunustoria	Incline No. 3	April 2013 to March 2015	100
3.	Jhanjra	MIC	September 2013 to February 2015	100
		1 & 2 Incline		100
		3 & 4 Incline		100

We also observed that ECL did not analyse the pollution levels in these locations post-rationalization for their conformity with the prescribed norms.

4.4.3 NAAQS prescribed the maximum permissible level of emissions of PM_{10} (100 µg/cum) and $PM_{2.5}$ (60 µg/cum) concentration in industrial, residential, rural and other areas. We observed that the concentration of PM_{10} and $PM_{2.5}$ in air exceeded the levels prescribed in NAAQS in six mines across three subsidiaries during 2013-18 as detailed below:

[13] A group of mines in close proximity to one another
[14] Micrograms per cubic metre

Table 05: Levels of air pollutant in the mines of subsidiaries

Subsidiary	Pollutant	No. of occasions monitored	Range of actual levels recorded (µg/cum)	Readings in excess of the specified standards		
				No. of occasions	Per centage of (5) to (3)	Mines
(1)	(2)	(3)	(4)	(5)	(6)	(7)
BCCL	PM_{10}	130	101 to 660	64	49	Dahibari-Bansantimata OCP and Moonidih UG
	$PM_{2.5}$	130	61 to 480	57	44	
ECL	PM_{10}	107	101 to 196	67	63	Rajmahal
WCL	PM_{10}	823	101 to 647	260	32	New Majri IIA OC, Gokul OC and Penganga OC
	$PM_{2.5}$	411	61 to 228	65	16	

We did not come across instances of breach of the permitted levels in 22 other sampled operating mines.

We observed that the subsidiaries monitored the parameters through Routine Environment Monitoring (REM) reports without analyzing the reasons for variation of the parameters as against the standards fixed, for remedial action. We also observed that in case of WCL, Maharashtra Pollution Control Board (MPCB) forfeited (between September 2013 and September 2016) bank guarantee (BG) amounting to ₹ 32.5 lakh tendered by them, for exceeding ambient air quality norms during the period 2013-18. Yet, no action was taken to reduce emission levels. BCCL attributed (November 2018) the pollution at Dahibari OCP (DBOCP) in excess of the norms to vehicular movement on National Highway 19.

WCL confirmed (November 2018) that the levels exceeded in buffer zone which were beyond their control. However, this was not assessed further for necessary action.

ECL stated (December 2018) that monitoring was done as per the Standards of GSR 742 (E) dated September, 2000, issued by MoEF&CC.

The Ministry also stated (April 2019) that air quality of core zone is being monitored as per Notification No. GSR 742(E) dated 25 September 2000 as prescribed in Clause (i) of Air quality Monitoring and Preservation of the Standard EC conditions prescribed by MoEF&CC. As per the aforesaid notifications, if any residential or commercial or industrial place falls within 500 metres of any dust generating sources, NAAQS notified becomes applicable. The receptors in buffer zone are being monitored for the parameters of NAAQS, 2009 as specified in Standard EC Conditions of MoEF&CC.

The reply of the Management/Ministry is not acceptable in view of the fact that as per the provision of the Air (Prevention and Control of Pollution) Act, 1981, the CPCB

notified NAAQS in 2009 which aimed to provide uniform air quality for all, irrespective of land use pattern, across the country. Further, the guidelines issued (March 2014) by CIL reiterated that the standards prescribed in NAAQS be complied with.

In the Exit Conference (May 2019), it was agreed upon to revisit the existing CIL guidelines for necessary modification regarding implementation of NAAQS 2009, in totality, for core as well as buffer zone.

4.4.4 EC issued (between February 2013 and December 2013) for clusters of mines of BCCL stipulated that Source Apportionment Study and Mineralogical Composition Study (Study) be conducted for Jharia coalfield in order to ascertain the source and extent of air pollution due to mining activities so that appropriate mitigating measures could be taken. These Studies are undertaken by Government research agencies on receipt of advance by them as consideration for services.

We observed that the proposal for conducting these studies received from National Environmental Engineering Research Institute (NEERI) as early as in September 2013 followed by in January 2014 for a consideration of ₹ 1.12 crore was not acted upon. We further observed that the study was entrusted to the same agency, *i.e.,* NEERI, only in May 2018 for enhanced consideration of ₹ 1.42 crore and to submit the report within 12 months. This resulted in delay ranging between 53 and 64 months.

BCCL stated (November 2018) that action could not be initiated as no response was received to their tenders floated originally. The reply is not tenable as not only was the original tender floated late (in January / March 2015) but also the clause relating to advance payment for undertaking the Study was not incorporated in the tender notification, thereby forcing the Government research agencies to abstain from participating in the tender. The belated award of work to NEERI resulted in corresponding delay in initiating the process of remedial measures.

4.5 Transportation of coal

Coal after excavation in the mine is transferred to the pit head stock, which is then transferred to crusher/ washery by dumper/ truck. The coal from the crusher/washery is transferred to the customers either by road (truck) or rail. Transportation by road generates a lot of air pollutants for which EMP emphasised the need to minimise road transportation.

As per CIL guidelines prescribed (March 2014), for mitigating air pollution, generation of dust is to be controlled at the source with necessary measures *viz.,* CHP, piped conveyor belt system, SILO including Rapid Loading System, Merry-Go-Round[15], dust

[15] The Merry-Go-Round (MGR) system is a closed-circuit dedicated rail transportation system between the production and consumption points.

suppression by water sprinklers, mist blowers, mechanical brooming *etc.* Further, dust generation is to be minimised along coal / waste transportation roads and green belt is to be created around the source of dust.

4.6 Violation of guidelines

4.6.1 During the course of joint inspection of mines, we observed the following shortcomings in the implementation of the guidelines in 17 out of the 28 operating mines selected for scrutiny.

Table 06: Status of Implementation of CIL Guidelines in the mines of subsidiaries

Sl. No.	Parameter indicated in the Guidelines	Non-adherence observed		
		Subsidiary	Mines	Percentage (%) of mines that failed to adhere with reference to sampled mines [16]
1	Use of covered conveyer belt / system for transporting coal from mines to railway siding / washery for reducing air pollution	ECL	Sonepur Bazari, Kunustoria, Dabor and Jhanjra	80
		CCL	Rajrappa OCM	25
		MCL	Lingaraj and Bharatpur	50
		SECL	Gevra OCM	25
2	Use of silos for rapid and dust free loading of coal into wagons	ECL	Jhanjra and Sonepur Bazari.	40
3	Wetting of top surface of coal loaded trucks by sprinklers / mist sprays for dust suppression	WCL	Majri IIA, Penganga and Gokul mines	100
4	Use of fixed sprinkler for dust suppression at railway siding	ECL	Sonepur Bazari and Kunustoria	40
		CCL	Jarangdih railway siding of AKK OCM and Kathara OCM	50
		MCL	Lakhanpur and Basundhara (W)	50
5	Use of mechanical brooming / industrial cleaner to suppress dust	ECL	Rajmahal, Jhanjra, Sonepur Bazari, Kunustoria and Dabor	100
		CCL	Piparwar OCM	25
		WCL	Majri IIA, Penganga OC, and Gokul mines	100
		MCL	Bharatpur, Lakhanpur and Basundhara (W)	75
6	Plantation at railway siding / stockyard / approach roads to reduce air pollution	MCL	Lakhanpur and Basundhara (W)	50
		CCL	AKK OCM	25
		WCL	Penganga and Gokul mines	67

[16] BCCL=4, CCL= 4, ECL= 5, MCL= 4, NCL= 4, SECL= 4 and WCL=3.

Pic. 01: Para No. 4.6.1, Table No. 06, Sl. No. 01: Un-covered conveyor belt at CHP in Lingraj Mine of MCL

Pic. 02: Covered conveyor belt at CHP in Mungoli mine of WCL

Pic. 03: Para No. 4.6.1, Table No. 06, Sl. No. 04: Jarangdih Railway siding of CCL without fixed sprinklers

Pic. 04: Ghugus Railway siding of WCL with fixed sprinklers

As regards the reasons for various shortcomings in implementation of CIL guidelines, Audit observed the following:

- The old damaged GI sheets of the covered conveyor system of Lingaraj and Bharatpur mines of MCL required replacement. Damaged sprinklers of Lakhanpur mine of MCL was under repair and a proposal was initiated for fixed sprinkler at Basundhara (W). For suppression of dust in the mines of MCL, a proposal for filters required for road sweeper machine of Bharatpur had been initiated. The plantation along the railway siding at Basundhara(W) and Lakhanpur mines of MCL was at proposal stage.
- In Dabor and Kunustoria mines of ECL, being small in size, conveyer belt was not installed, although management assured that study would be made for construction of silos with conveyer belt system for catering such small mines at a

centralized place based on the road connectivity. Further, installation of silos (12 MTY) and conveyor belt system for rapid and dust free loading of coal was under process at Sonepur Bazari and Jhanjra mines of ECL. It was also observed that the project for construction of CHP with silo facility at Sonepur Bazari mines, conceived as early as in May 2013 did not materialise so far (November 2018) due to delay in finalizing technical and financial parameters and coal continued to be transported by road disregarding stipulations in the EC. Fixed sprinklers for dust suppression at railway sidings of Sonepur Bazari and Kunustoria mines of ECL were under construction and management assured that the possibility of provision of mechanical brooming in the coal mining area of ECL would be explored.

- In case of Rajrappa mine of CCL, the washery was in close proximity and hence transportation of coal from mine to washery through belt conveyor was not techno-economically feasible. Further, for dust suppression, water was sprinkled regularly through mobile water sprinklers at washery and sidings at AKK and Kathara mines of CCL and management assured that the suitability of mechanical brooming at Piparwar mine would be assessed based upon experience of other coal companies before its deployment in CCL. It was also observed that the subsidiary assured for three tier plantation at railway siding at AKK mine.
- In Gevra mine of SECL, departmental issues/site constraints were responsible for delay in commissioning of conveyor system.
- In WCL, coal transportation trucks were covered completely by tarpaulin and thus arrangement of wetting of top surface of coal loaded trucks by sprinklers for dust suppression did not exist in all the mines of WCL. For use of mechanical brooming/ industrial cleaner to suppress dust, three mechanical sweeping machines had been procured and deployed at Chandrapur, Wani North and Nagpur mines of WCL and procurement for other mines was under process. Three-tier plantation was under process at Penganga and Gokul mines of WCL.

The coal subsidiaries accepted (October/November 2018) the audit observations and stated that corrective actions would be taken.

4.6.2 While granting EC to Lakhanpur, Bharatpur and Basundhara (W) projects of MCL, MoEF&CC specified (July 2008, October 2008 and February 2013) that mist blower be commissioned. Further, MCL was to operationalise mist spray system of water for control of air borne dust at different loading and transportation points. We observed that MCL did not comply with these directives (November 2018) on the plea that the technology was the latest and that it did not have the expertise for procurement,

operation and maintenance of such machines. The reply is not tenable as the technology was adopted by WCL as early as in February 2015 and MCL could have replicated it. We further observed that considerable time (29 months) lapsed in evaluating the proposal of hiring *vis-a-vis* procurement, which was avoidable.

4.7 Delay in commissioning rapid loading system

Transportation of coal to consumers and from mine to washery / siding through piped conveyor and wagon loading through silo reduces dust pollution. There were shortcomings in adherence as detailed below:

4.7.1 While granting EC for the expansions of Piparwar OCM of CCL, the MoEF&CC stipulated (2007, 2012 and 2014) that a rapid loading system[17] (RLS) consisting of railway siding and silo be constructed with adequate dust suppression arrangements in a time bound manner so as to replace transportation of coal by road. We observed that although the silo was constructed in April 1997, the work relating to the railway siding was completed belatedly and the RLS was commissioned only in June 2018. The delay was attributed to delay in initiating the process of land acquisition for construction of the railway siding and lack of effective follow-up action by the Management with the State/District administrative authorities for physical possession of land.

Meanwhile, due to absence of RLS, coal was transported by road to Bachara siding (involving a distance of 10 kilometres) from Piparwar till June 2018. The mitigative measures put in place for handling air pollution were thus not commensurate to handle the level of pollution as the EMP of the project was based on the premise that coal would be transported by rail, while it was actually transported by road till June 2018.

