

Road to Green Mining



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Guidelines for Environmental Personnel in Mines

March - 2014

Foreword

Coal India Limited (CIL) has an ambitious goal to cater to the energy requirement of the country by producing 615 MT of coal as per the XII Plan projections by FY 2016-17, which is about 6.4 % annual average growth rate over what is being produced today. This production is to be achieved with due consideration and compliance of the stringent environmental stipulations.

One of the most important statutory provisions, which have a direct impact on increasing the production, is the compliance of EIA Notification 2006. At the same time, a number of new statutes have come into force making the environment compliance as one of the most important requirement for the company. Now as per statute, all new /expansion mines need to have environmental clearance. Environmental Clearances (EC) come with number of conditions besides implementation of approved Environmental Management Plan (EMP). As a consequence, many statutory obligations including filling of returns, renewal of Consent etc are essential to operate mines within the legal frame work. EC is not just obtaining another approval but it is to be clearly understood that activities regarding environmental management really starts after getting the environmental clearance.

Any lapses on our part can lead to violation, which may hamper production, prosecution, legal complication, stoppage notice to mines etc. As a Central Public Sector undertaking, we are committed to comply all legal obligations including EC conditions in true spirit.

As knowledge is power which provides the required skill and ability to function properly, I feel that an unified and standard guidelines is necessary for CIL, thus a Committee has been constituted for formulation of guidelines which shall give confidence to the executives in charge of Environment related operations / amelioration to carry out their duties efficiently.

This guideline is also aimed to serve as a ready reckoner for the field executives of coal producing subsidiaries. With this tool, they will be in a position to confidently address any statutory requirement or deal with any stake holder regarding our environment compliances. Besides the statutory activities the company is poised for adopting various eco-friendly measures in CIL for which further capacity building of our executives shall be taken up for ameliorative environmental activities.

I request all concerned to utilize the guidelines for effective environment management as well as help in achieving the goal of Environmental Excellence.

Nagendra Kumar
Director (Tech.)
Coal India Ltd

Preface

In order to formulate guidelines for Environmental personnel a committee was constituted by Director (Tech), CIL vide Office order no. CIL / WBP / 2013 / 5287, dated - 06/06/2013, with the following members for imparting working knowledge to Environmental personnel working in fields to carry out their duties in environment department effectively and efficiently,

- 1) Shri Kaushik Chakraborty, General Manager (Mining / Env), WCL
- 2) Shri B. K. Sharma, General Manager (Env), NCL
- 3) Shri K. Anand General Manager (Env), CIL – Convener
- 4) Shri S. C. Subramanian – Chief Engineer (Env), SECL

The Scope of the committee is to prepare the guidelines covering the following:

1. The Roles and Responsibilities of the Environmental Personnel posted at Subsidiary HQ, Area level and Project level
2. Broad idea on various Acts / regulations applicable in coal industry
3. Various clearances / approvals to be obtained for starting / working of a mine
4. Working knowledge of various mitigation measures, technologies and methods to deal with various pollutants / pollutions in coal industry.
5. Land reclamation & restoration.
6. Mine Closure Plans
7. Techniques in tree Plantation.
8. Energy audit and Renewable energy generation
9. List of important statutory returns to be filed with periodicity.
10. Other Environment activities which are not mandatory as per statutes, however desirable for better Environmental concern.
11. Environment day celebrations and involvement of local public
12. Planning and preparation of Budget.

Accordingly the Committee has prepared the guidelines within the above mentioned scope of work covering various environmental aspects required for Subsidiary Engineers working as Environment personnel in the coalfields to carry out their duties more efficiently with due back – up knowledge bank. Special care has been taken to cover all practical aspects which will empower the Environment executives to work with more confidence and take proper mitigative measures. Moreover, with this knowledge, the executives shall gain confidence while facing various statutory bodies / stakeholders and can explain the CIL's Environment commitment and concerns. This will definitely help in developing the green image of the company, which really cares for environment besides producing coal. We believe that there is always a scope for improvement and there should be continual improvement.

This is the first such document in CIL for which Committee sincerely acknowledges the initiative of our Director (Technical) CIL for his encouragement and guidance for preparation of this guideline.

The committee has attempted to compile the document with earnest care but there is always a scope for improvement therefore openly welcomes any suggestions for improvement in the document in the email cgmenv@coalindia.in.


18/9/13

Kaushik Chakraborty,

GM(M)/Env,WCL


18/9/13

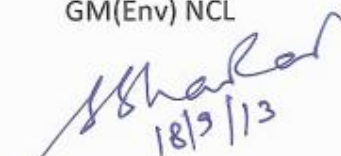
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List of Abbreviations:

AMM	-	Abandoned Mine Methane
CBM	-	Coal Bed Methane
CHP	-	Coal Handling Plant
CIL	-	Coal India Ltd.
CMM	-	Coal Mine Methane
CPCB	-	Central Pollution Control Board
CSR	-	Corporate Social Responsibility
CTE	-	Consent to establish
CTO	-	Consent to operate
DETP	-	Domestic Effluent Treatment Plant
DFO	-	Divisional Forest Officer
EAC	-	Expert Appraisal Committee
EC	-	Environment Clearance
EIA	-	Environmental Impact Assessment
EMP	-	Environment Management Plan
EPA	-	Environmental Protection Act
ESMP	-	Environmental and Social Mitigation Plan
ETP	-	Effluent Treatment Plant
FAO	-	Final Approval Order
FC	-	Forestry Clearance
FRA	-	Forest Right Act
GHG	-	Green House Gases
NRB	-	Non-Residential Building
O>	-	Oil and Grease Trap
OM	-	Office Memorandum
MoC	-	Ministry of Coal
MoEF	-	Ministry of Environment & Forest
NAAQS	-	National Ambient Air Quality Standards
PC / PH	-	Public Consultation / Public Hearing
PP	-	Project Proponent
PR	-	Project Report
QCI	-	Quality Council of India
RB	-	Residential Building
RI	-	Regional Institute
R&R	-	Rehabilitation and Resettlement
SD	-	Sustainable Development
SEAC	-	State Expert Appraisal Committee
SEIAA	-	State Environment Impact Assessment Agency
SPCB	-	State Pollution Control Board
STP	-	Sewage Treatment Plant
TOR	-	Terms of Reference
UCG	-	Underground Coal Gasification
UTPCC	-	Union territory Pollution Control Committee
VAM	-	Ventilation Air Methane

1.0 Environment Management in CIL – An over view

Coal is required for the energy need of the country and it is the cheapest fossil fuel in our country. Coal meets 55% of India's primary commercial energy requirement and it will continue to be the major source of energy in the foreseeable future. India is the third largest producer of coal in the world. Coal is obtained from the mother earth by various methods of mining. Mining has some impact on environment as well as on society. Any impact on environment and society can be managed and mitigated in a sustainable manner, if mining is done and maintained in environmentally responsible ways. Being a responsible corporate citizen, Coal India Ltd (CIL) has adopted environment friendly and sustainable mining practices.

CIL subscribes to the view of Sustainable Development. Unless the environment can sustain the developmental activities, any pursuit of development in isolation can cause irreparable damage to the ecosystem and associated environmental attributes. Keeping this view in mind, CIL attaches top priority towards sustainable development and approved its 'Corporate Environmental Policy' in December 1995. However, the present policy is the amendment of the earlier 1995 Policy and is complimentary to the National Environmental Policy.

Environment management has taken further deep root in the functioning of CIL management since the introduction of World Bank Project in the year 1995. At that time 25 projects had been taken up under World Bank Loan. While following the stipulation of World Bank, a no. of Environmental and Social Mitigation Plans (ESMP) had been under taken for the above projects. Since then ESMP has been adopted in other non-world bank projects also.

Finally, in the year 2012, CIL had formulated comprehensive Environmental Policy - 2012. This modification in the present policy is the outcome of the experiences gained since 1995 keeping in view the modifications / amendments made time to time in environmental policies and additional requirements notified by various statutory organisations concerning environment clearance, forest clearance, consent to establish and operate from the State Pollution Control Board (SPCB), mine closure plan, reclamation of degraded land, mitigation measures of various pollutions etc. and also with the objective of revisiting the corporate policy. Details of important issues are elaborated in the following chapters.

This Policy, which is reproduced below, has a vision of Green Mining and mission of total compliance of environmental statutes applicable to coal mining industry.

1.1 CIL Environmental Policy - 2012

Policy Statement

Coal India Limited affirms its commitment for environment friendly mining with right mitigation of pollution, reclamation of the degraded land, preservation of biodiversity and

proper disposal of waste following the best environmental practices including judicious use of the non-renewable energy on the path of continual improvement.

OBJECTIVES:

CIL shall endeavour to:

1. Conduct mining and associated operation in an environmentally responsible manner to comply with applicable laws and other requirements related to environmental aspects. Design projects with due consideration of Sustainable Development.
2. Prevent pollution of surrounding habitation by continuous monitoring and adopting suitable measures for environment protection.
3. Ensure compliance of all applicable Environment Clearance (EC) conditions, Forestry Clearance (FC) conditions and other statutory conditions issued by regulatory authorities.
4. Implement Environment Management Plans (EMPs) in all our mines effectively to mitigate pollutions on air, water and noise, reclamation of degraded land and proper disposal of wastes.
5. Strive to conserve Bio-Diversity.
6. Conserve natural resources through recycling of wastes on the principle of REDUCE, RECYCLE, REUSE, REPLACE and REDEFINE. Put special thrusts on efficient energy utilization as a measure to reduce carbon foot-print.
7. Strive for continual improvement in our environmental performances by setting targets, measuring progress and taking corrective actions.
8. Create environmental awareness among the employees and the local communities through pro-active communication and training.

Strategies for Implementation of Environmental Policy:

Strategies: Coal India adopts the strategies appended below for effective implementation:

1. Mine Planning on Sustainable Development:

- a) Coal, being a non-renewal energy source, extraction shall be planned prudently only to meet national essential requirement. The projects shall be designed on the principle of Sustainable Development with due consideration for environment, conservation, safety, quality and aspirations of the community around at the planning stage itself.

