

Designing Audit of Extractive Industries from Environmental and Sustainability Perspective

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Session Objectives

The objective of the session is to familiarize the participants about-

- 1) the basic aspects of mining,
 - 2) its impact on environment, and
 - 3) the fundamental principles involved in conducting environmental audit in Extractive Industries.
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Session's Coverage and Documents

- Minerals and Mining Sector
- Overview of Environmental Aspects of Mining
- Types of Mines
- Role of SAI's in auditing the Mining Sector
- Mining Activities and its impact on Environment
- Sustainable Development
- Environmental Audit
- Choosing and Designing the Audit
- Case Study

Session's Coverage and Documents

- Auditing Mining- Guidance for Supreme Audit Institutions, INTOSAI, 2010
- Environmental Auditing on Mining and Minerals- Guidance for Supreme Audit Institutions, INTOSAI
- SAI India's Report No 19 on Commercial Audit.

The minerals and mining sector

The mining and minerals sector is central to modern life in any Country.

Mining contributes to the development of the economy:

- taxes from large-scale mining companies;
- creating employment opportunities both directly in the mines and indirectly through services to the mines;
- improving human capital through the provision of education and health services;

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The minerals and mining sector

- increasing foreign exchange reserves (reducing foreign exchange deficit);
 - improving infrastructure like roads and water supply;
 - creating other economic activities to support the mines instead of importing all supplies from abroad.
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Overview of environmental aspects of mining

- Supply of metals and minerals is not without environmental and social costs.
- Mineral resource activities affect all environmental media – land, air, water, and associated flora and fauna
- human environment.
- Individual health and safety,
- Local community lifestyles,
- Cultural survival, social order and economic well-being.

Types of Mines

- Four types of mining:
- **Dredging:** High volume mining technique for low-value products near a plentiful source of water.
- **Surface Mining:** It is used when deposits of commercially useful rock or minerals are found near the surface.
- ‘Open-Cast’ in soft rock mining like ‘Coal’, ‘Limestone’

Types of Mines

- ‘Open-Pit’ in hard rock mining like ‘Copper’ and ‘Diamonds’.
- **Underground Mining:** Mining Technique used in hard minerals like Gold, Copper, Zinc, nickel and Lead.
- Sometimes used for softer mineral like coal.
- Access to minerals is through shafts or inclined roadways.
- Depth, extent, quality and geology of the deposit decides the choice.
- **In-Situ Mining:** Solution and Thermal.

View of a open cast mine showing Top soil, overburden



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View of a open cast mine showing Top soil, overburden



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The role of SAIs in auditing the mining sector

- SAIs have a role to play in mining activities in their country.
- SAIs to facilitate the transparency of government operations
- SAIs to ensure that an informed public guides the actions of governments in the mining sector.
- SAIs to promote sound financial management and public accountability.
- SAIs can legitimately and credibly evaluate the effectiveness and efficiency of government policy
- SAIs to report on any unsustainable mining practices.

The role of SAIs in auditing the mining sector

- Outcomes of an audit on mining will result in improved institutional and stakeholder capacity in the mining sector.
- Recommendations in environmental audit reports to ensure that mining companies take an environmentally and socially responsible approach.

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The role of SAIs in auditing the mining sector

In mining activities, there are six possible areas of focus. The six areas are:

- ✓ land and water use;
 - ✓ waste management;
 - ✓ chemicals and pollutants;
 - ✓ tailings disposal;
 - ✓ human health risks;
 - ✓ potential environmental risks and the plans to mitigate these risks.
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Mining activities and their impact on the environment

Environmental effects of mining

Air pollution

- Main air quality issue is the dust produced by the working of open pits and by crushing and grinding operations.
 - Dust can also be given off by tailings dams.
 - Workers and nearby communities get affected by dust.
 - Mines are also sources of greenhouse gas emissions.
 - CO₂ is produced by energy use
 - Methane is sometimes released from underground operations, especially in coal mines.
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Sprinkler on railway siding

Spraying of Water through fixed Sprinkler



Mining activities and their impact on the environment

Environmental effects of mining

Water pollution

- Potential sources of water pollution include drainage from surface and underground mines,
- Wastewater from beneficiation and surface run-off.
- Particular problem is acid mine drainage.
- Many mining operations especially those extracting ores containing nickel, copper, iron, zinc, cadmium, lead and coal may produce acidic and metal-bearing solutions.