4.8 Delay in firming up tender for capacity augmentation

4.8.1 Initially, Jayant project of NCL was sanctioned for 10 million tonne per year (MTY) capacity and accordingly CHP for the same capacity was in operation in the project. Later on, expansion of the project to the capacity of 15 MTY was approved (June 2008) by NCL Board. While according approval of expansion project, MoEF&CC stipulated (December 2008) that coal be transported by MGR with silo loading facility only. This necessitated construction of a new CHP of 5 MTY incremental capacity to match the production capacity of the mine. Madhya Pradesh Pollution Control Board (MPPCB), quoting National Green Tribunal (NGT) directives, directed (April 2016) NCL to discontinue coal transport by road. Notwithstanding these directives, quantities to the extent of 21 *per cent* and 23 *per cent* of its supply

[17] RLS(Rapid Loading System) is the facility used in the coal industry for quick loading of coal into the wagons/trucks.

were transported to Morwa siding by road during the years 2016-17 and 2017-18 respectively. We observed that NCL was forced to resort to road transport as the tender for capacity augmentation of CHP from 10 MTY to 15 MTY was cancelled (2012) on the plea that the quotations received were too low as compared to the estimated cost put to the tender. Subsequently, NCL Board approved (March 2016) the expansion of Jayant project to 25 MTY, leading to a gap of 15 MTY in the capacity of CHP as compared to the then existing capacity.

NCL stated (October 2018) that consequent to augmentation of mine capacity to 25 MTY, it was decided to construct CHP with a capacity to handle 25 MTY and that action was on hand to prepare tender documents for the same. However, delay of over six years (between 2012 and 2018) in firming up the tender was not justified and coal continued to be transported by road disregarding stipulations in the EC, thereby contributing to pollution.

4.9 Idling of infrastructural facilities

For minimizing air pollution, coal is to be transported by rail with silo as mandated in the EC issued by MoEF&CC to the projects from time to time. To minimise costs and to maximise benefits, it is imperative that idling of facilities created be avoided, by synchronizing the pace of progress of construction of silos with that of the progress of work relating to railway line. We observed the following shortcomings in project management which resulted in idling of facilities created at cost of ₹ 742.42 crore.

4.9.1 While granting EC for Gevra expansion project of SECL, MoEF&CC stipulated (June 2009) that the extracted coal be supplied by rail / MGR to consumers. Accordingly, work relating to railway siding with silo loading facility which was under execution by RITES Limited, was to be completed by July 2010. We observed that though construction of silo was completed belatedly in February 2016 at a cost of ₹ 138.85 crore, works relating to railway siding remained (November 2018) incomplete and, hence, coal produced from Gevra OCM continued to be transported through road, thereby contributing to dust generation.

SECL attributed (November 2018) the delay in completion of siding works to structural hindrances at site which impeded the progress of work and subsequent (August 2014) foreclosure of the contract subsisting between RITES and their contractor. SECL further stated that track laying work was completed by RITES and that fitness certificate from the Railways was awaited.

The Ministry stated (April 2019) that construction of conveyor belt, CHP and railway lines are major civil/electrical/mechanical work, which require considerable time and are also subject to unforeseen obstacles such as land acquisition issues, delay in

obtaining various clearances, law & order problem *etc*. The projects were constantly being reviewed involving all stakeholders to ensure early commissioning.

The replies of Management/ Ministry are not tenable as the above factors contributing to delays in project implementation are known facts and challenges prevailing in the coal mining sector. Due to ineffective project management, SECL took substantial time to dismantle structures such as siding office, canteen building, HT electric poles, workshop boundary, huge quantity of construction materials etc. which were required to be removed from the proposed railway alignment. This delayed the progress in completion of railway siding by 33 months (November 2018) since completion of construction of Silo in February 2016.

In the Exit Conference, the Ministry stated (May 2019) that the progress of projects was being monitored by them on regular basis and necessary steps would be taken to complete the pending projects expeditiously.

4.9.2 While granting EC for Lakhanpur and Lingaraj projects of MCL, MoEF&CC stipulated (May 2014 and November 2015) that coal transportation to consumers be made by rail so as to reduce the dust pollution. Coal transportation from mine to washery / siding was to be through piped conveyor and wagon loading through silo. MoEF&CC also directed that no road transportation of coal be resorted to after the stipulated period.

We observed that silos were not commissioned till November 2018 though these were mandated to be completed by December 2016 (Lingaraj) and December 2017 (Lakhanpur). We further observed that though the work relating to construction of silo was completed in Lingaraj mine at a cost of ₹ 227.42 crore, this could not be operationalised due to absence of railway connectivity. Further, the contract for construction of silos was not awarded for Lakhanpur mines. We also observed that though EC did not stipulate construction of silo at Bharatpur mines, MCL constructed (June 2017) silos at a cost of ₹ 165 crore. However, the facility could not be operationalised so far (November 2018) due to defective conveyor system and, consequently, coal continued to be transported by road, thereby contributing to pollution.

Pic. 05: Para No. 4.9.2: Idling of SILO at Lingaraj mine of MCL and resorting to road transportation.

MCL stated (October 2018) that actions would be taken for early commencement of silo. Further developments are awaited (November 2018).

4.9.3 EC relating to Block B mines of NCL stipulated (August 2014) that the road transport from mine to siding be discontinued from August 2016 and coal dispatch be made through Coal Handling Plant (CHP) / railway wagons with silo loading. We observed that CHP having a capacity to handle 3.5 MTPA was completed in January 2016 at a cost of ₹ 211.15 crore. However, coal could not be dispatched through CHP due to absence of rail connectivity and hence coal continued to be transported by road beyond August 2016, thereby contributing to air pollution.

NCL stated (October 2018) that laying of railway lines was held up due to opposition from local villagers demanding employment for land losers among them and that action was on hand for resolution of disputes. NCL further stated that the CHP was being used for crushing of coal. The reply is not tenable as land being an emotive issue, the consequences arising out of its acquisition and the demands of the land losers should have been addressed beforehand so as to ensure that the work relating to track laying remained synchronous with the pace of progress of construction of silos / CHP, so as to utilise the facility for the intended purpose.

Audit Summation

Air quality monitoring in three subsidiaries of CIL was found deficient as against 96 monitoring stations, only 58 were established. Further, 12 mines of four subsidiaries did not comply the SPCB directives for installation of Continuous Ambient Air Quality Monitoring Stations to facilitate online monitoring of ambient air quality. The average ash content in the coal extracted from some of the mines of Mahanadi Coalfields Limited (MCL) was more than 34 *per cent* and the same was supplied to various consumers. Although MCL contemplated setting of four washeries as early as in March 2008 for supply of beneficiated coal to thermal plants, these have not been commissioned so far. The concentration of PM_{10} and $PM_{2.5}$ in air exceeded the levels prescribed in NAAQS in six mines across three subsidiaries during 2013-18. Shortcomings were noticed in the implementation of prescribed CIL guidelines (March 2014), in 17 out of the 28 operating mines selected for scrutiny. Due to delay in commissioning of rapid loading system in CCL, firming up tender for capacity augmentation of CHP at NCL, idle infrastructure on construction of railway siding/silo at SECL, MCL and NCL, coal continued to be transported by road, thereby contributing to air pollution.

CHAPTER 5

WATER POLLUTION & CONTROL MEASURES

Mining is likely to have significant effects on ground water as well as surface water. Mining operations can both contaminate and cause severe physical dislocation of aquifers.

The major source of water pollution in coal mines is the suspended solids in the drainage system of mine water[18] and storm water[19]. In some coal mines, the mine water is acidic due to the presence of sulphur / pyrites / pyritic compounds. Effluent from washeries and coal preparation plants generally contain fine coal particles, suspended solids, washery medium, reagents *etc*. and sometimes oil and grease. In Heavy Earth Moving Machineries (HEMM) and light vehicles workshops, the workshop floors mix oil and oily matter into water along with dirt that is being washed. Besides, the sewage from residential complexes contaminates water mainly with organic matter.

To mitigate water pollution caused by mining activities, measures such as installation of water treatment plants (Effluent Treatment Plant or ETP) for eliminating pollutants from mine water as well as storm water and discharge from the workshops, installation of Sewage Treatment Plant (STP) for treatment of effluents from the residential colonies of the mines were adopted.

5.1 Excessive levels of pollutants

Bureau of Indian Standards (BIS) prescribed (May 2012) the maximum levels of water pollutants in mine water which is subsequently used for drinking and other purposes after treatment.

We observed that during 2013-18, out of 28 mines selected for audit scrutiny, in eight mines across three subsidiaries, *viz.*, BCCL (one[20]), CCL (four[21]) and MCL (three[22]) the pollutants exceeded the prescribed limits as detailed below.

[18] Mine water is water that collects in a mine and which has to be brought to the surface by water treatment method in order to enable the mine to continue working.
[19] Storm water is surface water in abnormal quantity resulting from heavy falls of rain or snow.
[20] DBOCP
[21] Rajrappa (including washery), Piparwar, Kathara and AKK
[22] Lakhanpur, Bharatpur and Basundhara (West)

Table 07: Levels of water pollutant in Subsidiaries

Potable water

Parameter	Unit	Maximum prescribed level	Actual level (Range)	Mines where pollutants exceed the limits
Turbidity	NTU[23]	5	7-15	Lakhanpur, Bharatpur and Basundhara (W) mines of MCL
Total Coli form / Faecal Coli form	mg/litre[24]	0.0	1.8-22	
Cadmium	mg/litre	0.003	0.05	
Manganese	mg/litre	0.3	0.31-0.94	
PH	Hydrogen ions/ litre	6.5-8.5	4.04-8.76	
Biochemical Oxygen Demand	mg/litre	3	3.1-20	
Total Chromium	mg/litre	0.05	0.06-0.36	
Calcium	mg/litre	75	76.8-179	Rajrappa, Piparwar, Kathara and AKK mines of CCL
Alkalinity	mg/litre	200	220- 420	
Total dissolved solids (TDS)	mg/litre	500	512-1860	
Total Hardness	mg/litre	200	236- 744	

Source: CMPDIL monthly monitoring reports.

Effluent water

Parameter	Unit	Maximum prescribed level	Actual level (Range)	Mines where pollutants exceed the limits
Chemical Oxygen Demand (COD)	mg/litre	250	300-980	Rajrappa, Piparwar, Kathara and AKK mines of CCL
Oil and grease	mg/litre	10	12-16	
Total Suspended Solids (TSS)	mg/litre	100	104-12628	
			138-142	DBOCP of BCCL

Source: CMPDIL monthly monitoring reports.

Although MCL claimed (October 2018) that corrective measures were taken, the level of pollutants exceeded the prescribed limits successively during 2013-18. CCL attributed the pollutants in excess of the prescribed limits in potable water to geological deposits and stated (October 2018) that effluent management system would be further strengthened. Further developments are awaited (November 2018). BCCL stated (November 2018) that currently pollution level is under control.

5.2 Zero discharge of water

5.2.1 As per the directives of Odisha State Pollution Control Board (OSPCB), zero discharge of untreated water was to be ensured by March 2016. We observed that during 2013-18, 62 lakh KL of untreated water was discharged in nearby water bodies

[23] Nephelometric Turbidity Units
[24] Milligram per litre

by Lakhanpur (2.95 lakh KL) and Basundhara (W) mines (59.05 lakh KL) of MCL thereby contaminating ground water, disregarding the conditions stipulated in EC and the directives of OSPCB.

MCL stated (October 2018) that remedial measures for adherence of zero discharge in these mines were under consideration. The reply is not tenable as we observed that the proposal was only under conceptual stage despite lapse of over 30 months since the date fixed for completion.

5.3 Treatment of acidic mine water

While according EC for Block-B expansion project (5.47 MTPA) of NCL, MoEF&CC stipulated (August 2014) that acidic mine water be treated and the progress thereof be intimated. NCL was also directed by MoEF&CC to implement the acid mine treatment based on report of IIT, Bombay. Further NEERI was to monitor the implementation of acid mine water treatment in the mine and also assess the impact of acid mine water on the nearby villages. NCL engaged (October 2014) CMPDIL for evaluation of the impact of acidity. CMPDIL recommended (March 2017) utilization of the OB materials from the dumps for filling up the mine pits in order to prevent the pyritic material from getting exposed to oxygen and moisture thereby preventing the formation of Acid Mine Drainage. However, no action was taken on these recommendations on the plea that modalities of permitting National Thermal Power Corporation (NTPC) for ash filling in Gorbi mines was under finalization as discussed in paras 7.1.2.1 and 7.1.2.2 *infra*.

NCL stated (October 2018) that the mine voids of abandoned Gorbi mines were identified for fly ash filling and filling of overburden from Block-B mine. We observed that the MOU was concluded with NTPC only in January 2019, though CMPDIL recommended the course of action to be adopted as early as in March 2017. The delay of over 21 months was thus avoidable.