- b) CIL shall make efforts to incorporate latest mining equipments with higher and optimum capacity and latest mining technologies those are better suited for the environment while preparing the Project Reports.

2. Environmental Impact Assessment (EIA) & Environment Management Plan (EMP):

- a) Mining shall be carried out in such a way as to facilitate the maintenance of stipulated environmental standards and quality of various pollutants within the prescribed limits under the relevant acts and statutes and National Environmental Policy 2006 during mining and accordingly EIA /EMP is prepared for new and existing mines, washeries etc.
- b) EIA and EMP for all new mines, new washeries, central and regional workshops and other industrial units shall be formulated as per the approved TOR (Terms of Reference) and public consultations for obtaining Environmental Clearance (EC) from MOEF. Similarly, for existing projects those need enhancement of production capacities, change of technology and renewal of lease and increase in land area etc. fresh EC will be required as per norms. Further, the operations in these units shall be guided by the consent letters for air and water, issued by the respective SPCBs.
- c) Detailed Mine Closure Plans shall be prepared for all existing and operating as well as future mines as per the MoC guidelines.

3. Compliance of the statutory requirements:

- a) The implementation of the Environment Management Plans (EMP) and fulfillment of all the statutory requirements are to be ensured at all levels. The Area Environment Cell jointly with the project Environment Cell shall ensure timely implementation and submission of statutory requirement including returns.
- b) Half yearly report of the status of implementation, prepared by the concerned Area Cell, shall be submitted to the MOEF. Quarterly monitoring reports for air and water quality and noise level for every project are to be submitted by the Company HQ Cell to State Pollution Control Boards. Annual environmental statements, required for each unit for the concerned financial year shall be submitted by each unit to concerned State Pollution Control Boards.
- c) Special efforts are to be taken to obtain authorization or permission required under Hazardous Waste (Management & Handling) Rules.

4. Measures to mitigate pollution:

- a) Air Pollution:
 - i) Generation of dust shall be controlled at the source to the possible extent. Necessary measures including use of mobile and / or fixed sprinklers for dust control are to be installed at the sites of drilling, loading & unloading and CHP transfer points.

- ii) Dust is to be minimized along coal / waste transportation roads.
- iii) Dust barriers shall be created around the source of dust.

b) Water Pollution:

- i) The mine water as well as other effluent shall be treated effectively so as to ensure the discharge norms as per statute. The treated effluent will be reutilized to the extent possible with a view to achieve maximum water conservation and utilization.
- ii) The oil & grease of the effluents shall be removed through Oil and Grease traps.
- iii) The other effluents shall be treated properly and the clean water from the treated effluents is utilized for benefit of the industry as well as for the local communities.
- iv) Acid mine water treatment and management has been undertaken in some mines of North Eastern Coalfields, Central Coalfields Ltd and South eastern Coalfields Ltd.

c) Noise Pollution / Ground Vibration:

- i) All effective measures to avoid noise pollution will be taken. The employees deployed in highly noisy working atmosphere shall be provided with Personal Protective Equipments like ear muffs / plugs.
- ii) Besides noise proof enclosures and rotation of the employees in these areas shall be done as far as feasible.
- iii) Controlled blasting techniques shall be followed to reduce ground vibration and noise pollution.

d) Land Reclamation:

- i) Reclamation of mined out areas will be done as per the land-end-use-plan and as stipulated in the approved Environment Management Plan and Mine Closure Plan.
- ii) Slopes of external dumps are an important area to be considered for proper and effective reclamation. These slopes are to be suitably graded & terraced for plantation. Study of Slope stability of dumps for optimization of land use and safety of OB dump slopes is also important.
- iii) Progressive reclamation will be carried out as soon as the mined out areas become dormant. Reclamation will be concurrent and progressive as per feasibility report so as to minimise the delay between mining and productive post-mining land use.
- iv) All efforts shall be made for implementation of back filling to the practical extent.
- v) Reclamation techniques and practices will be developed to suit the ecological conditions and the expert consultation shall be sought, if required.
- vi) EMP shall suggest the means for preservation and suitable use of top soil. All existing non-active dumps are to be technically and biologically reclaimed. Scientific studies shall be undertaken, wherever required, to select suitable local species of plants for each coalfield and sustainable sequence of reclamation through grass to shrubs to trees.

CIL shall monitor the reclamation work by preparation of comprehensive land use maps of all coalfields and opencast mines through Satellite Surveillance. Major OCPs (Coal +

OB) > 5 MM3 / annum are being monitored every year and other OCPs at 3 years interval to get the updated picture of afforestation, excavation area, back filling, abandoned quarries, dumps etc. The outcome shall be put in the websites in public domain.

e) Mine Closure Plans:

Detailed Mine Closure Plans are being / shall be prepared for each mine. Mine Closure Plans are being delineated in two phases viz. progressive and final Mine Closure Plans and are being implemented accordingly. Appropriate funds are set aside and deposited under a special Escrow fund every year as per MoC guidelines which shall be utilized to ensure proper implementation of final mine closure.

Mine Closure Plan underscores about developing post mine land use pattern suitable for income generation of the local community.

f) Mine Fire:

Coal India shall endeavor to reduce occurrence of mine fire and subsidence in built-up areas. Action Plan for mine fire control shall be / are being implemented to control mine fires. Monthly report shall be submitted to top management of the subsidiary and CIL. Quarterly report shall be submitted to company board for its information and directions for further actions.

Technologies like Satellite Surveillance are being used to monitor the extent and severity of fire in different coalfields. Especially in opencast mines, surface miners should be introduced as early as possible to virtually eliminate coal bench fire.

g) Monitoring:

- i) All the critical receptors in and around the mining projects would be monitored regularly to assess the efficacy of pollution control measures taken and to ensure air, water quality and noise level to appropriate standards.
- ii) The effect of mining on the hydrology of the area will be monitored closely. In particular, the level of water in the nearby wells and piezo-meter holes and its quality will be regularly monitored. Rain water harvesting shall be taken up for water conservation.
- iii) Area and unit environmental cells shall develop regular interaction with the people in and around the coal mines on matters related with environment management to have a vigilant and sensitive approach towards the nearby community and take necessary corrective actions accordingly.
- iv) Coal India will strengthen its environmental initiatives by way of regular and effective monitoring through Internal Environmental Audit covering all the subsidiaries and generate a data bank useful for monitoring and reporting purpose.
- v) Action Plan with quarterly time frame, covering 3 years period shall be prepared for implementing mitigative measures in each of the units. This shall be a rolling plan updated at the beginning of each year. The annual budget (revenue & capital) shall be

prepared based on the action plan. Monitoring the various bench marks in the action plan and the budget utilisation shall be monitored at different levels.

h) Other measures:

- i) Rainwater harvesting shall be given due importance in and around mines.
- ii) Efforts to build Data Bank covering information related to EMP parameters shall be made at subsidiary HQ, area and unit levels for all the environmentally cleared projects for reporting purpose.
- iii) Special emphasis will be given to carry out or undertake R&D related to various facets of coalmine environmental management in collaboration with Central Mine Planning and Design Institute (CMPDI) with the state-of-the-art laboratory facilities.

i) Setting high standards:

- i) Besides ensuring statutory compliance, the CIL desires to set high standards and continual improvement.
- ii) A number of new and existing mines and establishments have been certified with ISO 14001. All the mines shall be brought under umbrella of ISO 14001 in a phased manner.

5. Preservation of bio-diversity:

- a) This will start from mine planning, reclamation of mined out areas in collaboration with State Forest Departments, Wild Life Divisions, NGOs etc. working in the fields of bio diversity conservation.
- b) The development of abandoned / degraded land / mined out areas shall be biologically reclaimed by forestation preferably with local species which existed before mining.
- c) Before taking out top soil spreading, collection of local seeds shall be done for spreading on the technically reclaimed soil before the rainy season.
- d) The species selection for plantation shall be done in consultation with the local community to include the local species and their preferences, if any.

6. Coal Beneficiation / Coal Washeries:

- a) For beneficiation of Run- of - Mines (ROM) coal for power plants located beyond 1000 KM from the mine coal, the washeries are being set up in a phased manner.
- b) The Slurry Management System (SMS) in all washeries shall be organised to ensure collection of fines. The rejects produced shall be gainfully utilized for power generation in Fluidized Bed Combustion (FBC) plants, selling to brick manufacturers or adopting other environmental friendly disposal options.
- c) The reject dumps and tailings shall be suitably treated to avoid any contamination.
- d) The effluent from washeries including tailings pond shall be suitably treated and re-circulated to minimize the fresh water consumption and with the concept of zero discharge.

7. Conservation and Clean Technology:

- a) Efforts to promote clean coal technology and improve the technology by R&D projects are being / shall be taken up.
- b) Energy saved is 1.25 times energy produced. A system may be evolved to conduct regularly energy audit voluntarily to find the energy losses in the form of electricity, diesel and coal.
- c) Clean Development Mechanisms will be explored for reducing emission of Green House Gas (GHG) by exploration, identification, preparation of projects reports for extraction of Coal Bed Methane, Coal Mine Methane, Abandoned Mine Methane, Ventilation Air Methane, Shale gas, UG Coal Gasification, utilisation of solar, wind & geothermal energy etc. R & D activities and required steps are to be taken up for commercial exploitation of the energy sources.
- d) As a step towards reduction of GHGs in the atmosphere, the coal companies shall take up the job of assessing carbon foot print to identify the possible areas for reduction of carbon foot print.

8. Awareness Programme:

- a) Wide spread publicity and propaganda through exchange & communication of information, news letters, periodicals on environment, awareness seminar, workshops, celebration of World Environment Day etc at CIL / Subsidiary HQs as well as different units of the subsidiaries shall be done. Regular training programmes will be organised at various levels to inculcate awareness among employees.
- b) Courses on environmental and forestry laws and Environmental Protection Measures and the corporate Environmental Policy shall be organised for project executives in phased manner.
- c) Environment week shall be celebrated starting with World Environment day i.e. on 5th June and organized for all units / projects once in every year. This is to arouse awareness amongst field personnel. This will also promote the importance of environment in the employees and inculcate a sense of social responsibility for environmental protection.
- d) CIL acknowledges excellence in environmental activities by awarding the achievers in the Foundation Day of the company. These awards recognise the merit in preparation and implementation of Environmental Management Plan (EMP), land reclamation programme and compliance of statutes, proper protection of air and water quality.