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Mining activities and their impact on the environment

Environmental effects of mining

Water pollution

- Mineral separation processes using dangerous and toxic chemicals like sulphuric acid or cyanide (e.g. leaching) or organic reagents (e.g. flotation) can be serious sources of contamination.
 - Mine wastewater contains large amounts of suspended solids.
 - Solids can affect aquatic flora and fauna and physically choke local waterways and lakes.
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Mining activities and their impact on the environment

Environmental effects of mining

Mines and mineral wastes

- By nature, mining involves the production of large quantities of waste.
 - Gold and silver are among the most wasteful metals, with more than 99 percent of ore extracted ending up as waste.
 - Iron mining is less wasteful, with approximately 60 percent of the ore extracted processed as waste.
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Mining activities and their impact on the environment

Environmental effects of mining

Biodiversity and habitat

- Mining may result in additional indirect impacts far from the mine site.
 - Most obvious impact on biodiversity from mining is the removal of vegetation
 - In turn, it alters the availability of food and shelter for wildlife.
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Mining activities and their impact on the environment

Environmental effects of mining

Tailings

- Tailings that remain after extraction and processing are mostly mud and slurries.
 - Tailings contain quantities of metals and other minerals and residues of the chemicals used to extract them.
 - Tailings are usually dumped in heaps, released into ponds, or retained by tailings dams.
 - In some cases, release into rivers occurs which introduces large amount of suspended solids and contaminants directly into aquatic habitats.
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Mining activities and their impact on the environment

Socio-economic impacts of mining

Once mineral is discovered and its mining potential established, the local people are affected.

The value of the land increases and people from outside can start buying land and establishing businesses.

Mining and associated activities can have the following effects on the local population:

- ✓ Displacement of the people
- ✓ Loss of livelihood

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Mining activities and their impact on the environment

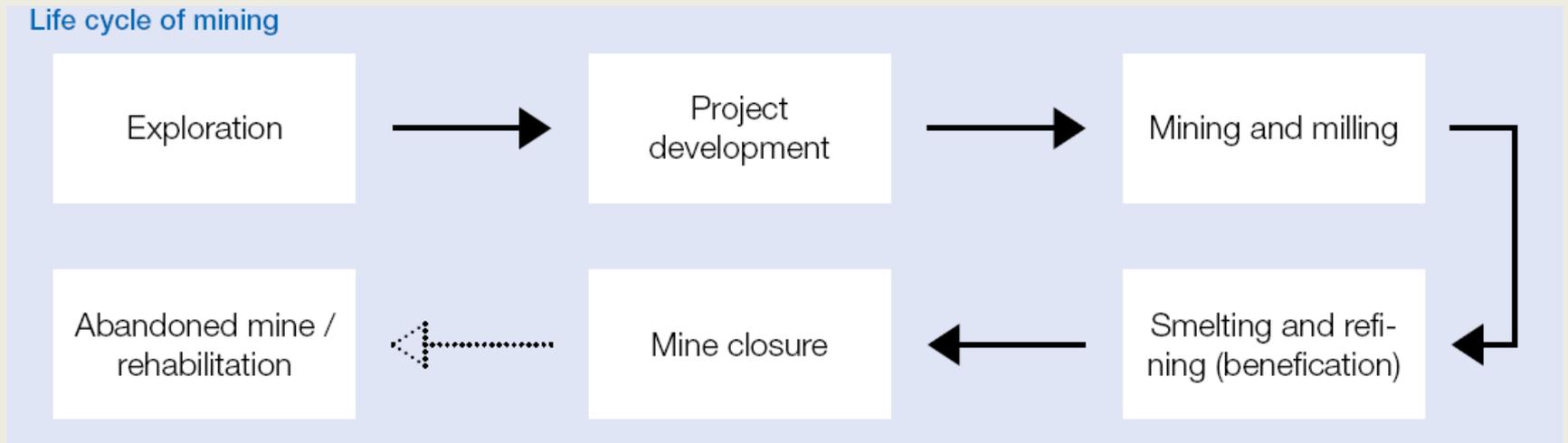
Socio-economic impacts of mining

- ✓ Changes in population dynamics
 - ✓ Cost of living
 - ✓ Water scarcity
 - ✓ Health impacts
 - ✓ Infrastructure facilities
 - ✓ Employment opportunities
 - ✓ Economic disparity and frustration
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Mining activities and their impact on the environment