5.4 Drainage of excess mine water

Council of Scientific & Industrial Research in collaboration with Central Institute of Mining and Fuel Research (CSIR-CIMFR), Dhanbad supplied, installed and commissioned (November 2014) a pilot plant with capacity to produce 4000 litres potable water per hour from waste mine water, at BCCL. CIL intimated (January 2016) MCL that with a view to providing treated water to the villages for drinking purpose from the surrounding underground mines, a detailed study be conducted so as to standardise the mechanism for utilization of excess mine water and directed MCL to identify the areas where this technology could be implemented. MCL identified

(November 2016 / May 2017) six locations in two[25] areas for implementation. The local administration of these areas was to operate and maintain these plants and distribute the water to the beneficiaries. BoD of MCL directed (January 2018) that CSIR-CIMFR be engaged for preparation of detailed project report for one project on pilot basis and the proposal be resubmitted along with the consent letters from the local administration for operation and maintenance of the plants. We observed abnormal delay ranging between 10 and 16 months in identifying the locations and eight months thereafter in referring the proposal to the BoD. The project is yet to take off (November 2018).

MCL stated (October 2018) that the matter would be pursued with the local administration for concluding Memorandum of Understanding (MoU) for operation and maintenance of the plant. Meanwhile, 51.10 lakh KL[26] of surplus mine water remains untapped and is discharged as waste annually.

5.5 Effluent management system at workshop

5.5.1 In its guidelines, CIL stipulated (March 2014) that the treatment plants of workshop re-circulate the treated water for washing purpose, duly adhering to zero discharge concept *i.e.*, reused within the workshop. We observed that facility at workshops of Dabor and Sonepur Bazari of ECL suffered from the following shortcomings, thereby impeding the process of water treatment.

Table 8: Status of Effluent Management System at Workshops of ECL

Sl. No.	Shortcomings	Workshops of	Indicative of
1.	Existence of weeds in HEMM washing facility	Dabor	Lying unutilised for the entire monsoon season
2.	Choked drains and chambers of HEMM washing facility resulting in overflow of sludge	Sonepur Bazari	Poor maintenance

Pic. 06: Para No. 5.5.1 (Sl. No. 01): Existence of weeds in HEMM washing facility at Dabor, ECL

Pic. 07: Para No. 5.5.1 (Sl. No. 02): Choked drains and chambers of HEMM washing facility at Sonepur Bazari, ECL, resulting in overflow of sludge

[25] Four in Orient Area and two in Talcher Area.
[26] 14000 KL/day x 365 days

ECL stated (November 2018) that weeds outgrew at the HEMM washing facility at Dabor during monsoon season and that the drains and chamber of HEMM washing facility were maintained regularly. While accumulation of weeds is a pointer to absence of plan of action in place to ensure proper maintenance during monsoon season, records indicating the periodicity of actual cleaning vis-à-vis planned, were not maintained and hence the ECL's claims as regards regular maintenance was not susceptible to verification.

5.6 Sewage Treatment Plant

Sewage Treatment Plant (STP) cleans the effluents from the sewage water of the residential colonies of the mines so that it can be recycled before releasing it back to the environment. While according EC for projects from time to time, MoEF&CC stipulated that STP be installed in the following residential colonies of the collieries. We observed that the subsidiaries did not install STP, thereby contaminating the ground water as detailed below:

Table 9: Non-installation of STP in residential colonies of subsidiaries

Sl. No.	Subsidiary	Location where STP was not installed
1	CCL	Residential colonies of Piparwar, Kathara and AKK mines
2	ECL	Residential colonies of Dabor, Kunustoria, Jhanjra and Sonepur Bazari mines
3	MCL	Residential colonies of Lingaraj and Basundhara mines
4	NCL	Residential colonies of Block B mine
5	SECL	Residential colonies of Rajendra mine
6	WCL	Residential colonies of Majri II A , Gokul and Penganga mines

We also observed that the STP installed at Lakhanpur mines of MCL was inoperative since May 2008. MCL issued work order only in August 2018 (after a delay of 10 years) for its rectification at a cost of ₹ 98.38 lakh. The work is still to be completed (November 2018). Meanwhile, the sewage water remained untreated.

The subsidiaries stated (October / November 2018) that their residential colonies at mines were equipped with soak pit and septic tanks and that action was on hand to install STPs. We further observed that although MPCB forfeited the BG amounting to ₹ 10.00 lakh in June 2013, STP was constructed in the residential colony of Umrer mines of WCL only in August 2018, involving a delay of 62 months.

The fact remains that delay in installation of STPs by the subsidiaries, exposed the ground water to contamination.

5.7 Pollution in water bodies

5.7.1 We observed that due to absence of mechanical brooming / industrial cleaner **i**n Piparwar OCM, as discussed in para 4.6.1 *supra*, the spillage from overloaded trucks / dumpers accumulated along the sides of the bridge of Safi River. As the spillage was not cleaned periodically, these eventually drained into the river thereby contaminating the river water.

CCL stated (November 2018) that the deployment of mechanical booming / industrial cleaner would be explored. Further developments are awaited (November 2018).

Pic. 08: Para No. 5.7.1: Spillage from overloaded trucks coal accumulated along the sides of the bridge of Safi River at Piparwar OCM of CCL

5.7.2 . We further observed that the rejects of Kathara washery of CCL was found to be contaminating Damodar River as discussed in para no. 7.3.1.1 *infra.*

Pic. 09: Para No. 5.7.2: Rejects of Kathara washery of CCL contaminating Damodar River

In the Exit Conference, CCL stated (November 2018) that action would be initiated to prevent contamination.

5.7.3 EC relating to cluster of DBOCP of BCCL stipulated (February 2013) that no OB was to be dumped near water bodies and rivers and a safety barrier of at least 60 metres be maintained along the water bodies to avoid their contamination with mine waste.

We observed that OB was dumped on the bank of Khudia river without maintaining the minimum distance, thereby contaminating the river. BCCL stated (November 2018)

that action was on hand for construction of toe wall / stone pitching. Further developments are awaited (November 2018).

Pic. 10: Para No.5.7.3: OB dumped on the bank of Khudia river

5.8 Non-adherence to guidelines of Central Ground Water Authority

5.8.1 In accordance with guidelines issued by Central Ground Water Authority (CGWA), industries / infrastructure / mining projects were required to obtain NOC for the use of ground water. We observed that CCL (Piparwar OCM), BCCL (DBOCP, Kuya, Moonidih UG and Putki Balihari mines) and SECL (Baroud, Gevra and Rajendra mines) continued to use ground water for their mining operations without obtaining NOC from CGWA.

BCCL stated (November 2018) that application for NOC was submitted in off-line mode (February 2013, June 2015 and January 2017) to CGWA and that follow-up action was initiated for submission of application in on-line mode, based on proposals prepared by CMPDIL in March 2018. SECL also stated (November 2018) that application was submitted through on-line mode and that NOC was awaited. In the Exit Conference, CCL agreed (November 2018) to initiate corrective action. Meanwhile, ground water continued to be used without authorization.

5.9 Mercury content

Mercury is one of the natural and harmful components of coal. Central Pollution Control Board (CPCB) recommended (February 2013) that:

- mercury levels be analysed in all coal seam samples of all the projects of NCL on annual basis through Indian Institute of Technology, Banaras Hindu University (IIT BHU) / IIT Kanpur
- mercury level be analysed in blood samples of its employees to generate a data bank and

- a study be conducted through Indian Medical Council for assessing the impact of mercury pollution on the population of the Singrauli region within a radius of 15 km area.

We observed that NCL did not get the coal seam samples analysed for mercury content on annual basis. It engaged Indian Institute of Technology, Banaras Hindu University (IIT, BHU) in July 2013 and Indian School of Mines, Dhanbad (ISM) in June 2016, leaving the intervening spell (June 2014 to May 2016) bereft of analysis. Further, National Institute of Occupational Health, Ahmedabad reported (June 2016) that the level of mercury in 6.8 *per cent* and 8 *per cent* of the samples drawn from the mining group and the residence group respectively, exceeded the permissible limits. ISM also reported (November 2016) that the level of mercury was abnormally high and that it ranged between 13.729 mg / kg and 24.936 mg / kg (against the permissible limit of 0.005 mg / kg) in 22 coal samples. ISM reaffirmed (October 2017) that the results reported were true. Yet, NCL referred (November 2018) these samples to IIT BHU for retesting, the results of which were awaited (March 2019). We also observed that no analysis of coal seam samples was made beyond June 2016, thereby, thwarting the remedial measures of occupational health and safety.

5.10 Threat of Subsidence

Mining operations in Deulbera of MCL which commenced in 1926, was discontinued since July 2006 due to threat of surface water. Four panels having inadequate cover between 18.5 metres and 50 metres were identified for complete stabilization of the water on priority basis. The surface area above the identified panels was stated to pose danger to structures due to subsidence of strata that could take place in future. Sand stowing to the extent of 3.30 lakh cum was required for stabilization. Sand stowing was discontinued in 2016 after stowing to the extent of 1.02 lakh cum on the plea that its sand mining lease period expired and its renewal / compliance with formalities would take considerable time. As the period of lease is pre-determined, MCL should have initiated advance action either for its renewal or for locating alternative sources, more specifically since it was known beforehand that renewal/compliance with formalities for alternative sources would take considerable time.

MCL stated (October 2018) that hydro-pneumatic method of stowing was presently under execution. We further observed that against the residual quantity of 2.28 lakh cum of sand stowing to be completed to mitigate the threat of subsidence, stowing was carried out only to the extent of 2852 cum. The threat of subsidence, therefore, remained unmitigated (November 2018).

Audit Summation

The pollutants exceeded the limits prescribed by Bureau of Indian Standards (BIS) in eight mines across three subsidiaries. Further, during 2013-18, 62 lakh Kilo-litre (KL) of untreated water was discharged to nearby water bodies by Lakhanpur and Basundhara (W) mines of MCL thereby contaminating ground water. CCL, BCCL and SECL continued to use ground water for their mining operations without obtaining No Objection Certificate from Central Ground Water Authority. The subsidiaries did not install Sewage Treatment Plant at the residential colonies of the collieries, thereby contaminating the ground water. Due to absence of mechanical brooming / industrial cleaner **i**n Piparwar OCM of CCL, the spillage from overloaded trucks / dumpers accumulated along the sides of the bridge of Safi River, was not cleaned periodically. These eventually drained into the river thereby contaminating the river water. Further, rejects of Kathara washery of CCL was found to be contaminating Damodar River. NCL did not get the coal seam samples analysed for mercury content on annual basis. Further, no analysis of coal seam samples was made beyond June 2016, thereby, thwarting the remedial measures of occupational health and safety.

CHAPTER 6

LAND MANAGEMENT - MITIGATION OF LAND DEGRADATION AND RECLAMATION

Mining involves forest land, Government non-forest land and tenancy or private land for its developmental as well as operational activities. During exploitation, land degradation due to change in land use takes place. An external dump is created to accommodate OB removed to extract coal and is accumulated till internal dumping or backfilling commences.

The process of land management includes top soil management, technical reclamation of external OB dump, internal dump / backfilled area, management of void left after completion of extraction, technical reclamation of subsidence due to UG mining, plantation *i.e.,* biological reclamation of technically reclaimed dumps and monitoring progress of reclamation by satellite surveillance.

6.1 Topsoil management

Topsoil is the upper and outer most layer of soil, usually the top 5 cm to 20 cm. It has the highest concentration of organic matter and microorganisms wherein most of the earth's biological soil activity occurs. It takes approximately 1000 years for one inch of topsoil deposit to be formed. The topsoil also contains a range of nutrients and trace elements essential to plant growth and may also contain native seeds that are concentrated in the top 50 mm of the soil profile. In order to re-establish of native species, the thin layer of top soil needs to be removed during excavation of coal in the OCM, stacked separately and preserved carefully for beneficial soil organisms and future vegetation. However, the duration of stockpiling needs to be minimised since excessive time of storage could cause structural degradation, death of seeds and micro-organisms, especially when soil moisture content is high.

Considering the time taken to generate and the importance of topsoil, MoEF&CC stipulated that topsoil be stacked at earmarked specific sites with adequate measures to preserve and be used either concurrently for backfilling or as top layer for reclamation of mined out areas. A record of topsoil indicating the area of stacking along with the date was to be maintained. The stipulations did not exempt the subsidiaries from maintaining the records related to topsoil, notwithstanding the fact that topsoil was either used concurrently for backfilling or the inventory of topsoil that existed was minimum.