Implementation of Policy:

- i) **Manpower:** CIL shall have environmental divisions at all decision making / operational levels in its structure. The different levels where the environment cells to be built / strengthened are as under:

- i) CIL Corporate level at Kolkata
- ii) Subsidiary HQ level

- iii) Area level
- iv) Unit / Colliery / Workshop / Washery level
- v) CMPDI (HQ) level / CMPDI Regional Institute / CMPDI Environment Laboratories

ii) Roles and Responsibilities:

The environmental divisions / cells will be built at company HQs, Area and Unit level with appropriate manpower and resources. Implementation of environmental statutes and mitigation measures to be taken up by the environmental cells and / or allied interdisciplinary functionaries of aforesaid levels, as the case may be, and responsibility rests with the concerned level. The environmental cell of company HQ shall be responsible for implementation of the policy at the subsidiary by preparation of suitable action plan every year and concerned Director shall be intimated the status of implementation or violations regularly.

Each subsidiary should prepare action plan for waste recycling.

Possibilities of entering into joint Venture with the agency having expertise on the Mine reclamation activities in all mined out areas are to be explored.

Possibilities for supporting the initiatives of State Forest Department for afforestation by examining the ratio of area of forest land cleared for mining vis-a-vis area afforested every year are to be explored.

iii) Funding the environmental activities:

For projects having approved EMPs, the fund for the environmental activities is covered under capital & revenue provisions made in its project report. For other units, suitable provision as per the requirement to take up all necessary mitigation measures shall be kept in the revenue budget. The fund earmarked shall be spent exclusively on environmental measures to the extent feasible. For capital funding, marginal schemes shall be prepared for each unit or each area to cover the requisite capital expenses.

As per the guidelines of MOC, the cost of mine closure to be provided in the mine plans / project reports and EMPs and deposited in a ESCROW fund, which shall be utilized for final mine closure.

iv) Environmental Cost Code:

As a policy, the cost code for environment has been put in place, for generation of data on expenses incurred for environmental safeguards. This will help to monitor cost effectiveness of environmental control measures being applied and help frame future budget provisions.

Review of Environmental Policy:

In view of the present fast changing social, economic and environmental scenario, this Policy shall be reviewed and revised every 5 years to incorporate the changes in the legal, technical, environmental, economic and social inputs prevailing at that time. Whenever, there is change

in National Environmental Policy or other National / State relevant policies, Acts etc, this Corporate Environmental Policy would be reviewed and suitably revised.

1.2 CIL's Resettlement and Rehabilitation Policy – 2012 and Sustainable Development (SD) Policy - 2013

- a) Rehabilitation and Resettlement (R&R) Policy – Even though environmental personnel do not deal it directly, a detailed knowledge about R&R policy of the company will help them in discharging their duties and implementing the environmental activities in a better way. R&R policy of CIL is reproduced in Appendix - I.
- b) Sustainable Development (SD) Policy – Environmental activities and CSR are the sub sets of SD policy. So, the environmental personnel should have knowledge about SD policy of CIL. SD policy of CIL is reproduced in Appendix - II.

1.3 Definition of some key of terms related to Environment Management:

Abatement of Pollution: It is a process that involves the reduction of the presence of environment damaging pollutants.

Acid Rain: Acid rain is caused by emission of dioxide of sulphur and nitrogen oxide which react with water molecules in the atmosphere. The precipitation has a low value on the pH scale and has harmful effects on the living and non-living things.

Aquifer: An aquifer is an underground layer of water bearing permeable rock or unconsolidated materials (gravel, sand or salt) from which ground water can be extracted using water well. Aquifers are found in most parts of the world and play a vital role both in agriculture and in sustaining life.

Air Pollutant: An air pollutant refers to anything in the air capable of harming living organism or the environment. Such substances can occur naturally or inducted through human activities and examples include suspended particulates, chemicals, biological materials or other harmful materials in the Earth's atmosphere.

Back filling: Filling of an excavated area or void by the Over Burden (OB) material or any other approved material.

Biological Reclamation: Converting the technically reclaimed area into a green field / cover such as plantation of trees to create man made forest or pasture land or agricultural land (if feasible) as envisaged in EMP / Mine closure plan.

Biodiversity is the variety and different living organisms from all sources, including terrestrial, marine and other aquatic life and a part of complex ecosystems. This includes genetic diversity within and between species and of ecosystems. Thus, in essence, biodiversity is the degree of variation of life.

Biogas: It is a form of bio-fuel. Biogas is generated when organic matter breaks down in an oxygen-free environment with the help of organic / in-organic materials and can be used for generating energy. Such organic matter can include crop residues, sewage and manure, and biogas is not usually associated with the release of environmentally damaging pollutants.

Biomass is organic material from which fuel can be derived. Such material can include crops residues, food waste, animal waste and the residue left over from the harvesting process.

Carbon footprint is a measure of emission of greenhouse gases caused directly or indirectly by human activities, organization's lifestyle or operation, product processes, corporation, processes or events and it is measured in units of carbon dioxide.

Carbon Neutral is a term having a net zero carbon foot print. For example, carbon dioxide generated by fossil fuel burning is counterbalanced by plantation, renewable energy generation as a means of compensation.

Deforestation is the process of transforming forest into non-forest sites.

Drainage / Catchment Area A catchment area is an extent or an entire geographical area of land where surface water from rain and melting ice or snow converges to a single point where the waters drain into another water body such as a river and its tributaries, estuary, lake, wetland, reservoir, sea or ocean.

Ecology is the scientific study of interactions among organisms and their environment.

Ecosystem - Means a dynamic complex system of plants, animals, microorganisms, communities and their non-living environment interacting as the functional units (Convention on Biological Diversity, 1992). It is a community of living organisms (plants, animals and microbes) in conjunction with the nonliving components of their environment (things like air, water and mineral soil), interacting as a system.

Effluent Treatment Plant (ETP): It is a plant that provides the mechanism and processes used to treat the contaminated / polluted water generated by the industry or all allied operations or from the residential colony to meet the acceptable standards before discharging it into the natural drainage system

Emission standards are the set specific limits to the amount of pollutant that can be released into the environment so that it is tolerable and harmless to the ecosystem.

Environment - The sum total of all surroundings of the living organisms, including natural forces and other living things which provide conditions for development and growth as well as of danger and damage.

Environment Impact Assessment (EIA): Environmental impact assessment is an assessment of the effects of a proposed development on the physical, biological, social, and economic

environment. The development could be a policy, plan, and programme, project, social, cultural or economic.

Environment Management Plan (EMP): The detailed action plan with mitigation measures to be taken based on Environment Impact Assessment (EIA) for establishing commercial activities.

Environmental pollutant - Any solid, liquid or gaseous substance present in such concentration as may be, or tend to be injurious to environment

Erosion is the general term for the progressive wearing away of the materials on a surface - typically rocks and soils

E-Waste is a particular type of waste generated out of damaged electrical / electronic products.

Geo-textiles: It is a variety of textiles materials (organic & in-organic) that are used in conjunction with earth for stabilizing & strengthening the earth system.

Global Warming is the gradual rise in average temperature of the Earth's near surface to change earth's climate system.

Greenhouse effect is a process by which greenhouse gases in the atmosphere trap radiation from the sun. These gases which include carbon dioxide, methane etc. permit the passing through of sunshine, but absorb the heat thrown up by the earth's surface.

Infiltration (hydrology) is a process by which water on the ground surface enters the soil or ground water flow from one area to another.

Mine spoil: A mixture of rocks, rock fragments, soil and other natural materials that result from surface / opencast mining operation.

Mine Reclamation is the process of restoring land that has been mined to a natural or economically usable purpose. Reclamation creates useful landscapes that meet a variety of goals ranging from the restoration of productive ecosystems to the creation of industrial & municipal resources and minimizes & mitigates the environmental effects of mining.

Renewable energy is energy that comes from resources which is perpetual, abundant, inexhaustible, clean alternative to fossil fuels, derived from natural process and replenished constantly such as sunlight, wind, river flow, rain, tides, waves and geothermal heat etc.

Stakeholder - A person, group or organisation with the potential to affect or be affected by an organisation's action or business.

Sustainable development (SD) is the developmental activities those meet the needs of the present without compromising the ability of future generations to meet their needs.

Technical reclamation: It denotes proper handling of OB and other materials for control of soil erosion like compacting, leveling, grading, gully plugging, terracing, proper dressing, spreading of top soil etc. to make OB dump stable and suitable for undertaking biological reclamation.

1.4 IMPLEMENTATION OF ENVIRONMENT CLEARANCE AND OTHER STATUTORY CONDITIONS.

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 to be under taken as per the EMP, EC, FC, and Consent to establish & operate conditions.

1.4.1 EC suggests various measures to be taken in its clearance conditions. Details of Mitigation measures taken and compliance reports of all conditions are to be sent half yearly i.e. on – 30th September & 31st March every year or any other interval as fixed by MoEF for the entire life of the concerned mine both in a hard & soft copy to MOEF, Regional office and Also *uploaded in company web-site (please refer EC conditions)*.

1.4.2 Compliance reports of consent to operate conditions are to be sent to SPCB

1.4.3 Environmental monitoring as specified in EC / EP Act – is to be carried out by any QCI accredited agency or CMPDIL. Please refer EC conditions of your project for details of parameters to be monitored besides applicability as per EP Act. Most common monitoring parameters have been given in the table below:

Sl. no.	Particulars
1.	Ambient air for PM 2.5, PM 10, SO _x , NO _x
2.	Water quality – <ul style="list-style-type: none"> ■ Mine effluent ■ Workshop effluent ■ Domestic effluent
3.	Noise level
4.	Ground water level in wells in 10 km radius every quarter and water quality once / yr
5.	Land use cover maps through satellite imagery
6.	Any other specific study as directed by MOEF
7.	Meteorological data of the region for climatic change.