Life cycle of mining (mining process)

- Minerals are a non-renewable resource. Mining represents a temporary use of the land.
- Mining life cycle can be divided into the following stages: exploration, development, extraction, processing, and mine closure.



Mining activities and their impact on the environment

Life cycle of mining (mining process)

The exploration phase of mining

- Exploration activities encompass all actions in the field that precede feasibility studies.
 - Potential environmental impacts during the exploration phase of mining include
 - Land alienation from protection options,
 - Disruption of habitat and harvesting and fishing activities,
 - Pollution of water sources from drilling,
 - Camp garbage, and
 - Deforestation.
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Mining activities and their impact on the environment

Life cycle of mining (mining process)

The development phase of mining

- Development of a mine consists of several principal activities:
 - Conducting a feasibility study, including a financial analysis to decide whether to abandon or develop the property;
 - Designing the mine;
 - Acquiring mining rights;
 - Filing an Environmental Impact Assessment (EIA);
 - Preparing the site for production.

Mining activities and their impact on the environment

Life cycle of mining (mining process)

Potential environmental impacts during the development phase

- Development and operational stages (extraction) magnify other environmental impacts.
 - Large areas of vegetation and topsoil are cleared.
 - Excavations create potential hazards that include landslides, slope failures, cave-ins, erosion and subsidence.
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Mining activities and their impact on the environment

Life cycle of mining (mining process)

The mining and milling phase of mining

- Air pollution includes direct emissions of compounds such as sulphur, carbon, nitrogen, and toxic metal particulates,
- Water pollution includes all of the above acidic substances, toxic and sedimentary process discharges, leaks, spills, leaching, and surface runoff.
- Wildlife and fisheries lose their habitats.
- Changes in the local water balance.
- Increased erosion and sedimentation of lakes and streams.

Mining activities and their impact on the environment

Life cycle of mining (mining process)

The smelting and refining phase of mining

- Smelting and refining phase may include activities such as subjecting minerals to high heat or electro-chemical process to form ingots or bars of pure metal or alloys.

Potential environmental impacts are:

- Heavy metals, organics and sulphur dioxide emissions to air,
 - Discharging of toxic chemicals such as sulphuric acid and ammonia used during processing,
 - Alienation of land as a result of the generation of slag,
 - High energy consumption resulting in indirect environmental impacts.
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Mining activities and their impact on the environment

Life cycle of mining (mining process)

Mine decommissioning

- Mine decommissioning usually occurs when the economic recovery of minerals has ceased.

Factors contributing to cessation of mining activities include

- Depletion of reserves that can be mined,
 - Changes in market conditions,
 - Changes in the financial viability of the company or adverse environmental or political conditions.
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Mining activities and their impact on the environment

Life cycle of mining (mining process)

Abandoned mines

- Thousands of former mining sites continue to pose a real or potential threat to human safety causing health and/or environmental damage in many areas- a negative legacy of the mining industry
 - Demonstrates a lack of care and planning in past practice and adherence to regulations
 - Inadequate regulations because of the lack of detailed understanding.
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Backfilling of opencast mines



Reclaimed overburden dump



Afforestation over Overburden dump



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Park created on abandoned Open cast mines



Reclaimed opencast mines converted into park in WCL



Sustainable Development

- Sustainable Development is the “development that meets the needs of present generations without compromising the need and the ability of future generations to meet their own need.”
- Sustainable Development involves the integration of three distinct aspects- environment, society and economy.
- It does not treat the environment as an absolute that is inviolable.
- Instead, it emphasizes to balance or trade-off between economic and social progress and the environment.
- International Institute for Environment and Development embarked on the Mining, Minerals and Sustainable Development (MMSD) project and established the nine key areas of action and challenges.