6.1.1 We observed that out of 23 OC/mixed mines selected for detailed scrutiny, in 13 mines across five subsidiaries, as detailed below, though topsoil was stacked in the earmarked area and reported periodically, basic records of topsoil indicating the quantity and areas of stacking were not maintained:

Table 10: Non-maintenance of records of Top Soil in the mines of subsidiaries

Sl. No.	Subsidiary	Mines where records were not maintained.
1	BCCL	Kuya and Dahibari Basantimata
2	CCL	Piparwar OCM, Rajrappa OCM, Kathara OCM and AKK OCM
3	ECL	Dabor, Rajmahal and Sonepur Bazari
4	NCL	Nigahi (till March 2014) and Khadia
5	SECL	Gevra OCM and Kusmunda OCM.

The subsidiaries accepted (October/November 2018) the audit observation and agreed to take remedial action. Further developments are awaited (March 2019).

In the C&AG's Performance Audit Report No. 9 of 2011-12, it was recommended that proper records of topsoil storage and use should be maintained.

6.1.2 We also observed that as at the end of March 2018, in three mines of WCL although 75.30 lakh cum of topsoil was stacked at earmarked sites, it remained unutilised since 2013-14. Further leguminous plants were not planted on it to retain / improve the nitrogen content in the topsoil as recommended (August 2000) by Indian Bureau of Mines.

6.1.3 We also observed that out of 9.69 lakh cum of topsoil generated during 2013-18 by three[27] mines of NCL, top soil actually used was 5.79 lakh cum (60 *per cent)* as detailed below.

Table 11: Utilization of Top Soil in NCL

Year	Quantity in lakh cubic metre (cum)		Percentage of utilization
	removed	utilised	
2013-14	0.84	0.59	70.24
2014-15	1.55	0.71	45.81
2015-16	2.05	1.13	55.12
2016-17	2.30	0.96	41.74
2017-18	2.95	2.40	81.36
Total	**9.69**	**5.79**	**59.75**

We further observed that as at the end of March 2018, 4.95 lakh cum[28] of top soil remained accumulated which is indicative of the fact that these were not being utilised concurrently as envisaged (para 6.1), thereby exposing its quality to deteriorate.

While accepting (November 2018) the accumulation of top soil, NCL's reply was silent as regards its concurrent use.

[27] Nigahi, Jayant and Block B

[28] 1.05 lakh cum (opening balance) + 9.69 lakh cum (generation) - 5.79 lakh cum (utilisation)

6.2 Non-adherence to norms relating to OB dump

In open cast mining method of coal extraction, benching[29] is to be made for coal seam and the OB with extraction of coal, as specified in the Coal Mines Regulations, 1957 (Regulation). The Regulations prescribe the maximum height and breadth of the OB dump to be maintained in the mines. Further, the conditions for maintenance of slope of OB dump are also affirmed by MoEF&CC from time to time through the EIA-EMP of the projects.

Audit test checked the records relating to OB dumps in the sample OC mines and observed the following:

6.2.1 A fatal accident occurred (December 2016) in Dahar Nangi patch of Rajmahal OCP of ECL wherein OB slid down due to failing of the floor burying 12 tippers, 6 excavators and 23 workmen in the process. This resulted in not only loss of 23 lives but also stoppage of production in the affected patch. Director General of Mines Safety (DGMS) suspended (June 2017) operations in this patch on the plea that the benches in coal II and III seams did not conform to the norms regarding height of the bench, specified in the Regulations.

The work relating to removal of OB and extraction of coal in Sonepur Bazari mines was entrusted (October 2014) to a contractor[30]. The scope of work awarded to the contractor included benching the OB in accordance with the prescribed norms. The Engineer–in–charge (EIC) of mines was to exercise general superintendence over the work of the contractor. We observed that DGMS suspended (January 2017) operations in Quarry 3 of Sonepur Bazari OCP also on the plea that the height of the benches of R-VIII coal seam deviated from the regulations. The findings of DGMS are indicative of defective monitoring.

Consequently, ECL had to resort to unscheduled production in other patches of Rajmahal and Sonepur Bazari OCP so as to recoup 37.92 lakh tonnes of coal (Rajmahal 26.25 lakh tonnes[31] and Sonepur Bazari 11.67 lakh tonnes) up to March 2018.

ECL attributed (November 2018) the failure of OB dumps at Rajmahal to absence of adequate land and reluctance of villagers to handover physical possession of their land, though notified under CBA Act. However, the reply was silent as regards failure to conform to the prescribed norms of benching in Sonepur Bazari. We also observed that ECL did not resume operations relating to extraction of coal in these patches so far (November 2018), implying that the suspension of operations remained in force.

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[29] Benching: A method of working small quarries or open pits in steps or benches.

[30] M/s. International Commerce Limited (ICL)

[31] 1.25 lakh te for the period from December 2016 to March 2017 and 25.00 lakh te during the year 2017-18

6.3 Plantation for green cover

Biological reclamation by way of broadcasting of grass seeds and plantation / afforestation was to be undertaken for stabilization of OB dumps against erosion and to put the land to best use. Tree plantation was to be taken up on external OB dumps and on back filled / internal dump areas including terraced slope, vacant land and avenue plantation as a remedial measure to mitigate air and noise pollution. CIL guidelines prescribed a green cover of at least one-third of the mining area. EC accorded to the mines and the related EIA-EMP envisaged developing heterogeneous mix of forest with local species having combined properties like medicinal, timber yielding and fruit bearing, so as to ensure perennial green cover and high survival rate.

6.3.1 Audit observed that there was no uniform strategy among subsidiaries for biological reclamation of mined out area through plantation activities as detailed below.

- ECL did not set year-wise internal targets for itself. As against 491.23 hectares (ha) of land technically reclaimed during 2013-18, the extent of land biologically reclaimed during the same period was 368.43 ha, leaving an accumulated area of 122.80 ha still to be biologically reclaimed as at the end of March 2018. We observed that during 2013-18, no plantation was undertaken in three[32] mines and the green cover in Rajmahal constituted less than one-third of mine area.
- Against the de–coaled area of 3922.85 ha, MCL biologically reclaimed only 2024.73 ha (51.61 *per cent*) as at the end of March 2018. No target was fixed for plantation during 2013-14 and hence no plantation was undertaken during that year. The details of consolidated internal target fixed for biological reclamation of de-coaled land by way of plantation and actual achievement there against by MCL during 2014-18 is furnished in **Annexure – I.**
- The actual achievement of plantation of saplings as compared to the internal target ranged between 47.16 *per cent* (2014-15) and 149.17 *per cent* (2015-16) during the four years ended March 2018. MCL could reflect better achievement in 2015-16 only due to reduction in target for that year, for which no reasons were found on record.
- We observed that out of 7.01 lakh saplings planted during 2014-18, 0.42 lakh saplings (6 *per cent*) were destroyed due to avoidable reasons such as fire, road widening, OB dumping and dump slide, which is indicative of the fact that these were not nurtured to their finality.

[32] Dabor, Rajmahal and Kunustoria

- No target for biological reclamation was fixed for Jayant OCP of NCL during 2013-18. The mine-wise targets fixed for biological reclamation for Nigahi, Block-B and Khadia mines of NCL for the period from 2013-18 is also furnished in **Annexure – I.** We observed that in these mines, the actual achievement of biological reclamation both in terms of area and in terms of number of plants fell short of targets and ranged from 29 *per cent* to 75 *per cent* (area) and from 22 *per cent* to 65 *per cent* (plants) respectively.

  NCL stated (October 2018) that targets were fixed based on projected technical reclamation, which could not be achieved due to frequent dragline[33] failure, less utilization of existing dumpers on account of shortage of tyres and inadequate logistics capacity to handle the excavated muck. The reply is not tenable as these were avoidable and no action was initiated to overcome these constraints. We also observed that NCL did not take up three tier avenue plantation as stipulated in the EC due to space constraint, which is pointer to defective planning.

6.3.2 We further observed the following deviations from the stipulations in EIA-EMP as regards plantations in the mines of three subsidiaries:

Table 12: Details of deviations regarding plantation in the mines of subsidiaries

Sl. No.	As prescribed in EIA-EMP/EC	Deviation observed	Subsidiary	Mines
1	Plantation to be done on OB dumps	No plantation cover on the OB dumps.	CCL	Kathara OCP & Khansmahal mines of AKK OCP
2	Three tier green belt plantation cover with combination of fast and slow growing species was to be developed along both sides of the roads and railway siding	No three tier green belt plantation was observed.	CCL	AKK OCM, platform 1 and 2 of Jarangdih Railway Siding (Kathara OCM) and Kargali washery (AKK OCM) respectively
			WCL	Gokul OC, Majri II A OC and Penganga OC
3	Plantation of varieties of native species including herb, shrubs and climbers under social forestry and natural vegetation in core and buffer zones.	Plantation confined only to two varieties of species	CCL	Piparwar OCM, Rajrappa OCM, Kathara OCM and AKK OCM
		Records maintained indicated that plantation did not include herbs, shrubs and climbers	ECL	Sonepur Bazari and Jhanjra
			WCL	New Majri IIA OC and New Majri UG to OC.
4	Plantation along the river banks to be done to avoid soil erosion.	No plantation cover along river banks.	CCL	Piparwar OCM and Kathara OCM

[33] Dragline is a Heavy Earth Moving Machinery used for removal of OB in the OC mine.

There was also no mechanism to monitor and ensure survival of the existing plantations in mines of CCL.

While shifting the onus of survival of the plantations on the State Forest department, CCL stated (November 2018) that further improvements would be made in its plantation activities. Further developments are awaited (November 2018).

WCL stated (November 2018) that three tier plantation was in the process and further plantation would be done gradually.

ECL stated (November 2018) that plantation was being carried out by State Forest Department and they plant native species as per their norms. However, the fact remains that these did not conform to the stipulations of EIA-EMP.

Pic. 11: Para No. 6.3.2, Table No. 14, Sl. No. 01: OB dumps without Plantation at Kathara OCP of CCL

Pic. 12: Plantation on OB dump at Jayant OCP of NCL

Audit Summation

In 13 mines across five subsidiaries, though topsoil was stacked in the earmarked area and reported periodically, basic records of topsoil indicating the quantity and areas of stacking were not maintained. As at the end of March 2018, in three mines of WCL, although 75.30 lakh cum of topsoil was stacked at earmarked sites, it remained unutilised since 2013-14. Audit also observed that Director General of Mines Safety suspended (June 2017) operations in a patch of Rajmahal OCP of ECL as the Overburden (OB) benches in coal II and III seams did not conform to the norms specified in the Regulations. DGMS suspended (January 2017) operations in Quarry 3 of Sonepur Bazari OCP also as the height of the benches of R-VIII coal seam deviated from the Regulation. Further, ECL did not set year-wise internal targets for biological reclamation of mined out area through plantation activities. Against the de-coaled area of 3922.85 ha, MCL biologically reclaimed only 2024.73 ha (51.61 *per cent*) as at the end of March 2018.

CHAPTER 7

ADHERENCE TO OTHER REGULATORY CONDITIONS FOR PROTECTION OF ENVIRONMENT

Mining companies are required to follow various rules, regulations and guidelines for mine closure activities, fly ash dumping, use of hazardous wastes, corporate social responsibility and directives of State Pollution Control Boards issued from time to time.

7.1 Closed Mines

There is a need for closure of mine on completion of the process of economical extraction as mining deposits are exhausted. Planning for mine closure is necessary and is to be done systematically so as to ensure safety, post closure monitoring, control of safety hazards, decommissioning of infrastructure, closure of entries to the mine, management of final voids, reclamation of vegetation / forest, financial aspects and closure costs.

A proper mine closure plan aims at leaving the area safe and not as a burden to the society, ensuring that it is a source of sustainable livelihood of local community in a self-sustaining ecosystem.

Audit test checked the records relating to closed mines and observed the following:

7.1.1 Mine Closure Status Reports

GoI issued (August 2009) guidelines for preparation of Mine Closure Plan (MCP) and stipulated that all coal mine owners, operating the mines without the approval of MCP, obtain approved MCP within a period of one year there from (by August 2010) or two years in advance of mine closure, whichever was earlier. For mines closed prior to August 2009, CIL stipulated (November 2016) that mine closure status reports (MCSR) be prepared.

We observed that for 35 mines of ECL (**Annexure – II**) which were closed between April 1946 and July 2009 (including six mines which were closed prior to nationalization), it did not prepare (November 2018) MCSR.

ECL stated (November 2018) that work relating to MCSR was assigned to CMPDIL in May 2018. No reason was found on record for the delay in entrustment of the work to CMPDIL.

7.1.2 Escrow account for mine closure expenses

For financial assurance of mine closure expenses, an escrow account was to be opened by the subsidiary with a scheduled bank in consultation with the Coal Controller Organization (CCO) and money equivalent to the expenses to be covered periodically, be deposited at prescribed rates. Up to 80 *per cent* of the total amount deposited including interest accrued in the escrow account or the expenditure incurred towards progressive mine closure in the past five years, whichever is less, could be claimed from CCO towards reimbursement of mine closure expenses.