1.4.4 Statutory Returns to SPCB / Other authorities with frequency

Sl. no.	Particulars	Authorising Authority	Frequency
1.	Hazardous Waste Rules - 2008	To be obtained from SPCB	Annually in form - 4 on 30 th June for previous financial year, In case of accident form - 5
2.	Bio – Medical Waste Rules 1998 /	From SPCB for hospital &	31 st January in form – II for previous year. In case of accident in form – III.

	amended 2003	dispensary	
3.	Battery Waste Rules - 2001	From SPCB	30 th June & 31 st December every year in form VIII
4.	Water Return for Cess assessment	To SPCB	5 th of every month or as per SPCB or quarterly, if agreed by SPCB to reduce paper work
5.	Water Cess Act - 1977	From SPCB	Payment of water Cess within 30 days from the date of receipt of assessment order from SPCB.
6.	Compliance of SPCB Mine Inspection	From SPCB	Reply to the letters / memos / show cause notices within fifteen days.
7.	Environment State-ment as per EPA	From SPCB	Form V - Annually by 30 th September every year
8.	Monitoring Report As Per EC conditions	To MoEF Regional Office	Quarterly / Monthly to SPCB & Regional Office, MoEF. To be uploaded in web
9.	EC compliance report	To MoEF Reg. Office	30 th September & 31 st March or as fixed by MoEF
10.	Renewal of Consent to Operate	From SPCB	As per directive of SPCB. To be applied 6 / 4 months before as specified in Consent letter.
11.	Environmental auditing and risk assessment.	Self Regulation	Monitoring of indicators in respect of land reclamation, water recharge, variation in temperature and others.

Sl. no.	Items to be monitored	Parameters	No. of Stations	Submission frequency
1	Ambient Air & water Quality	As per EC Condition	As per EC Condition	Quarterly Report are to be submitted to SPCB & MOEF
2	Noise level	Do	Do	Quarterly Report are to be submitted to SPCB & MOEF
3	Ground water Quality & Level	Do	In Core & Buffer Zone	Quarterly Report are to be submitted to CGWA & MOEF

Besides mines, other units like Work shops, Hospitals, canteens, townships etc. require certain permissions and approvals from the statutory authorities which should be dealt with the concern departments, if required in consultation with the environment department. These permissions and approvals from the statutory authorities are normally not uniform for all state govt., so the related rules and regulations of the respective govt. should be consulted.

Environmental Statutes Related to Mining Industries

2.0 Act, Rules, Regulations and other statutes are framed by the various competent authorities to have uniformity in use & application, direction to manage, prevent wastage & control activities, protect, conserve & preserve natural resources, set policy, notify office memorandum, standards and specifications, set fees and penalties, give guidelines about different activities etc. Related statutes need to be followed for trouble free compliance of such statutes and good rapport should also be maintained with the statutory officials.

A list of up dated major important statutes relevant to Mining Environment and allied activities are listed below.

2.1 WATER POLLUTION RELATED:

ACT:

- The Water (Prevention & Control of Pollution) Act, 1974
- The Water (Prevention & Control of Pollution) Cess Act, 1977
- The Water (Prevention & Control of Pollution) Cess (Amendment) Act, 2003

RULES:

1. G.S.R.378 (E), dated 24.07.1978-The Water (Prevention & Control of Pollution) Cess Rules 1978
2. G.S.R. 830(E), [Dt.24/11/2011] - The Water (Prevention and Control of Pollution) Amendment Rules, 2011
3. G.S.R. 840(E), [Dt.22/11/2012] - The Central Pollution Control Board (Member- Secretary, Terms and Conditions of Service and Recruitment) Rules, 2012
4. G.S.R. 860(E), [Dt.30/11/2012] - The Central Pollution Control Board (Qualifications and Other Terms and Conditions of Service of Chairman) (Amendment) Rules, 2012

NOTIFICATIONS

- S.O. 499(E) [Dt.06/5/2003] – Rate of Cess notified under Water (Prevention and Control of Pollution) Cess (Amendment) Act, 1977 (36 of 1977)

BIS SPECIFICATIONS

- MOEF Schedule – VI: 1996 – Water Quality Standards for effluent water
- IS 2296:1982 – Water Quality Standards for surface Water Bodies
- IS 10500:1991 – Water Quality Standards for drinking water
- IS 10500: 2012- Water Quality Standards for drinking water

2.2 AIR POLLUTION RELATED:

ACT:

- Air (Prevention & Control of Pollution) Act, 1981

RULES:

- G.S.R., dated 18.11.1982- Air (Prevention & Control of Pollution) Rules, 1982

NOTIFICATION:

- G.S.R. 826(E), [16/11/2009] – Revised National Ambient Air Quality Standards

2.3 FOREST CONSERVATION RELATED:

ACT:

- The Indian Forest Act, 1927
- Forest (Conservation) Act, 1980
- State / Union Territory Minor Forest Produce (Ownership of Forest Dept. Community) Act, 2005 – Draft
- Forest Rights Act, 2006

RULES:

- G.S.R., 719 dated 20.07.1981-Forest (Conservation Rules), 1981
- G.S.R. 23(E) – Forest Conservation Rules, 2003
- The forest (Conservation) Amendment Rules, 2014

POLICY:

- National Forest Policy, 1988

GUIDELINES:

1. Diversion of forest land for non-forest purposes under the Forest (Conservation) Act, 1980 - ensuring compliance of the *Scheduled Tribes and Other Traditional Forest Dwellers (Recognition of Forest Rights) Act 2006*, dated 30.07.2009
2. Guidelines dated 11.09.2009 - Guidelines for diversion of forest land for non-forest purposes under the Forest (Conservation) Act, 1980 - General Approval under Section 2 of Forest (Conservation) Act, 1980, thereof.
3. Guidelines dated 19.08.10: Guidelines for diversion of forest land for non-forest purposes under the Forest (Conservation) Act, 1980 - clarification regarding forest areas outside National Park / sanctuary but within 10 km radius from the boundary - reg.
4. Guidelines for diversion of forest land for non-forestry purposes under the Forest (Conservation) Act, 1980 - for stipulating the norms for Survey and Investigation (Prospecting of ores) on forest land, dated 19.08.2010
5. Guidelines dated 08.07.11: Submission of Geo-referenced digital data for applications under Forest (Conservation) Act, 1980.
6. Guidelines for re-diversion of forest land under the Forest (Conservation) Act, 1980, dated 30.09.2011
7. Guidelines dated 13.02.12: Guidelines for diversion of forest land for non-forest purposes under the Forest (Conservation) Act, 1980 - Non-availability of forest land for creation of compensatory afforestation.

8. Guidelines dated 12.07.12: Guidelines for diversion of forest land for non-forest purposes under the Forest (Conservation) Act, 1980.
9. Report of the Committee (July 2012) constituted under the Chairmanship of the Secretary, Environment and Forests to formulate objective parameters for identification of inviolate forest areas. -reg.
10. Guidelines for diversion of forest land for non-forest purposes under the Forest (Conservation) Act, 1980 -Modification in para 4.4 and 2.2 (iii) thereof, dated 07.01.2013
11. Guidelines dated 01.02.13: Guidelines for diversion of forest land for non-forest purposes under the Forest (Conservation) Act 1980- Submission of proposals to obtain approval for diversion of entire forest land located within the mining lease and grant of environment clearance to mining projects.
12. Guidelines dated 05.02.2013: Diversion of forest land for non-forest purposes under the Forest (Conservation) Act, 1980 - ensuring compliance of the Scheduled Tribes and Other traditional Forest Dwellers (Recognition of Forest Rights) Act, 2006.
13. Guidelines dated 03.05.2013: Guidelines for diversion of forest land for non-forest purposes under the Forest (Conservation) Act, 1980 - Modification in para 2.8 thereof.
14. Guidelines dated 05.11.2013: Guidelines for diversion of forest land for non-forest purposes under the Forest (Conservation) Act 1980—Simplified procedure for grant of approval in certain cases of renewal of mining leases.
15. Guidelines dated 21.08.014: Guidelines regarding de-linking of grant of forest clearance from the clearance from the Standing Committee of the National Board for Wild Life (NBWL).
16. Guidelines dated 28.10.2014: Diversion of forest land for non-forest purposes under the Forest (Conservation) Act, 1980- ensuring compliance of the Scheduled Tribes and Other Traditional Forest Dwellers (Recognition of Forest Rights) Act,2006.
17. Guidelines dated 17.11.2014: Guidelines for diversion of forest land for non-forest purposes under the Forest (Conservation) Act, 1980- Submission of proposals to obtain approval for diversion of entire forest land located within the mining lease and grant of environment clearance to mining projects.
18. Guidelines dated 20.01.2015: Guidelines for diversion of forest land for non-forest purposes under the Forest (Conservation) Act, 1980 - Submission of proposals to obtain approval for diversion of entire forest land located within the mining lease and grant of environmental clearance to mining projects.