Sustainable Development

Viability of the minerals industry

- Minerals industry has a key role to play to make a substantial positive contribution to sustainable development
- Fundamentals of sustainable development must become embedded in the culture of mining companies
- It will have significant and cumulative effects on a whole range of aspects of company life in terms of health, safety of workers and long term skills training.

The control, use and management of land

- Development of minerals competes with other land uses.
- Uncertainty over obtaining access to land imposes serious constraints on industry.

Sustainable Development

- Many other actors- including local communities and indigenous people have vital interests in how land is used and who decides the land use.
- Land use decision has to be arrived at through the process that respects the principle of prior informed consent and in a democratic way.
- Decision to explore and mine in an area must be based on an integrated assessment of ecological, environmental, economic and social impact.
- Land use strategy must incorporate the principles of sustainable development

Sustainable Development

Community Development

- Challenge at the community level is to maximize the benefits and to avoid or mitigate any negative impacts of mining.
- Trade-offs relating to different social, economic and environmental goals need to be determined through participatory process.
- Relationship between the mining company and other actors needs to be one of collaboration, trust and respect.
- Economic benefits brought by mining should be shared equitably within the communities.

Sustainable Development

National economic and social development

- Mining should bring benefits that can sustain at the national level even after mining ceases.
- Creating and sustaining mineral wealth in maximizing human well-being to be undertaken in a way that protects environmental quality and other social and cultural values.
- Despite recognizing the sovereign rights of governments, it has to act in the best interest of the nation.
- Portion of the rents derived from minerals and other non-renewable resources needs to be set aside and reinvested to ensure sustainable income when the resource is used up.

Sustainable Development

Environmental Management

- Considerable degree of environmental impact is there in exploration, mining and mineral processing.
- Ideally, the mineral sector should not work at the expense of environment. In practice, a balance is to be struck.
- Challenge becomes how to optimize the trade-off between environmental damage and the potential development benefits.
- No permit should be accorded on the basis of trade-off today against long term legacies that may harm future generations.

Sustainable Development

An integrated approach to using minerals

- Efforts should be made for equitable distribution of use between industrial and developing countries.
- Efficient use should be encouraged to reduce waste, depletion and pollution.
- Remanufacture, re-use and re-cycling should be encouraged.
- Life cycle analysis should be used as a decision making tool to assess production processes, mineral uses, the impacts and alternative materials choice.

Flow of Information

- Increased openness and greater transparency in information production and dissemination to be ensured throughout the minerals life cycle.
- Systems of accountability and verification are essential to monitor the performance of companies, governments and civil society.
- Knowledge needs to be shared and gaps progressively filled.

Sustainable Development

Artisanal and small scale mining

- Artisanal and small-scale mining (ASM) plays crucial role in providing sources of income in poor areas.
- ASM has high environmental costs and poor health and safety record. These need to be avoided or reduced.
- Alternative economic activities more appropriate for working towards sustainable development should be sought.
- 'Fair-Trade' markets to be encouraged to ensure fair return so they can adhere to the practices of sustainable development.

Roles, Responsibilities and instruments for change

- Good behaviour have to be agreed upon and respected.
- Best Practices will improve as knowledge improves.
- Participatory & democratic decision making structures to be adhered.

Environmental Audit

- Environmental Audit is defined as Financial, Compliance and Performance Audit towards the approach of responsible body to environmental problems, policies or programmes. It includes their performance in managing environmental issues.
- SAI does not need to have specific mandate to conduct Environmental Audit. General authorization to conduct financial or compliance audit is sufficient.
- SAI's skills and experience in conducting Financial and compliance audit may be used in environmental audit.
- SAI auditors are not expected to have more knowledge than the management or environmental experts. They need to have core competence in the subject matter in question.