7.1.2.1 Gorbi mines of NCL was declared (July 1997) as abandoned due to the exhaustion of coal reserve. MCP prepared (November 2008) by CMPDIL and approved (April 2010) by the BoD of NCL, projected the mine closure expenses to be ₹ 23.00 crore. However, no action was initiated by NCL for mine closure on the plea that National Green Tribunal (NGT) raised the issue of providing an old / abandoned mining pit to NTPC for fly ash dumping. The inaction was not justified as we observed that the matter under consideration by NGT did not prevent NCL to undertake mine closure activities at Gorbi mines.

7.1.2.2 In accordance with the Guidelines issued (January 2013) by the Ministry, final MCP along with the details of the updated cost estimates for various mine closure activities and the amount deposited in the Escrow Account was to be submitted to the Ministry, at least five years before the intended final closure of mine.

The projected life of Jhingurdah and Kakri mines of NCL lapsed during 2015-16. Yet 18.25 million tonnes (MT) of residual coal reserves were estimated in Jhingurdah (8.24 MT) and Kakri (10.01 MT) mines. This required OB removal to the extent of 53.77 million cum in Jhingurdah (39.02 million cum) and Kakri (14.75 million cum). The filling of mine void is thus necessitated, thereby entailing revision of MCP originally approved.

NCL stated (October 2018) that MCP of Jhingurdah project was updated. We observed that while MCP relating to Jhingurdah project was updated, NCL did not update the MCP relating to Kakri project. Further NCL did not deposit the additional amounts relating to mine closure expenses of these projects in the escrow account so far (October 2018).

7.1.2.3 We also observed that NCL did not conclude MoU with NTPC till January 2019 for utilizing the abandoned mine void of Gorbi mines for fly ash dumping as discussed in para 7.1.3.1 *infra.* Meanwhile, delay in firming up the decision as regards mine closure resulted in escalation of mine closure expenses to ₹ 33.44 crore, imposing additional burden to the extent of ₹ 10.44 crore. We further observed that NCL did not earmark this additional amount required for mine closure.

NCL stated (October 2018) that with the proposed fly ash dumping by NTPC in mine voids, the incremental amount for mine closure may not be required. The reply is not tenable as it is merely speculative and does not factor in time value of mine closure cost, which was originally estimated by CMPDIL as early as in November 2008.

7.1.2.4 Against amounts deposited by MCL towards mine closure expenses into the designated escrow account in various tranches from time to time, claims amounting to ₹ 220.39 crore relating to eight mines[34] were pending settlement as at the end of March 2018. Of this, claims amounting to ₹ 1.93 crore were pending with CCO as at the end of March 2018. We observed that out of the residual amount of ₹ 218.46 crore, claims amounting to ₹ 67.21 crore was preferred by MCL with CCO during September-December 2018, while claims amounting to ₹ 151.25 crore were yet to be forwarded by CMPDIL to CCO for settlement and these were pending for want of related audit reports.

7.1.3 Ecological restoration of closed mine

A plan for the ecological restoration of the mined out area and for land use was to be prepared with details of cost involved. The ToR of MoEF&CC for preparation of EIA-EMP of the clusters / mines stipulated that the abandoned quarries / mined out pits / voids relating to pre-nationalization period be properly backfilled and biologically reclaimed. Filling of mine voids with fly ash has been considered as one of the viable options to the coal companies. Fly ash in bulk quantity can be utilised in stowing of underground mines in lieu of sand and filling up abandoned open cast mine voids. These results in higher percentage of utilization of fly ash generated which is otherwise a major pollutant.

Fly ash dumping

7.1.3.1 MOC identified (November 2016) Gorbi mine of NCL for fly ash dumping. Vindhyachal Super Thermal Power Station, a unit of NTPC expressed (January 2017) its interest to conclude MoU with NCL for utilizing the abandoned mine void of Gorbi mines for fly ash dumping. The Core committee of the National Green Tribunal (NGT) directed (January 2017) NCL to provide closed Gorbi mine to NTPC for fly ash dumping and to complete the process of signing of MOU with NTPC within one month i.e. by February 2017. While evaluating the proposal, DGMS observed (January 2017) that safety of operations needed to be exercised and scientific study along with necessary statutory clearances were required to be obtained from MoEF before commencement of the ash dumping by the NTPC. We observed that NCL concluded

[34] Bhubaneswari OCP, Samaleswari OCP, Lakhanpur OCP, Talchar UG, Mandira UG, Belpahari OCM, Lilari OCP and Jagannath OCP

MoU with NTPC only in January 2019 after lapse of 24 months. By virtue of this arrangement, NCL shifted the onus of obtaining all statutory clearances before commencement of fly ash dumping on NTPC. The delay in concluding MoU by 24 months, was thus avoidable.

7.1.3.2 MCL did not adopt a uniform policy for the dumping of fly ash. It permitted Talcher Thermal Power Station (TTPS), a unit of NTPC, to dump fly ash at Jagannath OCP and firmed up (February 2011) rates to be paid by TTPS for fly ash dumping. It also permitted Bhusan Steel Limited (BSL) to dump 5.58 lakh cum of fly ash from March 2014 to February 2016 at Jagannath OCP for a consideration of ₹ 1.23 crore. However, no charge was fixed for fly ash dumping by TTPS at South Balanda mines although a subsisting MoU concluded (July 2004) with TTPS provided for its review arising out of new developments in posterity. This deprived MCL of revenue amounting to ₹ 4.78 crore[35].

MCL stated (October 2018) that action would be taken to raise bills on TTPS for fly ash dumping in South Balanda mines. Further developments are awaited (November 2018).

7.1.3.3 Between April 2009 and December 2014, ECL permitted five thermal power plants[36] to dump 201.26 lakh cum of fly ash in eight abandoned mines[37], without any charges, thereby being deprived of revenue amounting to ₹ 142.89 lakh[38].

7.1.3.4 We also observed that fly ash generated in the process of power generation by Kathara Captive Power Plant of CCL was dumped in the open space, posing environmental hazard. CCL stated (November 2018) that action would be taken to utilise the fly ash for filling the mine voids. Further developments are awaited (November 2018).

7.1.3.5 There are different practices followed in subsidiaries towards use of fly ash for filling mine voids. While MCL allowed fly ash dumping in their mine voids, MoEF&CC imposed (January 2015) restriction on fly ash utilization in the mine voids of ECL. The issues on use of fly ash in coal mines were discussed (July 2016) in a meeting held between CIL, CMPDIL and its Ministry with MoEF&CC and it was concluded that fly ash contained significant quantities of hazardous leachable trace elements which could contaminate ground water. In absence of uniform policy, CIL

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[35] Calculated for the period from April 2011 to March 2018 at rates prescribed for TTPS for dumping of fly ash at Jagannath mines.

[36] Mejia Thermal Power Station, Durgapur Thermal Power Station and Durgapur Steel Thermal Power Station of Damodar Valley Corporation, Balaji Construction and Maithon Power Limited

[37] Parascoli (W), Dhandadih, Paracea, Topsi patch, Old Belbad, J.K.Nagar (Nimcha fire trench), Mandman and Lakhimata.

[38] Calculated at the minimum rate of Re.0.71 per cubic meter charged by Jagannath OCP of MCL

stated (November 2018) that NITI Aayog was seized of the matter and that a comprehensive policy was under finalization by them.

The Ministry also stated (April 2019) that utilization of fly ash in mines involved several technical, environmental & safety issues. This needs addressal in the Fly Ash Notification, 2009. The expert committee constituted in this regard by the NITI Aayog has deliberated the issue in detail and proposed that MoEF&CC should revisit the condition stipulated in the existing EC for fly ash utilization and modify them in consonance with the fly ash notification. The circular and guidelines of MoEF&CC for utilization of fly ash shall be followed by all concerned. Further developments are awaited (April 2019).

In the Exit Conference, the Ministry stated (May 2019) that a uniform policy would be adopted based on the recommendations of NITI Aayog.

7.1.3.6 During joint inspection of sampled mines, we found that Sheebpur mines (closed in 1984) of ECL, was left with a mine void. We observed that several brick kilns operated alongside the mining area. ECL did not initiate action for filling this void which offered scope for illegal mining or any accident.

Pic. 13: Para No.7.1.3.6: Mine void at Sheebpur closed mine of ECL

Pic. 14: Para No. 7.1.1: Improper closure of Dalmiya UG pit at ECL closed prior to nationalisation

7.2 Adherence to Regulatory conditions

7.2.1 Production in excess of quantities permitted in CTO

The EC and FC issued by MoEF&CC permitted the maximum quantity of coal to be extracted from the mines after compliance of various measures specified therein. In accordance with the Water (Prevention and Control of Pollution) Act 1974 and section 31A of Air (Prevention and Control of Pollution) Act 1981 read with clause 3.2 of the guidelines, operation of plant or facility prior to obtaining consent attracted pollution charges equivalent to five times the CTE fee. However, coal could be extracted only to the extent quantities permitted under CTE /CTO for each mine, notwithstanding the fact that EC permitted higher quantities.

Audit test checked the compliance of various statutory conditions in the 28 sample mines and 2 washeries and observed the following:

7.2.1.1 Sonepur Bazari OCP under ECL was permitted to extract coal to the extent of 12 MTPA since March 2016 under the EC granted by MoEF&CC. However, CTO issued by West Bengal State Pollution Control Board (WBSPCB) in June 2016 permitted extraction of only 8 MTPA. Yet, Sonepur Bazari produced 8.93 MT coal during 2016-17 thereby violating the condition in CTO.

ECL stated (November 2018) that production was within the permitted quantity under EC. The reply is not tenable as the quantity specified in CTO was not to be exceeded.

7.2.1.2 We observed that MCL did not obtain the requisite consent in advance of increased production. Consequently, between April 2013 and June 2017, OSPCB levied pollution charges amounting to ₹ 6.57 crore for production of coal in excess of the quantities permitted in the CTE in nine mines[39]. MCL was thus saddled with avoidable payment of penal charges which is a pointer to systemic lapse.

MCL stated (October 2018) that the process of grant of EC was long drawn and in the instant case of nine mines it ranged from 13-76 months and that due to huge demand, coal was produced in excess in national interest.

7.2.2 Production in excess of mining plan

In accordance with the modified (February 2015) approved mining plan of Basundhara (W) of MCL, 3.0 MT of coal was to be extracted during 2015-16 against which MCL produced 3.728 MT. We observed that Deputy Director of Mines (DDM), Odisha levied (June 2017) penalty of ₹ 50.97 crore invoking the provisions of the MMDR Act. We also observed that violation of mining plan was affirmed (August 2017) by the Hon'ble Supreme Court and that MCL did not dispute the demand till March 2018. We further observed that MCL created (March 2018) a provision of ₹ 50.97 crore in its books for discharge of the liability.

MCL stated (October 2018) that production in excess of the mining plan was resorted to off-set shortfall in production in other mines.

7.2.3 Operation of units without EC, CTE and CTO

The sequence of obtaining Environment Clearance, Consent to Establish and Consent to Operate for mines and washeries is discussed in para 1.2.2 *supra*. We observed that as at the end of March 2018, 16 units relating to two subsidiaries comprising of mines (13) and washeries (3) were being operated without valid EC (9), CTE (1) and CTO (6) as follows:

[39] Lakhanpur, Samaleswari, Belpahar, Hirakhand Bundia, Orient 4, Lajkura, Lingaraj, Ananta and Orient 3

Table 13: Operation of mines/washeies without EC, CTE and CTO in BCCL and CCL

Sl. No.	Subsidiary	Operations without				
		EC		CTE		CTO
		Mines	Washeries	Mines	Washeries	Mines
1	BCCL	4	3	-	-	2
2	CCL	2	-	1	-	4
TOTAL		**6**	**3**	**1**[40]	**-**	**6**[41]

Operation of these units as detailed in the **Annexure – III** was in violation of the regulatory mechanism. As these Units were being operated without obtaining EC, CTE and CTO, adequacy of the mitigative measures in vogue to handle environmental pollution as prescribed under various rules / regulations could not be assessed.

BCCL and CCL accepted (November 2018) the audit observation and stated that necessary corrective actions had been taken.

7.2.4 Infructuous expenditure

Wild Life Protection Act, 1972 and Wild Life (Protection) Amendment Act, 2006, prohibit unsustainable use of land within the tiger reserve area. National Environment Policy, 2006 and CIL's Policy 2012 are committed to protect the wild life in compliance of Article 48(A) of the Constitution.