2.4 WILD LIFE RELATED:

ACT:

- The Indian Wildlife (Protection) Act, 1972
- The Wild Life (Protection) Amendment Act, 2002

- The Wild Life (Protection) Amendment Act, 2006

RULES:

- G.S.R. 348(E) dated 18.04.1995-Wildlife (Protection) Rules, 1995
- S.O.445(E),[18/4/2003] – The Declaration of Wild Life Stock Rules, 2003
- S.O.1092(E), [22/9/2003] – The National Board for Wild Life Rules, 2003

NOTIFICATIONS

- S.O.474(E), [28/5/2001] – Additions to Schedule I of Wild Life (Protection) Act, 1972 (53 of 1972)
- S.O.665(E), [11/7/2001] – Amendments to Schedule I and Schedule III of Wild Life (Protection) Act, 1972 (53 of 1972)
- S.O.1197(E), [05/12/2001] – Amendments to Schedule I and Schedule IV of Wild Life (Protection) Act, 1972 (53 of 1972)
- S.O.1085(E), [30/9/2002] – Amendments to Schedule I and part II of Schedule II of Wild Life (Protection) Act, 1972 (53 of 1972)
- S.O.802(E), [16/5/2007] – The National Board for Wild Life Rules, 2007

2.5 ENVIRONMENT PROTECTION RELATED:

ACT:

- Environment (Protection) Act, 1986

RULES:

- S.O. 844(E) dated 19.11.1986- Environment (Protection) Rules, 1986

NOTIFICATIONS

1. S.O. 728(E) dated 21.07.1987 and subsequent amendments - Recognition of Environmental Laboratories and Analysts
2. S.O. 394(E) published in Gazette No. 185 dated 16-4-87 and amendments thereafter - Officers Authorized for taking Cognizance of offences
3. S.O. 83 (E) dated 16-2-87 and amendments thereafter -Authorized Officers / Agencies to enter the Premises for Inspection.
4. S.O. 84(E). dated 16th February, 1987 and amendments thereafter - Officers / Agencies to take Samples
5. EIA notification 2006

GUIDELINES

1. G.S.R.371 (E), [17/5/2002] - The Environment (Protection) Second Amendment Rules, 2002. (DG Sets)
2. G.S.R.489 (E), [09/7/2002] - The Environment (Protection) Third Amendment Rules, 2002
3. G.S.R. 448(E), [12/7/2004] – The Environment (Protection) Second Amendment Rules, 2004. (DG Sets)
4. S.O.1737 (E), [11/10/2007] – Environmental Impact Assessment Notification, 2007
5. G.S.R. 280(E), [11/4/2008] – Environment (Protection) Amendment Rules, Notification (DG Sets)
6. G.S.R. 752(E), [24/10/2008] – Environment (Protection) Amendment Rules, 2008. (DG Sets)
7. S.O.195 (E), [19/01/2009] – Environmental Impact Assessment Notification, 2009
8. S.O.3067 (E), [01/12/2009] – Environmental Impact Assessment Notification, 2009
9. S.O.695 (E), [04/4/2011] – Amendment to EIA Notification, 2006
10. S.O.156 (E), [25/01/2012] – Amendment to EIA Notification, 2006

LATEST CIRCULARS:

- Consideration of projects for grant of environment clearance under EIA Notification, 2006, which involve forestland - Procedure to be followed - further clarifications – Regarding, O.M. dated 09.09.2011
- Guidelines for granting Environment Clearance for expansion of Coal Mining Projects involving one-time production capacity expansion of up to 25% in the existing operation - reg., O.M. dated 19.12.2012
- Guidelines for granting Environment Clearance for expansion of Coal Mining Projects involving one time production capacity expansion in the existing operation-reg., O.M. dated 07.01.2014

2.6 NATIONAL ENVIRONMENT TRIBUNAL & APPELLATE AUTHORITY:

1. The National Environment Tribunal Act, 1995
2. The National Environment Appellate Authority Act, 1997

2.7 NATIONAL GREEN TRIBUNAL:

National Green Tribunal Act 2010

2.8 HAZARDOUS SUBSTANCES MANAGEMENT RELATED:

1. Hazardous Wastes (Management & Handling) Rules, 1989
2. Hazardous Wastes (Management & Handling) Amendment Rules, 2000
3. Hazardous Waste (Management Handling & Trans-boundary movement) Rules, 2008
4. Bio-Medical Waste (Management & Handling) Rules, 1998
5. Batteries (Management & Handling) Rules, 2001
6. The batteries (Management and Handling) rules, 2001
7. E-waste (Management & Handling) Rules, 2011

2.9 NOISE POLLUTION RELATED:**RULES:**

1. S.O.123 (E), [14/2/2000] - Noise Pollution (Regulation and Control) Rules, 2000
2. S.O.1046 (E), [22/11/2000] - The Noise Pollution (Regulation and Control) (Amendment) Rules, 2000
3. S.O.1088 (E), [11/10/2002] - The Noise Pollution (Regulation and Control) (Amendment) Rules, 2002
4. S.O.1569 (E), [19/09/2006] - The Noise Pollution (Regulation and Control) (Amendment) Rules, 2006
5. S.O.50 (E), [11/01/2010] - The Noise Pollution (Regulation and Control) (Amendment) Rules, 2010.

2.10 BIO-DIVERSITY RELATED:

Biological Diversity Act, 2002

2.11 MINERAL CONSERVATION & DEVELOPMENT RELATED:

G.S.R.No.1023 (E), dated 24.10.1988- The Mineral Conservation & Development Rules (MCDR), 1988 amended in 2003)

2.12 MINE CLOSURE RELATED:

Mine Closure Plan guide lines from Ministry of Coal dated - 07/01/2013

2.13 MISCELLANEOUS:

- Environmental Clearance and conditionality for the project issued by Ministry of Environment & Forests (MOEF), Govt. of India (EIA notification 2006)
- Consent to Operate and Conditionality for the project under Air & Water Act issued by State Pollution Control Board (SPCB)

Note: For further information please consult the website: www.moef.nic.in

2.14 Hazardous Wastes (Management, Handling and Trans-Boundary Movement) Rules, 2008.

These Rules classify certain kinds of waste materials as hazardous waste under the Hazardous Waste (Management & Handling) Rules, 2008 that requires proper handling and disposal. Organization will seek authorization for disposal of hazardous waste from concerned State Pollution Control Boards (SPCB) as and when required.

List of Hazardous Waste applicable to coal mines

Sl. no. of Sch. - 1	Process	Hazardous Wastes
5	Industrial Operation using mineral / Synthetic oil as lubricant in Hydraulic systems or other applications.	5.1 Used / Spent Oil 5.2 Wastes / residue containing oil.

34	Purification Process for air, water & waste water.	34.3 Chemical Sludge from Waste Water Treatment 34.4 Oil & grease skimming residue
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These waste shall be handled and to be stored as per procedure in the act. It can be stored not exceeding 90 days and a record shall be maintained of sale, transfer, storage and make available for inspection. The field people should ensure that the authorized agency lifting the Hazardous waste has valid authorization issued by SPCB.

Environmental

Clearances

3.0 Environmental Clearance

As per the EIA Notification, 2006 (14/09/2006), Ministry of Environment & Forests (MoEF), Govt. of India, the following projects or activities shall require prior environmental clearance from the concerned regulatory authority, which shall hereinafter referred to be as the Central Government in the MoEF for matters falling under Category “A” in the Schedule and at State level the State Environment Impact Assessment Agency (SEIAA) for matters falling under Category “B” in the said schedule, before any construction work or preparation of land by the project management except for securing land, is started on the project or activity:

- (i) All new projects or activities listed in the schedule to this notification;
- (ii) Expansion and modernization of existing projects or activities listed in the schedule to this notification with addition of capacity beyond the limits specified for the concerned sector, that is, projects or activities which cross the threshold limits given in the schedule, after expansion or modernization;
- (iii) Any change in product mix in an existing manufacturing unit included in schedule beyond specified range.
- (iv) Increase in the land Area over the approved
- (v) Renewal of lease for the mining area.

3.1 General Condition (GC) – Any project or activity specified in Category “B” will be treated as Category “A”, if located in whole or part within 10 km from the boundary of: (i) Protected areas notified under Wild Life (Protection) Act, 1972; (ii) Critically polluted areas as notified by Central Pollution Control Board from time to time; (iii) Notified Eco- Sensitive areas; (iv) Inter State boundaries and International boundaries. In 2009, the schedule has been amended now stipulates as under

Schedule

(EIA Notification, 2006 - Special Reference to Mining of Minerals) Mining, Extraction of natural resources and Power generation (for a specified production capacity) relevant to coal mining

Project Activity		Category with threshold limits		Conditions if any
		A	B	
(1)	(2)	(3)	(4)	(5)
1(a)	Mining of Minerals	≥50 ha of mining lease area for coal mining	<50 ha ≥ 5 ha of mining lease area for coal mining.	General Condition shall apply Note: Mineral prospecting (not involving drilling) is exempted provided the concession area has got previous clearance for physical survey.

Above notification has been revised and amended at later date. Therefore, latest notification should be followed.

3.2 Application for Prior Environmental Clearance (EC)

An application seeking prior environmental clearance in all cases shall be made in the prescribed Form 1 for new project and Supplementary Form 1A, for expansion, alteration or modification annexure II with EIA Notification, 2006, after the identification of prospective site(s) for the project and / or activities to which the application relates, before commencing any construction activity, or preparation of land, at the site by the applicant. The applicant shall furnish, along with the application, a copy of the pre-feasibility project report.

3.3 Stages in the Prior Environmental Clearance (EC) process for new projects.

The environmental clearance process for new projects will comprise of a maximum of four stages, all of which may not apply to particular cases as set forth below in the notification. These four stages in sequential order are: -

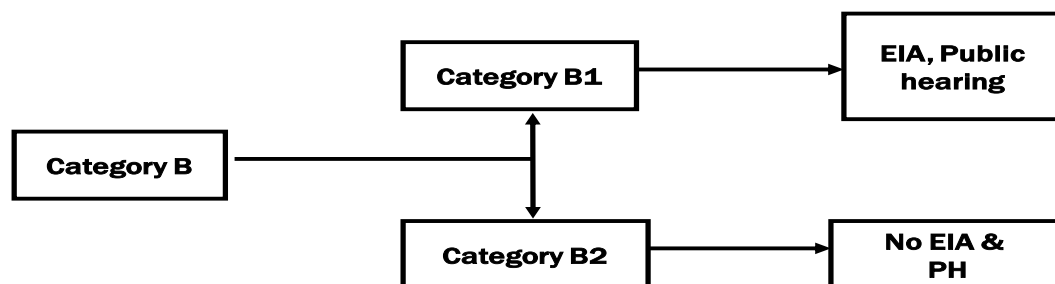
- Stage (1) Screening (only for category “B” projects or activities)
- Stage (2) Scoping.
- Stage (3) Public Consultation
- Stage (4) Appraisal.