Environmental Audit (Financial Audit)

- International Accounting Standards address the principles of recognition, measurement and disclosure of environmental matters in financial report. SAI may design the audit accordingly:
- Obligation to recognize the impairment of asset and consequent need for writing down its value,
- Failure to comply with legal requirements concerning environmental issues may involve accrual for remediation of works, compensation, fines or penalties and legal cost,
- Obligations associated with solid waste landfill closure, after care and restoration obligations associated with mining operations

Environmental Audit (Financial Audit)

- An entity may need to disclose the potential environmental obligations as contingent liability, where,
 - the possible obligation depends on possible occurrence of a future event; or
 - the amount of the present obligation can not be reasonably estimated; or
 - an outflow of resourced to settle the obligations is not probable

Environmental Audit (Financial Audit)

- Some additional information in the notes to accounts may be required:
 - the industry in which the entity operates and its associated environmental issues,
 - the accounting treatment adopted for environmental costs (what is included, whether expensed or capitalized, how items are amortized to income etc),
 - fines and penalties incurred under environmental legislation,
 - environmental restoration liabilities, including measurement uncertainties, nature and timing,

Environmental Audit (Compliance Audit)

- Compliance Audit can examine-
 - entities compliance with financial authorities and accounting practices (for example, legislative control such as appropriations for entities spending)
 - compliance with environmental laws and treaties, Specially, where non-compliance could materially affect the entities financial satatements.
 - apart from financial statement, the audit entity may incur expenditure that may be relevant to the wider use of public fund

Environmental Audit (Compliance Audit)

- This type of environment audit can:
 - promote compliance and provides increase assurance about compliance with the existing environmental policy and legislation;
 - reduce the risks and costs associated with non-compliance with the regulations;
 - save cost by minimizing waste and preventing pollution; and
 - identify liabilities and risks

Environmental Audit (Performance Audit)

- Performance auditing seeks to provide new information, analysis or insights and, where appropriate, recommendations for improvement. It adds knowledge or value by:
 - ❖ providing new analytical insights
 - ❖ making existing information more accessible to various stakeholders
 - ❖ providing an independent and authoritative view or conclusion based on audit evidence
 - ❖ providing recommendations based on an analysis of audit findings

Choosing and designing the audit

- Selecting and determining the scope of audits of mining can be a challenge for SAIs.
- Focus should be on new social, economic and environmental concerns.
- More concern are in developing nations with resource-based economies.
- Wide range of conventions, protocols, declarations, treaties, standards, codes and recommendations relating to environmental, social and economic norms are the reference points.

Choosing and designing the audit

- Step 1: Identify the environmental threats of mining in your country
 - Step 2: Identity the government's responses to these threats in your country and relevant players
 - Step 3: Choose audit topics and priorities
 - Step 4: Decide on audit approaches: scoping the audit
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AUDIT DESIGN MATRIX

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Financial Management & regularity

Risk- Misallocation of Fund

Questions:

- Are adequate resources allocated?
- What are criteria for disbursement of fund and is that monitored?
- Do official trade-off exist in policies?
- Do the estimated benefits balance against the losses caused by mining?

Criteria:

- Approved Budget
- Strategic Plan

Compliance with agreements, laws and policies

Risk:

- Inadequate governance regime to protect the mining adverse impacts
- Failure to meet the environment commitments
- Inability to establish the legal framework for agreement and collecting royalty from mining activities

Questions:

- Are there international agreement?
- Is the country following the international conventions that it is a signatory to?

Compliance with agreements, laws and policies

- Has the government enacted laws and regulations to implement its international commitments and domestic policies?
- Are there any conflict or gap between the national policies and the country's environmental laws?
- Are environmental laws and regulations being adequately enforced?
- Is there any conflict between national policies and the international conventions that the country is signatory to?

Criteria:

- International agreements where the country is a signatory.

Policies

Risks:

- Uncontrolled mining and mineral activities

Questions:

- Are government policies being complied with?
- Has the government developed policies that address the environmental pollution caused by mining?
- Have the government policies been executed in laws and other legal instruments such as plans and budgets?
- Are government programmes efficient?

Criteria:

- Approved policies.