We observed that a proposal which was approved (March 1988) by the BOD of CCL for Hurilong UG coal project, was rejected (August 1998) by MoEF on the plea that the location was in close proximity to the Palamau tiger reserve. Yet, CCL, while following up (August 2007) the matter with MoEF&CC, acquired 6.58 acre non forest land and constructed service building, besides equipping the area with overhead electricity transmission line and two inclines - 100 metres and 77 metres long for mining. These facilities were created at a cost of ₹ 2.98 crore. However, MoEF&CC rejected (October 2007) the subsequent proposal also and hence the expenditure of ₹ 2.98 crore was rendered infructuous.

CCL stated (November 2018) that at present there was no activity in the Hurilong UG coal project.

7.3 Hazardous Substance Management

Hazardous wastes in coal mines include used / spent oil and wastes / residue containing oil arising out of the process of industrial operation using mineral / synthetic oil as lubricant in hydraulic systems or other applications, chemical sludge from waste water

[40] Other than the mines which did not have EC, as this was prerequisite for CTE
[41] Other than the mines which did not have CTE as this was prerequisite for CTO

treatment and oil and grease skimming residue resulting from the process of purification of air, water and waste water.

Hazardous Wastes (Management, Handling and Trans boundary Movement) Rules, 2008, which was in vogue till March 2016, and Hazardous and other Wastes (Management and Trans boundary Movement) Rules, 2016 (Rules) which was applicable thereafter defined hazardous waste as any waste which could endanger health or environment. Their handling, generation, collection, storage, packaging and transportation required authorization from the SPCB under the Rules. The Rules also stipulated that these wastes could be stored only up to ninety days.

7.3.1 Storage and associated risks

7.3.1.1 As at the end of March 2018, two items of hazardous wastes were held in stock by two subsidiaries for a period exceeding 90 days as detailed below.

Table 14: Storage of hazardous waste in the mines/washery of CCL and MCL

Sl. No.	Subsidiary	Item of waste	Quantity	Unit where lying	Period of holding
1	CCL	Washery rejects	26 lakh tonnes	Kathara washery	Over 13 years
		Burnt / Used oil	227.54 KL	Rajrappa OCM	Exceeding 90 days
2	MCL	Burnt / Used oil	101.59 KL	Bharatpur mine	Exceeding 90 days

We observed that MCL stored burnt / used oil in excess of the authorised quantities (62 KL). We further observed that as at the end of March 2018, eight[42] mines and two washeries of three subsidiaries handled hazardous wastes without obtaining the authorization from the respective SPCBs. Besides, while Basundhara (W) handled the hazardous waste without authorization from OSPCB from April 2014 to September 2017, Lakhanpur handled them without authorization from April 2015 to February 2017. We further observed that Basundhara (W) did not initiate advance action for renewal of authorization for handling hazardous wastes during the above period and that the application was filed with OSPCB only in April / September 2017.

MCL stated (October 2018) that actions had been taken for auctioning of burnt oil. CCL accepted (November 2018) the fact and stated that necessary actions would be taken for early disposal of old rejects and burnt oil. Further developments are awaited (November 2018).

7.3.1.2 Under clause 23 of Hazardous Waste (Management, Handling and Transboundary Movement) Rules 2016, the subsidiaries were to obtain insurance cover as contemplated under Section 4 of the Public Liability Insurance Act, 1991, as a safeguard against liability for damages caused to the environment or third party due to

[42] Kathara OCM (including washery) of CCL, Sonepur Bazari, Jhanjra, Dabor and Kunustoria of ECL, DBOCP, Putki Balihari and Moonidih mines (till July 2017) and Bhojudih Washery of BCCL.

improper handling and management of hazardous and other wastes. We observed that NCL and SECL did not handle the hazardous wastes in excess of the prescribed limits and hence did not attract the provisions of the Rules. However, none of the other subsidiaries complied with this and thus remained exposed to risks. MCL stated (October 2018) that the projects were directed to comply with the provisions of the Act. Further developments are awaited (November 2018).

7.3.2 Under recovery of burnt oil

Lubricating oil is used in the engines of HEMM deployed for extraction of coal. During the course of oil change and maintenance, the used oil (burnt oil) is drained out. A Committee constituted (November 2014) by NCL for fixing the norms for recovery of burnt oil recommended equipment-wise rates of recovery.

The equipment-wise norms prescribed for recovery of burnt oil and the actual recovery during the period from 2014-18 in three mines (Nigahi, Khadia and Jayant) were as follows:

Table 15 : Status of recovery of burnt oil in NCL

(All figures in percentage)

Equipment	Norm	Actual recovery		Mines in which under recovery was observed
		Minimum	Maximum	
Dumper	50	19.76	43.24	Nigahi
Dozer	37	14.94	34.32	Nigahi and Khadia
Dragline	29	1.12	14.39	Jayant and Khadia
Drill	27	10.19	24.47	Nigahi and Khadia
Shovel	17	2.57	15.10	Jayant and Khadia

While confirming (October 2018) that scope existed for minimizing oil leakage, NCL stated that the HEMMs deployed exceeded their technically estimated life. NCL further stated that action was on hand to replace the HEMMs which outlived their life so as to arrest leakage of burnt oil and prevent its ill-effects due to contamination. Further developments are awaited (November 2018).

7.3.3 Payment of water cess at higher rates

As per the provisions of the Cess Act, water cess at rates specified was collected for utilization for the purposes specified in the Act, *ibid.* Compliance with the standards laid down by GoI under EP Act, 1986 entitled the consumer for payment of water cess at concessional rates. We observed that MCL failed to install meters as stipulated under the Cess Act and to submit waste water analysis report and hence could not avail of concessional rates of cess. The saving it had to forego on account of this non-compliance was in the amount of ₹ 2.48 crore during 2013-18 as detailed in **Annexure – IV.**

MCL accepted (October 2018) the audit observation and stated that no water cess was paid from July 2017 due to abolition of the relevant Act.

7.4 Corporate Social Responsibility

Mining of coal has adverse impact on the ecosystem and biodiversity in and around the areas where the mines are in operation. Therefore, projects need to be designed on the principle of sustainable development with due consideration for environment, conservation, safety, quality and aspirations of the community around it. Expenditure on CSR is required to be incurred for activities relating to protection and safeguard of environment and for maintaining ecological balance.

In accordance with the specific condition of EC granted by the MoEF&CC to subsidiaries, five rupees per tonne of coal produced was to be earmarked for activities under CSR. The amount was to be spent for community development under CSR activities. We observed that the subsidiaries collectively expended only 41 *per cent* of the overall amount mandated by MoEF&CC during 2013-18.

The shortfall in actual expenses across subsidiaries ranged between 40 *per cent* and 87 *per cent* as detailed below:

Table 16: Shortfall in actual CSR expenses against mandated by MoEF&CC

(₹ in crore)

Subsidiary	CSR mandated by MoEF&CC	Actual CSR Expenses	Shortfall (2) – (3)	Percentage of (4) to (2)
(1)	**(2)**	**(3)**	**(4)**	**(5)**
BCCL	86.33	51.99	34.34	40
CCL[43]	32.96	13.11	19.85	60
ECL[44]	62.60	21.26	41.34	66
MCL[45]	59.95	22.63	37.32	62
NCL[46]	54.80	30.58	24.22	44
SECL[47]	193.51	63.16	130.35	67
WCL[48]	14.21	1.78	12.43	87
TOTAL	**504.36**	**204.51**	**299.85**	**59**

BCCL stated (November 2018) that its CSR expenses were based on corporate budgetary allocations. CCL, ECL and SECL stated (November 2018) that provision for CSR expenses was made in the books at two *per cent* of average net profits for the immediate preceding three financial years as mandated under the Companies' Act 2013. CCL further stated that project-wise allocation of CSR fund was not made. MCL and

[43] Piparwar OCM and AKK OCM
[44] Except Rajmahal and Kalidaspur
[45] Lakhanpur (May 2014) and Lingaraj (November 2015) mines
[46] Nigahi and Bina mines
[47] Gevra, Kusmunda and Dipka mines (2014-15 onwards)
[48] Majri, Wani and Umrer Areas

NCL stated (October 2018) that their overall corporate expenses under CSR exceeded the budgeted amount during 2013-18. WCL stated (October 2018) that their overall corporate expenses under CSR exceeded the amount mandated by MoEF&CC. The Ministry also endorsed (April 2019) the views of the Managements.

In the Exit Conference, the Ministry stated (May 2019) that even if a subsidiary was not obliged as per financial parameters provided in the Company's Act 2013, the CIL policy on CSR provided for CSR funding @ Rs.2.0 per tonne. Additionally, CIL also deposited fund under District Mineral Fund (DMF) for expenditure on development of local area which also had CSR activities in its envelope.

The above contentions are not tenable as the point at issue is the shortfall in CSR expenses at specific mines mandated by MoEF&CC without reference to the Companies' Act / consolidated budgetary allocations under CSR. Further, the principle of sustainable community development around specific mines is to be duly considered for which the expenses under CSR was mandated by MoEF&CC so as to avoid lopsided development.

Audit Summation

35 mines of ECL which were closed between April 1946 and July 2009 (including six mines which were closed prior to nationalization), did not have Mine Closure Status Report. Fly ash generated in the process of power generation by Kathara Captive Power Plant of CCL was dumped in the open space, posing environmental hazard. In MCL, Deputy Director of Mines, Odisha levied (June 2017) penalty of ₹ 50.97 crore invoking the provisions of MMDR Act for production of coal in excess of the mine plan. As at the end of March 2018, 16 units relating to two subsidiaries comprising mines (13) and washeries (3) were being operated without valid Environment Clearance (EC in 9 units), Consent to Establish (CTE in 1 unit) and Consent to Operate (CTO in 6 units). Consequently, the adequacy of the mitigative measures in vogue to handle environmental pollution as prescribed under various rules / regulations could not be assessed. EC for Hurilong Underground (UG) coal project which was in close proximity to the Palamau tiger reserve, was rejected (August 1998) by MoEF. In advance of obtaining the EC, CCL acquired and destroyed 6.58 acre non forest land and constructed infrastructural facilities at a cost of ₹ 2.98 crore, which rendered infructuous. Further, MCL did not install meters and submit waste water analysis report as stipulated under the Cess Act and hence could not avail of concessional rates of cess.

CHAPTER 8

REHABILITATION AND RESETTLEMENT FOR MINE FIRE

The problems of subsidence and fires of Raniganj coalfields (RCF) and Jharia coalfields (JCF), presently under ECL and BCCL respectively, are the result of unscientific mining carried out by the erstwhile mine owners over more than 200 years of operations prior to nationalization. The population living in the old mining areas increased unabated over the years though these areas were declared unsafe for habitation by the local administration. A High Level Committee was set up (December 1996) by the Ministry by co-opting members from the Ministry, other government departments, coal companies and the concerned State Governments to deal with the problem of fire, subsidence and rehabilitation. Based on the recommendations of the Committee, GoI approved (August 2009) a Master Plan to deal with fire, subsidence and rehabilitation and diversion of surface infrastructure within the leasehold areas of ECL and BCCL at an estimated investment of ₹ 9773.84 crore for coalfields of Raniganj (₹ 2661.73 crore) and Jharia (₹ 7112.11 crore). The salient features of the approved Master plan are indicated in **Annexure V**.

While ECL and BCCL were notified as the Implementing Agencies for handling fire projects and rehabilitation / resettlement of their employees and their families from the unsafe areas of Raniganj and Jharia coalfields respectively, Governments of West Bengal and Jharkhand were to rehabilitate and resettle others (including encroachers) in their respective provincial jurisdiction.

8.1 Implementation of Master Plans

8.1.1 Raniganj Master Plan

ECL shifted the families of all employees from unstable locations. The task relating to rehabilitation of non-ECL families was taken up by Government of West Bengal (GoWB) through Asansol Durgapur Development Authority (ADDA), its administrative agency. ECL also conducted meetings with representatives of ADDA to emphasise timely elimination of constraints hindering the implementation of rehabilitation programme.

8.1.2 Jharia Master Plan

We observed the following shortcomings in the implementation of fire projects by BCCL and rehabilitation of the families of its employees.

- Even after lapse of nine years since JMP was approved, BCCL did not formulate fire fighting activities as envisaged in the JMP. Firefighting activities commenced only in 25 projects (as against 45 projects identified), thereby endangering the lives of the people residing in and around the fire area, besides impacting the environment adversely.