3.3.1 Stage (1) - Screening:

In case of Category ‘B’ projects or activities, this stage will entail the scrutiny of an application seeking prior environmental clearance made in Form 1 by the concerned State level Expert Appraisal Committee (SEAC) for determining whether or not the project or activity requires further environmental studies for preparation of an Environmental Impact Assessment (EIA) for its appraisal prior to the grant of environmental clearance depending up on the nature and location specificity of the project. The projects requiring an Environmental Impact Assessment report shall be termed Category ‘B1’ and remaining projects shall be termed Category ‘B2’ and will not require an Environment Impact Assessment report. For categorization of projects into B1 or B2, the Ministry of Environment and Forests shall issue appropriate guidelines from time to time.

SCREENING

- No screening required for Category A projects
- Category B projects will be further screened at the state level for categorization into either B1 or B2. Specific guidelines to be evolved by MoEF



Apply in Form-I for screening

3.3.2. Stage (2) - Scoping:

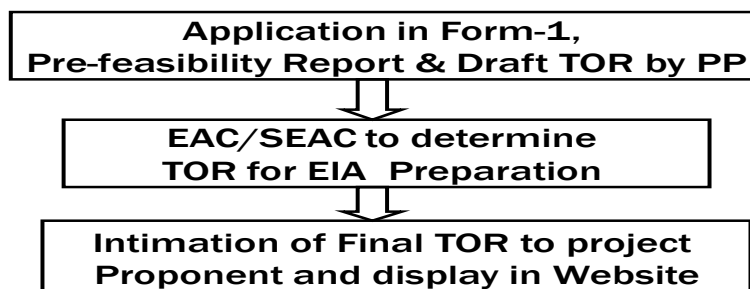
(i) “Scoping”: refers to the process by which the Expert Appraisal Committee (EAC) in the case of Category ‘A’ projects or activities and State level Expert Appraisal Committee (SEAC) in the case of Category ‘B1’ projects or activities, including applications for expansion and / or modernization and / or change in product mix of existing projects or activities, determine detailed and comprehensive Terms Of Reference (TOR) addressing all relevant environmental concerns for the preparation of an Environment Impact Assessment (EIA) Report in respect of the project or activity for which prior environmental clearance is sought. The EAC or SEAC concerned shall determine the TOR on the basis of the information furnished in the prescribed application Form1 / Form 1A including TOR proposed by the applicant, a site visit by a sub-group of EAC or SEAC concerned only if necessary. All projects and activities listed as Category ‘B’ in Item 8 of the Schedule (Construction / Township / Commercial Complexes / Housing) shall not require Scoping and will be appraised on the basis of Form 1 / Form 1A and the conceptual plan.

(ii) TOR shall be conveyed to the applicant by the EAC or SEAC within sixty days of the receipt of Form 1. If TOR are not finalized and conveyed to the applicant within sixty days of the receipt of Form 1, the TOR suggested by the applicant shall be deemed as the final TOR approved for the EIA studies. The approved TOR shall be displayed on the website of the MoEF and the concerned State Level Environment Impact Assessment Authority (SEIAA).

(iii) Applications for prior environmental clearance may be rejected by the regulatory authority concerned on the recommendation of the EAC or SEAC concerned at this stage itself. In case of such rejection, the decision together with reasons for the same shall be communicated to the applicant in writing within sixty days of the receipt of the application.

SCOPING

Scoping required for Category A and Category B1 projects, upon finalization of site - To



3.3.3. Stage (3) - Public Consultation:

(i) “Public Consultation” refers to the process by which the concerns of local affected persons and others who have plausible stake in the environmental impacts of the project or activity are ascertained with a view to taking into account all the material concerns in the project or activity design as appropriate. All Category ‘A’ and Category B1 projects or activities shall undertake Public Consultation, except the following: -

- (a) Modernization of irrigation projects [item 1(c) (ii) of the Schedule].
- (b) All projects or activities located within industrial estates or parks (item 7(c) of the Schedule) approved by the concerned authorities, and which are not disallowed in such approvals.
- (c) Expansion of Roads and Highways (item 7 (f) of the Schedule) which do not involve any further acquisition of land.
- (d) All Building / Construction projects / Area Development projects and Townships (item 8)
- (e) All Category ‘B2’ projects and activities.
- (f) All projects or activities concerning national defense and security or involving other strategic considerations as determined by the Central Government.

(ii) The Public Consultation shall ordinarily have two components comprising of: -

- (a) A public hearing at the site or in its close proximity - district wise, to be carried out in the manner prescribed in Appendix IV, for ascertaining concerns of local affected persons;
- (b) Obtaining responses in writing from other concerned persons having a plausible stake in the environmental aspects of the project or activity.

(iii) The public hearing at or in close proximity to the site(s) in all cases shall be conducted by the State Pollution Control Board (SPCB) or the Union territory Pollution Control Committee

(UTPCC) concerned in the specified manner and forward the proceedings to the applicant or to the regulatory authority concerned within 45 (forty-five) on request from the applicant.

(iv) In case the SPCB or the UTPCC concerned does not undertake and complete the public hearing within the specified period, and / or does not convey the proceedings of the public hearing within the prescribed period directly to the regulatory authority concerned as above, the regulatory authority shall engage another public agency or authority which is not subordinate to the regulatory authority, to complete the process within a further period of forty-five days,

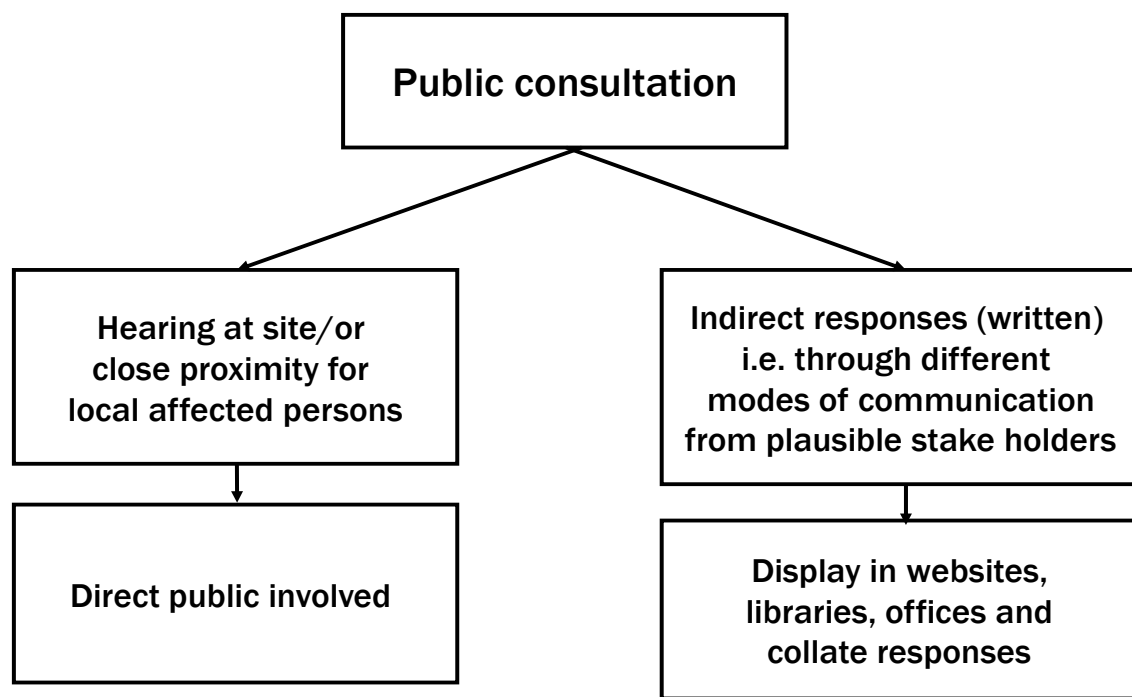
(v) If the public agency or authority nominated under the sub paragraph (iii) above reports to the regulatory authority concerned that owing to the local situation, it is not possible to conduct the public hearing in a manner which will enable the views of the concerned local persons to be freely expressed, it shall report the facts in detail to the concerned regulatory authority, which may, after due consideration of the report and other reliable information that it may have, decide that the public consultation in the case need not include the public hearing.

(vi) For obtaining responses in writing from other concerned persons having a plausible stake in the environmental aspects of the project or activity, the concerned regulatory authority and the SPCB or the UTPCC shall invite responses from such concerned persons by placing on their website the Summary EIA report prepared in the format given in Appendix IIIA by the applicant along with a copy of the application in the prescribed form, within seven days of the receipt of a written request for arranging the public hearing. Confidential information including non-disclosable or legally privileged information involving Intellectual Property Right, source specified in the application shall not be placed on the web site. The regulatory authority concerned may also use other appropriate media for ensuring wide publicity about the project or activity. The regulatory authority shall, however, make available on a written request from any concerned person the Draft EIA report for inspection at a notified place during normal office hours till the date of the public hearing. All the responses received as part of this public consultation process shall be forwarded to the applicant through the quickest available means.

(vii) After completion of the public consultation, the applicant shall address all the material environmental concerns expressed during this process, and make appropriate changes in the draft EIA and EMP. The final EIA report, so prepared, shall be submitted by the applicant to the concerned regulatory authority for appraisal. The applicant may alternatively submit a supplementary report to draft EIA and EMP addressing all the concerns expressed during the public consultation.