Performance Management and results

Risks:

- No control over performance programme to deal with threats caused by mining activities to environment.
- Inability to determine the efficiency, effectiveness and economy of government programme.

Questions:

- Have the relevant agencies defined expected results for their programme?
- Have they developed indicators and measures for their results and they are being monitored and tracked?
- Are the policies and programmes on environmental conservations achieving their objectives?

Performance Management and results

- Why are policies and programmes not achieving their objectives and how the causes can be countered?

Criteria:

- Performance indicators stipulated in relevant mining regulations
- Mitigation measures stipulated in environmental management plan
- Best practices stipulated by ISO

Public Education

Risk:

- Destruction of environment due to lack of awareness

Questions:

- Is the government allocating adequate funds for public outreach and education at each phase of policy?
- Is the government encouraging the public and private sector to protect the environment?
- Has the government integrated the mining environmental concerns into its public outreach strategies?
- Is the government measuring its public outreach results?

Criteria:

Established degradation rate

Established baseline

Accountability, coordination and capacity

Risks:

- Poor Performance and malfunctioning

Questions:

- Are the roles, responsibilities and accountability of relevant agencies clearly defined?
- Are all the necessary mechanisms to coordinate actions in place?
- Do the entities have adequate financial and human resources to carry out their roles and responsibilities?
- Have the entities developed robust internal management system?

Criteria:

- Service Charter, Organizational structure.

Reporting to clients and the public

Risks:

- No accountability
- No monitoring at the local government level appropriate and working well
- Action on recommendation is not taken
- Environmental issues not addressed
- No performance evaluation

Questions:

- How are departments and agencies reporting their results?
- Are departments and agencies meeting international and national reporting obligations?

Reporting to clients and the public

Criteria:

- International environmental agreements
- Regulatory agencies
- Parliament

Case Study

**Assessment of Environmental Impact
due to Mining Activities and its
Mitigation in CIL and its Subsidiaries
(Report No 12 of 2019)**

Introduction

Coal India Limited (CIL) a 'MAHARATNA' Public Sector Undertaking under Ministry of Coal, Government of India produces non-coking coal and coking coal of various grades.

There are 8 subsidiaries of CIL.

It operates 82 mining areas across eight states in India.

95% of Coal Production in India is through OCM.

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Regulatory Framework

- MoEF&CC is the nodal agency for planning, promoting, coordinating and overseeing the implementation of environmental and forestry policies and programmes.
- For new and existing mines (involving capacity augmentation), Environment Impact Assessment and Environment Management Plan (EIA-EMP) are formulated as per approved Term of Reference (ToR) and Public Consultations.
- On the basis of EIA-EMP, Environment Clearance (EC) is granted by MoEF&CC.
- If mining involves forest land, Forest Clearance (FC) is to be obtained from MoEF&CC for diversion of forest land for non-forest purposes.

Regulatory Framework

- EIA highlights the beneficial and adverse effects of coal mining on the environmental system.
- EMP details all mitigation measures to be undertaken for item wise activity during construction, operations and the entire life cycles of mining.
- Prior to establishment of mining project, all new intending project proposal are required to obtain No Objection Certificate (NOC) in the form of Consent to Establish (CTE) from State Pollution Control Board (SPCB).
- For carrying out operations, units are required to obtain Consent to Operate (CTO) from respective SPCBs.
- SPCBs are expected to play oversight role through periodical inspections for ensuring compliance of standards prescribed under the Acts.

Audit Objectives

- Whether CIL/Subsidiaries adhered to relevant Laws, rules and regulations as prescribed under the EP Act.
- Assess the implementation and effectiveness of sustainable development measures taken for environment protection in the mining area.
- whether adequate monitoring mechanism existed for remedial measures to prevent environmental degradation.