- Although JMP recommended adoption of excavation and back filling technique only in six projects, BCCL adopted it in all 25 projects thereby deviating from the JMP for which no reasons were found on record. National Remote Sensing Centre, Hyderabad reported that the quantum of surface fire which covered an area of 2.018 sq. km in 2014, expanded to 3.28 square km in 2018 due to excavation. We also observed that the extent of underground fire was not assessed. BCCL stated (November 2018) that it did not have the expertise to assess it. We further observed BCCL did not explore the possibility of hiring other agencies to assess the extent of underground fire so far (November 2018).

Pic. 15 & 16: Para No. 8.1.2: Mine fire at Jharia of BCCL

- 70011 quarters[49] (originally assessed as 79159 quarters but subsequently reduced due to reduction of manpower on the rolls of BCCL) were to be constructed in identified non-coal bearing area. Against this, the status as at the end of November 2018 was as follows.

[49] Including 15852 quarters for employees and 54159 quarters for others

Table 17: Status of occupancy of quarters in BCCL under JMP

Sl. No.	Quarters	For		Total
		Employees[50]	Others[51]	
1	To be constructed	15852	54159	70011
2	Actually constructed	7639	6352	13991
3	Percentage of (2) to (1)	48	12	20
4	Actually occupied	3366	2122	5488
5	Percentage of (4) to (2)	44	33	39

Out of the quarters constructed, only 6668 quarters (87 *per cent*) were allotted to its employees. No action was taken to allot the residual 971 quarters. Further 49 *per cent* of quarters allotted to employees were lying vacant. Thus infrastructural facilities for resettlement created at a cost of ₹ 51.35 crore[52] were lying idle. The slow pace of progress in the implementation of JMP exposed the inhabitants to the threat of subsidence and other environmental hazards.

- The stretch of National Highway 32 (NH) between Putki and Godhur, passing over coal bearing fire affected area was to be handed over to BCCL on lease under JMP as decided (November 2009) by Government of Jharkhand to facilitate excavation of coal. Meanwhile, as an interim measure, an alternate route was to be developed and its cost was to be borne by BCCL. Although BCCL deposited (February 2012) ₹ 19.85 crore towards this with the JRDA, it did not obtain possession of the stretch of NH between Putki and Godhur so far (November 2018).

Rehabilitation of encroachers and private legal title holders was taken up by Government of Jharkhand through JRDA.

Audit Summation

BCCL did not formulate fire fighting activities as envisaged in Jharia Master Plan. Fire fighting activities commenced only in 25 projects (as against 45 projects identified). The fires thus continued to endanger the lives of the people residing in and around the fire area, besides adversely impacting the environment.

[50] to be constructed by BCCL
[51] to be constructed by Jharia Rehabilitation and Development Authority (JRDA)
[52] Total cost of 5576 quarters=₹ 294.86 crore Total cost of 971 unallotted quarters (on average basis) =₹ 294.86*971/5576=₹ 51.35 crore

CHAPTER 9

MONITORING OF ENVIRONMENTAL ACTIVITIES

9.1 Environment Management Cell

A mine can be started after obtaining various clearances and permissions from different statutory bodies. Once the mining activities are made operational, various pollution control and mitigation measures and other activities are required to be undertaken as per the EMP, EC, FC and CTE and CTO. To ensure that the compliance mechanism is fully and effectively operational, it is necessary that the mitigation measures required for control of pollution are appropriately monitored at different levels. Environment Management Cell plays an important role in this regard.

9.1.1 MoEF&CC, while granting EC to projects, stipulated a separate Environment Management Cell (EMC) comprising of qualified personnel directly reporting to the HQ to be set up. Accordingly CIL and subsidiaries set up EMCs.

In CIL, we observed that, while deployment of Executives[53] exceeded the sanctioned strength at HQ in all the years, it fell short in its mines, during the period 2013-18 as detailed below:

Table 18: Deployment of Executives in CIL HQ and NEC Mines

Year	CIL HQ		NEC mines[54]		Total		Percentage of excess/ shortage(-) with respect to sanctioned strength	
	Sanctioned strength	Men in position	Sanctioned strength	Men in position	Sanctioned strength	Men in position	HQ	Mines
2013-14	5	7	2	0	7	7	40	(-)100
2014-15	5	6	3	2	8	8	20	(-)33
2015-16	5	6	3	2	8	8	20	(-)33
2016-17	5	8	3	1	8	9	60	(-)67
2017-18	5	11	3	2	8	13	120	(-)33

From the above, it is evident that deployment was skewed towards CIL HQ. While excess deployment was observed in CIL HQ, NEC mines experienced shortage of Executives.

[53] Qualified personnel deployed as Executives as per EC stipulations.
[54] 4 mines of North Eastern Coalfields under the control of CIL

CIL justified (November 2018) the deployment of Executives in excess of the sanctioned strength in its HQ on the plea that the scope of work considerably increased over the years and that the incumbents handled other assignments not related to environment also. The reply confirms the fact that CIL did not rationalise its manpower requirements to keep pace with its increased responsibilities and reassessed the sanctioned strength. Further, the manpower was always deficient in the mines/projects and was not proportional to the increased scope of work, thus having an adverse impact on monitoring environmental activities, as discussed in preceding paragraphs.

9.1.2 We observed inconsistencies in deployment of manpower for environmental activities in the seven subsidiaries of CIL as depicted in the following table:

Table 19: Deployment of Executives in Subsidiary HQs and Mines (March 2018)

Sl. No.	Subsidiary	Sanctioned strength			Actual deployment			Variation[55]	Percentage of excess deployment
		HQ	Mines	Total	HQ	Mines	Total		
1	BCCL	NA	NA	NA	12	27	39	-	-
2	CCL	NA	NA	29	8	13	21	(8)	-
3	ECL	NA	NA	33	9	21	30	(3)	-
4	MCL	3	32	35	9	41	50	15	43
5	NCL	NA	NA	5	8	17	25	20	400
6	SECL	8	17	25	5	25	30	5	20
7	WCL	NA	NA	10	11	21	32	22	220

While BCCL did not assess and fix the sanctioned strength of Executives required for its environmental activities either in the HQ or in the mines, four[56] other subsidiaries did not assess the strength of Executives required for deployment in the mines. Separate sanctioned strength for the HQ and mines were available in MCL and SECL. In MCL, deployment of Executives in the HQ (9) and in mines (41) exceeded the respective sanctioned strength by 200 *per cent* and 28 *per cent* respectively. In SECL, deployment of Executives in the HQ (5) fell short of the sanctioned strength by 38 *per cent* while at mines (25) it exceeded the sanctioned strength by 47 *per cent*. The overall excess deployment of Executives in four subsidiaries ranged between 20 *per cent* and 400 *per cent* of their sanctioned strength. These are indicative of the fact that the subsidiaries also did not assess their manpower requirements rationally and there was no uniform policy for deployment of manpower in the EMC.

[55] Figures in the brackets indicate shortage in deployment
[56] CCL, ECL, NCL and WCL

The subsidiaries stated (October / November 2018) that the tasks under the Environment department were multi-disciplinary in nature and hence manpower of other disciplines was utilised. The reply confirms the fact that the sanctioned strength of Environment department required rationalization. The subsidiaries further stated (November 2018) that action would be taken to rationalise the sanctioned strength. Further developments are awaited (November 2018).

9.2 Absence of adequate monitoring mechanism

MoEF&CC, through its EC conditions, directed from time to time that to ensure proper checks and balances the subsidiaries need to have well laid down system of reporting.

Audit observed from the records of MCL and NCL that the reports prepared by CMPDIL based on the samples taken from the mines were forwarded to the subsidiary HQ and concerned Area Offices. In case of any abnormal deviations found in the report, necessary instructions were communicated by the subsidiary HQ to the concerned Area Office for taking necessary remedial measures. However, such records for taking actions based on the reports of CMPDIL were not found available to audit in other subsidiaries of CIL.

We also observed that while the quality parameters relating to air and water were being monitored on fortnightly basis, the reports were prepared by CMPDIL and reported to the subsidiaries on quarterly[57] basis, thereby offering no scope for initiating remedial measures on the basis of adverse quarterly readings recorded.

We further observed that third party audit of environment department was not conducted for evaluation of its environmental activities. Besides, several good practices which were in vogue in some subsidiaries were not disseminated for adoption by the other subsidiaries. Further, the general superintendence exercised by CIL on the subsidiaries and by the subsidiary HQs on the mines in the field of manpower deployment, project monitoring and adherence to environmental norms / stipulations was also not found uniform and effective.

We observed weaknesses in the monitoring mechanism as regards adherence to pollution control measures, execution of works, mitigation of identified threats and safety measures as discussed in paras 4.1, 4.2, 4.4, 4.6, 4.9, 5.10 and 6.2 *supra.*

[57] In MCL, it is on monthly basis.

Audit Summation

The deployment of Executives exceeded the sanctioned strength at CIL Headquarters in all the years but it fell short at mines, during the period 2013-18. There were inconsistencies in deployment of manpower for environmental activities in the subsidiaries also. Further, though the quality parameters relating to air and water were being monitored on fortnightly basis, the reports were prepared by Central Mine Planning and Design Institute Limited and reported to the subsidiaries on quarterly basis, thereby offering no scope for initiating remedial measures on the basis of adverse fortnightly readings recorded. Besides, the general superintendence exercised by CIL on the subsidiaries and by the subsidiary HQs on the mines in the field of manpower deployment, project monitoring and adherence to environmental norms / stipulations was also not found uniform and effective.

CHAPTER 10

CONCLUSIONS AND RECOMMENDATIONS

10.1 CONCLUSIONS:

1. Six out of its seven coal producing subsidiaries of CIL did not have a Corporate Environment Policy approved by their respective Board of Directors as mandated by MoEF&CC. Further, guidelines containing the responsibility and delegation of powers of different levels in the Environmental wing was not dovetailed by the subsidiaries as a Manual to serve as a guide in the operations in specific mines under their control.
2. Despite adopting various clean coal technologies for mitigating air, water and land related pollution, many instances of non-compliance of the environmental regulations have been observed in CIL and its subsidiaries.
3. Due to absence of uniform policy, different practices are followed in coal subsidiaries as regards use of fly ash for filling mine voids.
4. The subsidiaries produced coal in excess of the quantities permitted under CTO and mining plan, besides operating without EC, CTE and CTO. CCL ventured into mining by destroying forest and constructing building in the vicinity of Palamau tiger reserve without environmental clearance.
5. The subsidiaries collectively expended only 41 *per cent* of the overall amount mandated by MoEF&CC on CSR during 2013-18. The shortfall in actual expenses across subsidiaries ranged between 40 *per cent* and 87 *per cent*, thereby impeding the process of sustainable community development around specific mines.
6. Against 45 identified fire projects under the Jharia Master Plan for resettlement / rehabilitation, firefighting activities commenced only in 25 projects. Neither did BCCL have the expertise to assess the extent of underground fire nor did it avail of the services of experts. National Remote Sensing Centre reported that the quantum of surface fire which covered an area of 2.018 sq. km in 2014, expanded to 3.28 square km in 2018, thereby endangering the lives of the people residing in and around the fire area besides impacting the environment adversely.
7. There was no progress in the implementation of the solar project although CIL projected to set up 1000 MW by March 2019. Besides, the envisaged environmental benefits by switching over to solar power also did not fructify.

8. There is no consistency among CIL and its subsidiaries for determining sanctioned strength vis-à-vis deployment of environment executives in their mines and HQs.
9. The monitoring mechanism in the subsidiaries and the oversight role played by CIL were found to be inadequate. Third party audit of environment department was not conducted for evaluation of its environmental activities in all the subsidiaries.

10.2 RECOMMENDATIONS:

We recommend that:

1. The companies under coal sector may put in place an Environment Policy duly approved by their respective BoD as mandated by MoEF&CC.
2. The subsidiaries may adopt two pronged strategy for pollution control. The capital works relating to pollution control measures may be completed expeditiously. The plantation works may also be taken up simultaneously and aggressively to increase green cover and restore ecological balance in and around the mines.
3. CIL should frame uniform and scientific policy towards use of fly ash in the mines so as to ensure environmental sustainability.
4. Corporate Social Responsibility (CSR) expenses may be dovetailed to ensure sustainable community development around specific mines as mandated under EC so as to avoid lopsided development.
5. Remedial actions for mitigation and arresting the adverse impact of subsidence and fire at Jharia Coalfields on the environment may be expedited.
6. Implementation of solar power project may be put on fast track so that the environmental benefits fructify as envisaged.
7. Manpower in the Environment Department of CIL and subsidiaries may also be rationalised and Environmental Manual be formulated to serve as a guide in the operations in specific mines under their control.
8. The monitoring mechanism in the subsidiaries may be strengthened by streamlining the existing reporting process for maintaining neutrality and to

ensure proper checks and balances in the system of compliance mechanism. The oversight role of CIL be directed to ensure compliance to prescribed environmental standards.