PUBLIC CONSULTATION

To ascertain the concerns of local affected persons and others who have a plausible stake in environmental impacts of the project/ activity – in 45 days



3.3.4. Stage (4) - Appraisal:

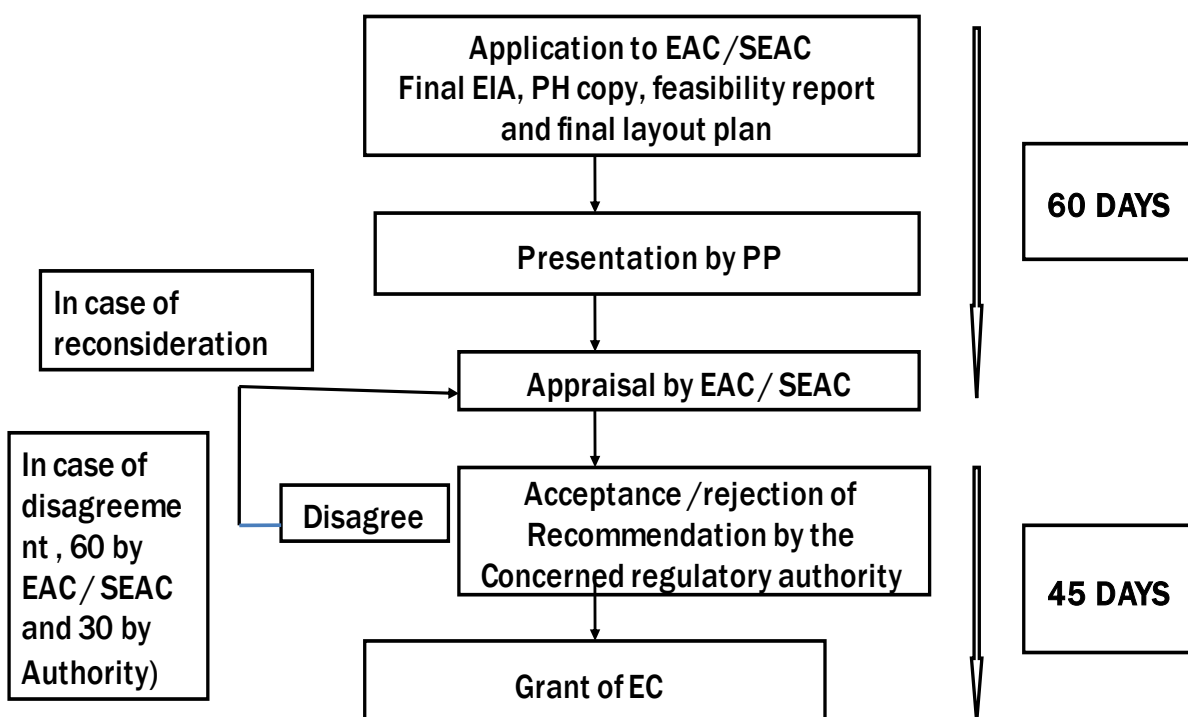
(i) Appraisal means the detailed scrutiny by EAC or SEAC of the application and other documents like the Final EIA report, outcome of the public consultations including public hearing proceedings, submitted by the applicant to the regulatory authority concerned for grant of environmental clearance. This appraisal shall be made by EAC or SEAC in a transparent manner in a proceeding to which the applicant shall be invited for furnishing necessary clarifications in person or through an authorized representative. On conclusion of this proceeding, the EAC or SEAC shall make categorical recommendations to the regulatory authority either for grant of prior environmental clearance on stipulated terms and conditions, or rejection of the application for prior environmental clearance together with reasons.

(ii) The appraisal of all projects or activities which are not required to undergo public consultation, or submit an Environment Impact Assessment report, shall be carried out on the basis of the prescribed application Form 1 and Form 1A as applicable, any other relevant validated information available and the site visit wherever the same is considered as necessary by the EAC or SEAC concerned.

(iii) The appraisal of an application shall be completed by the EAC or SEAC within sixty days of the receipt of the final EIA / EMP report and other documents or the receipt of Form 1 and Form 1 A, where public consultation is not necessary and the recommendations of the EAC or SEAC shall be placed before the competent authority for a final decision within the next fifteen days

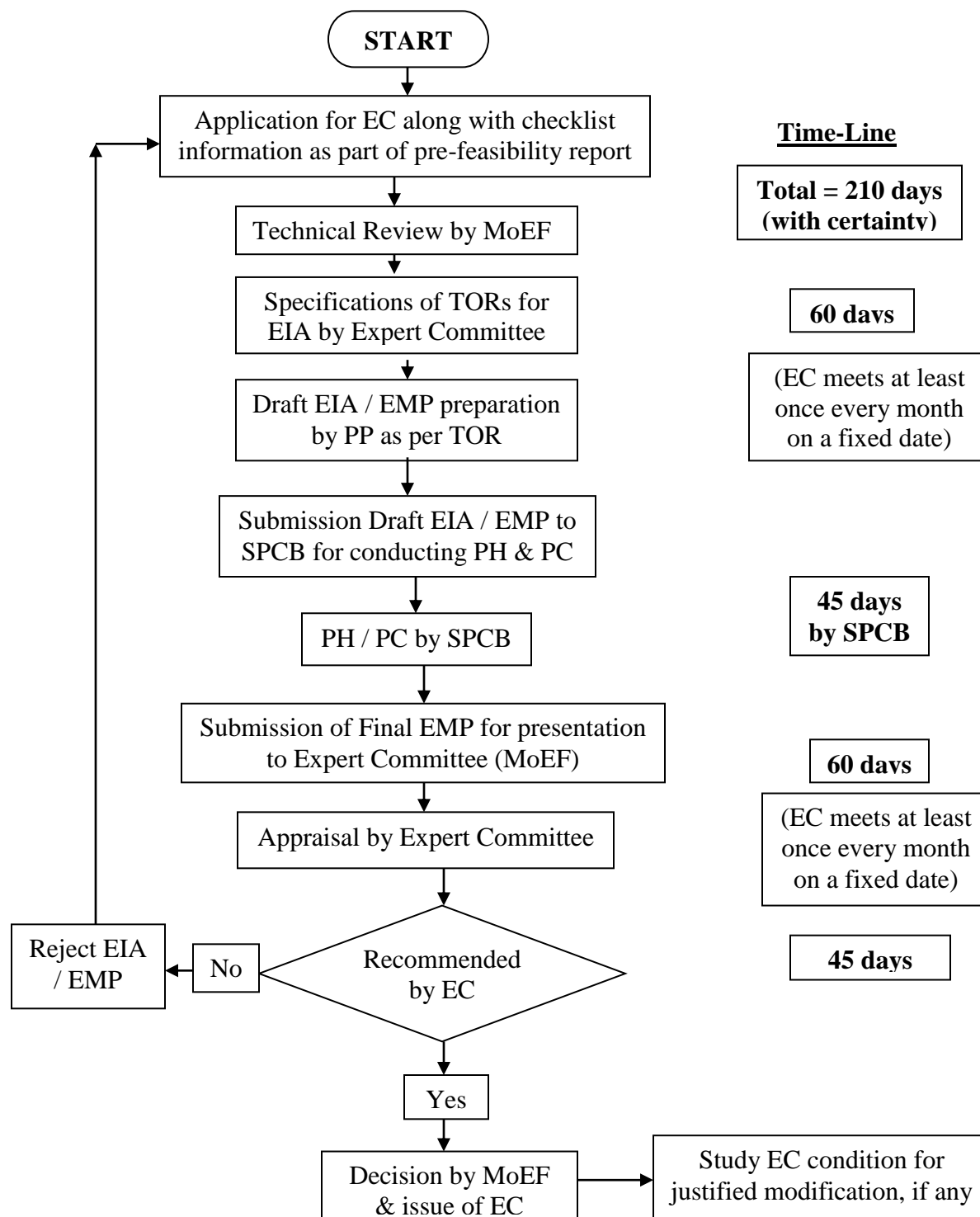
APPRAISAL OF PROJECTS

- Appraisal means detailed scrutiny of application in Form-1/Form-1A, final EIA report as per TORs, if required



Note: Clearances from other regulators not required unless it is required due to law or for necessary technical reasons

Flow chart for Revised EC Process for all Cat. - A projects (GoI)



Above notification has been revised and amended at later date. Therefore, latest notification should be followed.

3.4 Environmental Clearance as per EIA Notification 2006

Especially after EIA Notification 2006 all the operating mines and new mines need to have Environmental Clearance which is the genesis of virtually all environmental activities of any mine. So the detailed steps to be followed along with the responsibility for obtaining Environmental Clearance have been dealt below:

3.5 STEPS FOR OBTAINING ENVIRONMENTAL CLEARANCE

Sl. No.	Works particular	Responsibility
1.	Identification of project reports (PR) as per annual action plan	P&P dept. of Subsidiary
2.	Preparation of Form - 1 (for new mine) or Form 1A (for expansion / modification of existing mine) from data / information of PR	Subsidiary & CMPDI
3.	Following activities needs to be carried out simultaneously for obtaining Term of Reference (TOR) <ul style="list-style-type: none"> Registration for Forestry clearance (if Forest land is to be required / diverted for non-forest purpose i.e. mining) One season environmental base line data generation for air, water, noise in core & buffer zone Hydro-geological investigation in core & buffer zone Socio-economic data generation in core zone & buffer zone Flora & fauna study in core & buffer zone Health status of villagers in 1.0 km around periphery of core zone. Land use maps of core & buffer zone through satellite imagery 	Subsidiary & CMPDI
4.	Preparation of draft Term of Reference (TOR)	Subsidiary & CMPDI
5.	Submission of Form – 1 / 1A along with all documents & registration for FC (if any) to Ministry of Environment & Forests (MOEF), Govt. Of India through MOC / State Expert Appraisal Committee (SEAC) for > 50 Ha. land for obtaining TOR respectively	Subsidiary
6.	Preparation for presentation before EAC or SEAC as the case may be	Subsidiary & CMPDI
7.	Presentation before EAC (Coal) for obtaining TOR. If no further data / clarification are required, TOR is issued.	Subsidiary & CMPDI
8.	If required, additional data / clarifications are to be sent to MOEF	Subsidiary &

	promptly. If required, further presentation before EAC	CMPDI
9.	Preparation of draft EIA / EMP as per generic structure is to be started as parallel operation by the consultant approved by Quality Council of India (QCI) and necessary incorporation, as per TOR, can be done after obtaining formal TOR	CMPDI
10.	Submission of draft EIA / EMP as per TOR to State Pollution Control Board (SPCB) for Public consultation (PC) & Public hearing (PH)	Subsidiary & CMPDI
11.	Follow up with SPCB for early PH date. Ground work for PH to be done in advance. For preparing the PH proceeding on the very day of PH necessary arrangements i.e. computer, printer, draft PH proceedings based on earlier proceedings of PH should be kept ready.	Subsidiary
12.	Formal Receipt of proceedings of PH & note of PC from SPCB	Subsidiary
13.	Preparation of final of EIA / EMP incorporating the suggestions of PH & PC along with Hindi version of PH & PC.	Subsidiary & CMPDI
14.	Submission of final EIA / EMP to MOEF quoting the TOR no. enclosing a copy of Stage – I FC (if applicable)	Subsidiary
15.	Preparation of presentation of final EIA / EMP before EAC	Subsidiary & CMPDI
16.	Presentation of final EIA / EMP before EAC	Subsidiary & CMPDI
17.	Prompt reply to all clarifications, if any and further presentation before EAC, if required	Subsidiary & CMPDI
18.	Receipt of Environmental Clearance (EC)	Subsidiary
19.	EC letter to be critically examined for special / abnormal conditions or discrepancies. If any correction / modification is required, it is to be communicated to MOEF immediately for correction / modification with detailed justifications	Subsidiary
20.	Publication of notice of receipt of EC in two local news papers and uploading in company web site	Subsidiary
21.	Distribution of EC copy to concern Panchayat, Zila Parishad, Municipal corporation, local Urban body & NGO, if any. EC letter to be displayed at Collector, Tahasildar & Dist. Industry sector's Reg. office for 30 days.	Subsidiary
22.	Submission of one copy EMP, present status, advertisement copy, filled in data sheet to Reg. Office of MOEF along with Stage - I FC, if any	Subsidiary