Introduction



A.CIL :

Coal Producing Subsidiaries

- (1) Eastern Coalfields Ltd.**
- (2) Bharat Coking Coal Ltd.**
- (3) Central Coalfields Ltd.**
- (4) Northern Coalfields Ltd.**
- (5) Western Coalfields Ltd.**
- (6) South Eastern Coalfields Ltd.**
- (7) Mahanadi Coalfields Ltd.**

(8) Central Mine Planning And Design Institute Limited (CMPDIL)

- (9) B.Singareni Collieries Co. Ltd.**
- (10) C.Neyveli Lignite Corporation**

Audit Criteria

- 1. EP Act 1986 and related Rules, Regulations and Circulars
- 2. Water (Prevention and Control of Pollution) Cess Act, 1977
- Public Liability Insurance Act, 1991
- Standards prescribed by Bureau of Indian Standards in 2012
- CIL guidelines on Environment
- Mine Closure Guidelines 2009 and 2013
- Environment Impact Assessment and Environment Management Plan
- EC of Mines and Washery projects accorded by MoEF&CC
- Conditions stipulated by SPCB/CPCB for CTE and CTO
- Approved Raniganj and Jharia Actions Plan (2009)

Scope of Audit

Performance audit of CIL and its subsidiaries was undertaken for the period 2013-14 to 2017-18.

Out of 500 mines and 15 washeries, 41 mines and 2 washeries were selected for detailed scrutiny on random sampling.

Share of Production of sampled operating mines to total production of respective subsidiaries ranged between 10% to 65% in 2017-18.

Sample selection was heterogeneous comprising UG, OCM, Mixed mines and Closed mines.

Total production of sampled mines was 226.03 MT against the total production CIL and subsidiaries of 567.37 MT in 2017-18.

Environment Management System

- National Environmental Policy (NEP) formulated by GOI in September 2006. NEP suggested to prepare action plans on identified themes and formulate own policy in consistent with NEP.
- CIL formulated Comprehensive Environment Policy (CEP) in March 2012 followed by revised policy in December 2018.
- MoEF&CC while according environment clearance (EC) for projects in subsidiaries insisted that Environment Policy duly approved by Board of Directors (BoD) for subsidiaries needs to be in place. Six out of seven subsidiaries of CIL did not formulate a policy as mandated.
- CIL's Guidelines containing the responsibility and delegation at different levels in Environment discipline not dovetailed in the operating manual by the subsidiaries.

Air Pollution and Control Measures

- Air Quality Monitoring Stations as specified in EC were to be established in core zone and Buffer zone of each mine. In 12 of the sampled 30 operating mines/washeries, against 96 monitoring stations, only 58 (60%) were established.
- Ambient Air Quality Monitoring stations were to be installed with the connectivity to the server of SPCB for online monitoring of ambient air quality. 12 mines of four subsidiaries did not comply with the directive.
- Average ash content in the coal from 4 collieries ranged between 40.1% and 43.8%. MCL contemplated to set up 4 Washeries for supply of beneficiated coal. Not commissioned till November 2018. In CCL also ash content exceeded 34 percent.

Air Pollution and Control Measures

- MoEF&CC notified in November 2009 for monitoring of Particulate Matters (PM10 and PM 2.5) on annual and 24 hour basis. Ambient air quality monitored in ECL only from May 2015.
- Concentration of PM10 and PM 2.5 in air exceeded the levels prescribed in National Ambient Air Quality Standards(NAAQS) in six mines in three subsidiaries in 2013-18.
- In Gevra OCM, the Silo completed in November 2018 but railway siding remained incomplete. In two mines in MCL, silo was not functioning due to absence of railway connectivity.
- In NCL, in Block B mines, coal could not be sent through coal handling plant due to absence of railway connectivity. Consequently, coal was dispatched by road and thereby contributing to air pollution.

Water Pollution and Control Measures

- In 3 mines out of 28 mines selected for scrutiny, the pollutants exceed the limits prescribed by Bureau of Indian Standards.
- 62 lakh Kl of untreated water was discharged in nearby water bodies by three mines of MCL contaminating the ground water.
- CCL, BCCL and SECL continued to use ground water for mining operations without obtaining NoC from Central Ground Water Authority.
- Subsidiaries did not install Sewage Treatment Plant (STP) at the residential colonies of the collieries.
- Rejects of Kathara washery of CCL was found to be contaminating the Damodar River.
- NCL did not get the coal seam samples analysed for mercury content on annual basis thwarting the measures for occupational health and safety.