9. Deficiencies observed in mitigation of environmental pollution were based on audit of sample mines which may be reviewed in other mines to ensure compliance of environmental rules and regulations.

Ministry of Coal accepted the recommendations and stated that these recommendations would be applicable to entire coal sector which included companies other than CIL also and assured to take appropriate action.

(VENKATESH MOHAN)
Deputy Comptroller and Auditor General
(Commercial)

New Delhi
Dated: 31 July 2019

Countersigned

(RAJIV MEHRISHI)
Comptroller and Auditor General of India

New Delhi
Dated: 31 July 2019

Annexures

ANNEXURE-I
(Ref: Para 6.3.1)

MAHANADI COAL FIELDS LIMITED

DETAILS OF INTERNAL TARGET FIXED FOR BIOLOGICAL RECLAMATION AND ACTUAL ACHIEVEMENT DURING 2014-18

Year	Target Fixed		Actual Achievement		Percentage of achievement
	No. of saplings	Area to be covered (Ha)	No. of saplings	Area to be covered (Ha)	
2014-15	251764	100.71	118733	47.49	47.16
2015-16	115800	46.32	172742	69.09	149.17
2016-17	263555	105.42	138540	55.41	52.57
2017-18	300275	120.11	270752	108.30	90.17
Total	**931394**	**372.56**	**700767**	**280.29**	**75.24**

NORTHERN COAL FIELDS LIMITED

TARGET AND ACTUAL BIOLOGICAL RECLAMATION FOR NIGAHI, BLOCK-B AND KHADIA MINES FOR THE PERIOD FROM 2013-18

Target Fixed for / in				Actual Achievement		Percentage of achievement	
Area	Source	Area (Ha)	No of plants	Area (Ha)	No of plants	Area (Ha)	No of plants
Nigahi	EIA/EMP	236.8	994560	101.29	319695	42.77	32.14
Block-B[58]	Land Reclamation Plan	77.88	275000	58.28	178000	74.83	64.73
Khadia[59]	EIA/EMP	149.2	523400	43	117500	28.82	22.45
TOTAL		**463.88**	**1792960**	**202.57**	**615195**	**43.67**	**34.31**

[58] No target in terms of area as well as plantation during 2016-17 in case of Block-B
[59] For the year 2013-14 and 2014-15, no plantation was done against the target fixed for Khadia Project.

Annexure –II
(Ref: Para 7.1.1)

DETAILS OF MINES OF ECL WITHOUT APPROVED MINE CLOSURE STATUS REPORT

Sl. No.	Name of the mine	Month /Year of closure
1	Banksimulia 7&8	1974-75
2	Rana	1989
3	Gourangdi UG	Closed before nationalization
4	Khoirabad	October 2005
5	B.Dhemo/Ramjibanpur	1946-47
6	Dalmiya OC	1995
7	Kendra	1998
8	Dalmiya UG	Closed before nationalization
9	Damra	April1997
10	Sanctoria	1971
11	Shampur A	1996-97
12	Seetalpur	1971
13	Deoli	1965
14	Belrui Dishergarh	1976
15	Beldanga UG	1994-95
16	Jorekuri UG	1995-96
17	Bhanora	1996-97
18	Jpalasthali UG	1992-93
19	Kankartala 3 & 4	November 1998
20	Kakartala 1&2	November 1998
21	Sripur	1998
22	Toposi UG	1998-99
23	Toposi OC	2008
24	Madhujore UG	February 2001
25	Krishnanagar	2001
26	Palasthali OC	1993-94
27	Pariharpur UG	1993-94
28	Central Jamuria	January 1986
29	Ranipur	1986
30	Sangramgarh	July 2009
31	Sangramgarh OC	August 2008
32	Sheebpur OC	1984
33	Jamuria	1996
34	Poidih OC	1999
35	Kasta UG	1992-93

Annexure – III
(Ref: Para 7.2.3)

DETAILS OF UNITS BEING OPERATED WITHOUT EC/ CTE / CTO

Sl. No.	Subsidiary	Mine / Washery	Operating without EC/ CTE/ CTO
1	BCCL	Gaslitand OCP	EC
2	BCCL	Dobari OCP	EC
3	BCCL	Damagoria OCP	EC
4	BCCL	Kusunda OC	EC
5	BCCL	Bhojudih Washery	EC
6	BCCL	Dugda Washery	EC
7	BCCL	Mahuda Washery	EC
8	CCL	Giridih OCM	EC
9	CCL	Kabribad OCM	EC
10	CCL	Kathara OCM	CTE
11	BCCL	Gaslitand OCP	CTO
12	BCCL	Godhur OCP	CTO
13	CCL	Kathara OCM	CTO
14	CCL	Kargali OCM	CTO
15	CCL	Bokaro colliery	CTO
16	CCL	Kabribad OCM	CTO

Annexure-IV
(Ref: Para 7.3.3)

STATEMENT OF FOREGONE SAVINGS ON PAYMENT OF WATER CESS

(Amount in Rupees)

Water Cess paid by the areas of MCL					
Mine	**Year**				
	2013-14	**2014-15**	**2015-16**	**2016-17**	**2017-18**
Ananta	198142	171625	211531	77916	85027
Bharatpur	338660	500552	526331	418055	337650
Bharatpur	239548	0	0	0	0
Belpahar	470069	49178	228245	2917081	1004681
Bhubaneswari	0	2964812	136901	0	0
Balaram	0	4311292	870400	840883	908916
Basundhara	103491	33983	140045	500653	328532
Deulbera	225940	184830	241560	243380	74420
Handidhua	293603	244535	319079	365993	98136
Hirakhand	107661	37957	54594	27614	141376
Himgiri	168835	13059	40047	6510	0
Hingula	312036	181804	142455	300084	164485
IB Valley	82681	62520	75659	7022	0
IWSS Lingaraj	288900	317276	581751	411750	0
IWSS Talcher	37800	0	0	0	201150
IWSS Belpahar	170185	74710	94240	9610	0
Jaganath	124664	89840	162324	156813	83968
Kulda	0	0	2194736	938142	0
Lajkura	296366	128753	478942	895581	224740
Lakhanpur	557472	682361	1061594	2131044	2316701
Lingaraj	329542	321897	140288	952251	185146
Lilari	306487	214831	384693	66858	0
Nandira	704183	407919	246657	686780	183380
Orient1,11	174129	169344	189023	29226	266352
Orient111	247153	184899	240460	34162	326074
Orient IV	151840	151491	176549	17496	202883
Samaleswari	256173	266105	523921	511673	216224
Talcher	543120	452352	498480	669079	181536
Total	**6728680**	**12217925**	**9960505**	**13215656**	**7531377**
Grand Total Water Cess at enhanced rate (a)	**49654143**				
Cess at normal rate (b)	**24827072**				
Savings Foregone (a-b)	**24827072**				

Annexure-V
(Ref: Chapter 8)

Salient Features of Approved Master Plan for Raniganj Coalfields and Jharia Coalfields

Sl. No.	Particulars of the different components of Master Plan	RCF (ECL)	JCF (BCCL)
A	Dealing with fire		
1	Total no. of existing fires	7	67 (under 45 fire projects)
2	Estimated Cost (₹ in crore)	40.28	2311.5
B	Rehabilitation		
1	No. of sites to be Rehabilitated	139	595
2	Area affected in sq.km	8.62	25.69
3	No. of houses to be vacated/rehabilitated		
i)	BCCL (taking into account superannuation)	-	44155/25000
ii)	Private (Authorised)	-	29444
iii)	Encroachers (Unauthorised)	-	23847
iv)	Others	0	868
	Total no. of houses	33196	98314/79159
	Poputation covered	180263	395795
4	Land required for rehabilitation (Ha)	896.29	1504.99
5	Estimated Cost (₹ in crore)	2610.1	4780.6
C	Diversion of Railway line/Road/OC Pipeline	7 sites	Planning and survey with an outlay of ₹ 20 crore
	Estimated Cost (₹ in crore)	11.35	20
D	Implementing Agency for fire projects & rehabilitaion of BCCL/ECL houses	ECL	BCCL
E	Implementing Agency for rehabilitation of Non-BCCL/ECL houses - Private & Encrochers Govt. of WB	Asansol Durgapur Development Authority (ADDA)	Jharia Rehabilitation & Development Authority (JRDA) of Govt. of Jharkhand
F	Implementation schedule, years	10 (in two phases each of 5 years)	10 (in two phases each of 5 years) + 2 years for pre-implementation phase
G	Estimated Capital Requirement for fire projects/rehabilitation & diversion of rail/road/pipeline *etc.* (₹ in crore)	2661.73	7112.11

List of References

1. National Environment Policy of India.
2. Mines Act, 1952, Coal Mines Regulations 1957 (Revised in 2017) and Mines and Minerals (Development and Regulation) Act (MMDR Act), 1957 and 2015.
3. Land Acquisition Act 2013 and the Coal Bearing Areas (Acquisition and Development) Act, 1957 (CBA Act).
4. Forest Conservation Act 1980 and related Rules & Regulation.
5. Air (Prevention and Control of Pollution) Act, 1981, Water (Prevention and Control), Act, 1974 and Biological Diversity Act, 2002.
6. Standard ToR for Coal Mining & Washeries issued by MoEF&CC.
7. Hazardous Wastes (Management, Handling and Transboundary Movement) Rules, 2008 and Hazardous and Other Wastes (Management and Transboundary Movement) Rules, 2016.

List of Abbreviations

Abbreviation	Full Form
ADDA	Asansol Durgapur Development Authority
BG	Bank Guarantee
BIS	Bureau of Indian Standards
BoD	Board of Directors
BOD	Biochemical Oxygen Demand
BSL	Bhusan Steel Limited
CAAQMS	Continuous Ambient Air Quality Monitoring Station
CBA Act	Coal Bearing Areas (Acquisition and Development) Act, 1957
CEP	Corporate Environment Policy
CGWA	Central Ground Water Authority
CHP	Coal Handling Plant
CIL	Coal India Limited
CIMFR	Central Institute of Mining and Fuel Research
COD	Chemical Oxygen Demand
CPCB	Central Pollution Control Board
CSE	Centre for Science and Environment
CSIR	Council of Scientific Industrial Research
CSR	Corporate Social Responsibility
CTE	Consent to Establish
CTO	Consent to Operate
DDM	Deputy Director of Mines
DGMS	Director General of Mines Safety
DPR	Detailed Project Report
EAC	Expert Appraisal Committee
EC	Environment Clearance
EIA	Environment Impact Assessment
EMC	Environment Management Cell
EMP	Environment Management Plan
EP Act	Environment Protection Act, 1986
FC	Forest Clearance
GoI	Government of India
GoWB	Government of West Bengal
GST	Goods & Services Tax
HEMM	Heavy Earth Moving Machineries
IIT BHU	Indian Institute of Technology, Banaras Hindu University
ISM	Indian School of Mines, Dhanbad
JMP	Jharia Master Plan
JRDA	Jharia Rehabilitation and Development Authority
JSPCB	Jharkhand State Pollution Control Board

MCP	Mine Closure Plan
MCSR	Mine Closure Status Report
MGR	Merry- Go- Round
MMDR Act	Mines and Minerals (Development and Regulation) Act, 1957 and 2015
MoEF&CC	Ministry of Environment, Forest and Climate Change
MoU	Memorandum of Understanding
MPCB	Maharashtra Pollution Control Board
MPPCB	Madhya Pradesh Pollution Control Board
MW	Megawatt
NAAQS	National Ambient Air Quality Standards, 2009
NEERI	National Environmental Engineering Research Institute
NEP	National Environmental Policy
NGT	National Green Tribunal
NH	National Highway
NOC	No Objection Certificate
NTPC	National Thermal Power Corporation
NTU	Nephelometric Turbidity Unit
OB	Overburden
OC	Opencast
OCM	Open Cast Mining
OSPCB	Odisha State Pollution Control Board
PM_{10}	Suspended Particulate Matter
$PM_{2.5}$	Respirable Particulate Matter
REM	Routine Environment Monitoring
RI	Regional Institute
RITES Limited	Rail India Technical and Economic Service Limited
RLS	Rapid Loading System
SECI	Solar Energy Corporation of India
SPCB	State Pollution Control Board
STP	Sewage Treatment Plant
TDS	Total Dissolved Solids
ToR	Terms of Reference
TSS	Total Suspended Solids
TTPS	Talcher Thermal Power Station
UG	Underground
WBSPCB	West Bengal State Pollution Control Board