Land Management- Mitigation of Land Degradation and Reclamation

- In 13 mines out of 23 OC/Mixed mines selected for audit, top soil was stacked in the earmarked area and reported periodically but records of Top Soil indicating the quantity and areas of stacking were not maintained.
- Director General of Mines Safety (DGMS) suspended operations in a patch of Rajmahal OCP as the Overburden (OB) benches did not conform to the norms specified in the Regulations.
- DGMS suspended operations in Quarry 3 in Sonpur Bazari OCP as the height of the benches deviated from the Regulations.
- ECL did not set year-wise targets for biological reclamation of mined out area through plantation activities.
- MCL biologically reclaimed only 51.61% of de-coaled area at the end of March 2018.

Adherence to other Regulatory Conditions for Protection of Environment

- 35 mines of ECL closed between April 1946 and July 2009 (including 6 mines closed before nationalization) did not have Mine Closure Status Report.
- MCL did not adopt a uniform policy for the dumping of the fly ash.
- ECL permitted five thermal power plants to dump fly ash in eight abandoned mines without consideration.
- Fly ash generated in power generation by Kathara Captive Power Plant of CCL dumped in the open space, posing environmental hazard.
- Odisha government levied (July 2017) Penalty of Rs 50.97 crore for production of coal in excess of mine plan.

Adherence to other Regulatory Conditions for Protection of Environment

- At the end of March 2018, 13 mines and 3 Washeries were being operated without valid EC in 9 units, Consent to Establish (CTE) in 1 unit and Consent to Operate (CTO) in 6 units.
- EC for Hurilong UG coal project, in close proximity to the Palamau Tiger Reserve, was rejected (August 1998). Before obtaining EC, CCL acquired and destroyed 6.58 acre non forest land and constructed infrastructural facilities at a cost of 2.98 crores.
- MCL did not install meters and submit waste water analysis report as stipulated under the Cess Act. Hence , could not avail of concessional rate of cess. The foregone amount was Rs 2.48 during 2013-18.

Rehabilitation and resettlement for mine fire

- Even after lapse of 9 years of approval of Jharia Master Plan, BCCL did not formulate fire fighting activities as envisaged.
- Fire fighting activities commenced only in 25 projects as against 45 projects identified.
- Fire continued to endanger the lives of the people residing in around the fire area, besides adversely affecting the environment.

Mine Fire at Jharia BCCL



Monitoring of Environmental activities

- Deployment of executives exceeded the sanctioned strength at CIL headquarters during the period 2013-18. The excess deployment in CIL HQ ranged between 20% and 1205% of sanctioned strength.
- In North Eastern Coalfield (NEC), the shortage ranged between 33% and 100%.
- Quality parameters relating to air and water were monitored on fortnightly basis. Reports prepared by CMPDIL were reported to the subsidiaries on the quarterly basis offering no scope for remedial measures on the basis of adverse readings.
- General superintendence exercised by CIL on the subsidiaries and by subsidiary HQ on the mines in respect of manpower deployment, project monitoring and adherence to environmental norms not found uniform and effective.

Recommendations

- Companies under coal sector may put in place an Environment Policy duly approved by their respective BOD as mandated by MoEF&CC.
- Subsidiaries may adopt two pronged strategy for pollution control- capital works relating to pollution control to be completed expeditiously and plantation works to be taken up aggressively to increase green cover and restore ecological balance.
- CIL should frame uniform and scientific policy towards use of fly ash in the mines to ensure environmental sustainability.
- CSR expenses may be dovetailed to ensure sustainable development around specific mines as mandated under EC.

Recommendations

- Remedial actions for mitigating and arresting the adverse impact of subsidence and fire at Jharia coal fields.
- Implementation of solar power project may be put on fast track so that the environmental benefits fructify as envisaged.
- Manpower in Environment Department of CIL and subsidiaries is to be rationalized and Environmental Manual be formulated to serve as a guide in the operations.
- Deficiencies observed were on the basis of audit of sample mines which may be reviewed in other mines to ensure compliance of environmental rules and regulations.

Thank you