Note – 1. Project spread over more than one district will have separate PH and PC. However, SPCB may be requested for one PH & PC in a common venue for different districts.

2. Subsidiary means Subsidiary HQ., Area HQ., and Project as per the need.

3.6 STEPS FOR OBTAINING CONSENT TO ESTABLISH / OPERATE FROM SPCB (Details discussed in chapter 5.0)

Sl. no.	Works particular	Responsibility
1.	Start taking actions simultaneously for Consent to establish / operate and other statutory permissions along with EC processes to save time to start a mine.	Project
2.	Application for consent to establish / operate from SPCB (assumption – land acquisition completed to start the project)	Project
3.	Receipt of Consent to Establish & Operate from SPCB	Project
4.	Take all necessary steps to implement the conditions of the consents as many SPCBs ask for compliance report of earlier Consent to Operate (CTO) at the time of Renewal of Consent	Project

3.7 Important Notifications for Special Cases

EIA September 14, 2006

Environment Impact Assessment (EIA) introduced Clearance from the Ministry of Environment and Forests (MoEF) becomes mandatory for mines greater than or equal to 50 hectares (ha), classified as category A projects. For mining in Category B projects – measuring between 50 and 5 ha- clearance is required from the State's EIA authority. Category B is divided into B1 and B2. The two-sub-categories were determined by State-level Expert Appraisal Committee. Projects that require EIA are categorized as B1 and the rest, which do not require EIA, as B2. There is no regulation for mines smaller than 5 ha.

EIA December 1, 2009

First amendment

The amendment divides mine lease areas into two categories- coal mine and non-coal mine. Coal mine areas greater than or equal to 150 ha are brought under category A. Non-coal Mining leases between 5 ha and 50 ha remain under Category B. Again, the EIA notification has no mention of minor minerals and does not regulate mining in land less than 5 ha.

EIA Notification September 9, 2013

Minor minerals recognized

After National Green Tribunal (NGT) imposed ban on mining of sand, coastal sand, brick-earth and mud, MoEF amended EIA, 2006. For the first time, it mentioned minor minerals are brought them under a special category within the previous distinction of coal and non-coal areas. As per the new notification, leases less than 50 ha for minor minerals would be considered Category B.

For cases involving renewal of mining lease

MOEF vide its S.O. 674(E) dated 13-03-2013 states “provided that no fresh environment clearance shall be required for a mining project or activity at the time of renewal of mining lease, which has already obtained environment clearance, under this notification”.

Relevant MoEF Notification

Up to 25 % increase in production (without PH)

As per MoEF Office Memorandum J-11015 / 30 / 2004. IA. II (M) dated 19-12-2012

Sub: Guidelines for granting Environment Clearance for expansion of Coal Mining Projects involving one time Production Capacity Expansion of up to 25 % in the existing operation - reg.

The OM of even number dated 15th April, 2010 contains the guidelines for granting Environment Clearance (EC) for expansion of coal mining sector projects.

2. Now, it has been decided that in respect of existing coal mining projects which apply for one time capacity expansion of up to 25 % on the existing mining operation, within the existing mine lease area, the guidelines stated in this OM will be applicable in supersession of the guidelines of 15th April, 2010

3. Expansion projects for Coal Sector mining fall in two categories-(i) projects that have obtained an EC under the EIA Notification 1994 and (ii) projects that have obtained EC under the EIA Notification, 2006. The EAC may consider exempting Public Hearing for the capacity expansion proposals of existing coal mining projects, which have obtained EC under any one of these Notifications, which are for one time capacity expansion of up to 25 % in the existing mining operation, within the existing mine lease area, under clause 7 (ii) of the EIA Notification 2006 subject to the following conditions: -

(i) Such an exemption would be considered for those expansion projects which have obtained prior EC and have undergone Public Hearing during the process of obtaining EC.

(ii) The proposal is for one time capacity expansion of up to 25 % in the existing coal mining operation.

(iii) There is no additional mine lease area involved.

(iv) There is no change in mining method (underground to opencast).

(v) Application for the expansion project shall include a certified report of the Regional Office of the MoEF on the issues of compliance of EC conditions stipulated for the existing project for which EC for the expansion is being sought and necessary action taken there upon by the EAC, in terms of the MoEF Circular No. J-11011 / 618 / 2010-IA.II (1) dated 30.5.2012.

(vi) Details of the court cases, if any, pending in any Court of Law against the project as well as directions passed by any Court relating to the project shall be furnished by the proponent directly to the Environment Appraisal Committee (EAC). The EAC will deliberate upon the same and the gist of the discussion will be reflected in the minutes of the EAC meeting.

(vii) Details of notices, if any, issued to the project under Section 5 of the Environment (Protection) Act, 1986 will be reported by the proponent directly to the EAC. The EAC will deliberate upon the same and the gist of the discussion will be reflected in the minutes of the EAC meeting.

(viii) If the project falls in a Critically Polluted Area (CPA) wherein the moratorium has been lifted, the EAC shall examine the measures required to be implemented by the project proponent under the Environment Action plan prepared by the State Pollution Control Board concerned and status of their implementation. In such cases, the EAC shall also examine the monitoring data furnished by the project proponent of the environmental quality of the study area / CPA in which the project falls and after due diligence, decide if any additional mitigative measures are required for the expansion.

(ix) 25 % expansion in production capacity is subject to a ceiling of 2 MTPA of additional production where the transportation of the additional production is proposed by road and of 5 MTPA of additional production if such transportation is proposed by means of a conveyor and / or rail transport.

Dr. S K Aggarwal (Director)

Further relaxation given by MoEF for the existing mines vide Office Memorandum no. dated 7th January 2014 and OM is reproduced below:-

OFFICE MEMORANDUM - Dated: 07 January, 2014

Subject: Guidelines for granting Environment Clearance for expansion of Coal Mining projects involving one time Production capacity Expansion in the existing operation –reg.

1. The O. M. of even number dated 19.12.2012 deals with the guidelines for granting Environment Clearance (EC) for expansion of coal mining projects involving one time capacity expansion of up to 25 % in the existing operation.
2. The Ministry of Coal have been taking up with this Ministry, the case of smaller coal mining projects and have argued that the cap of capacity expansion up to 25 % for such projects, as per the existing guidelines vide O. M. dated 19.12.2012, is inadequate as it results in relatively small increase in production in absolute terms for such mines. They have requested for increasing the limit of capacity expansion in respect of smaller projects.
3. The matter has been considered in the Ministry of Environment & Forests and it has been decided that for expansion proposals of existing coal mining projects having production capacity up to 8 MTPA as per the EC letter, the limit of one time capacity expansion may be considered as 50 % or incremental production up to 1.0 MTPA, whichever is more, in the existing mining operation, within the existing mine lease area, by the EAC for exempting Public Hearing under Clause 7 (ii) of the EIA Notifications, 2006. All other stipulations stated in earlier O.M. of even number dated 19.12.2012 will continue to apply in such cases.
4. For coal mining projects having production capacity more than 8 MTPA, the provisions of the earlier O.M. of even number dated 19.12.2012 will continue to apply in Toto. This issues with the approval of Competent Authority.

Dr. Monoranjan Hota (Director)

In case of involvement of Forest Land

As per the Office memo J-11013/41/2006.IA.II(I) dated 9th Sept 2011 and subsequent Office Memo even no dated 18/05/2012, Stage - I clearance is required for obtaining the EC. Even if the EC process is complete and if the Stage - I FC is not produced to MoEF within stipulated time, the EC agreed upon shall be deemed to be cancelled and the entire process has to be started afresh. However, EAC may relook on the proposal on case to case basis.

EC from State Environment Impact Assessment Authority for coal mine area < 50 ha

Note: For a detailed information on recent circulars on environmental clearance one has to consult the website www.envfor.nic.in/circulars

Environmental Impact Assessment (EIA)

It is widely accepted that most effective and cost effective method of maintaining environmental quality in industrial development is to anticipate environment problem / adverse changes in pollution levels and measures to rectify problems as to plan corrective measure and as early as possible. The objective of integrating environmental concerns into the development activities right at the planning stage can be achieved through Environmental Impact Assessment (EIA) of the project.

EIA is essentially an exercise to evaluate the beneficial and adverse effects of a planned activity /project on the environmental system.

The sequence of operation followed in EIA is:

- Identification of Impacts;
- Prediction of Impacts and
- Assessment of Impacts.

Identification of Impacts - It is done early in the EIA process. It may form an important part of any rapid preliminary assessment. Identifying and quantifying the causes of impacts also forms an initial step in the prediction of impacts. It involves: -

- Identification of sources of impact, check-lists, project proposals, questionnaire to operators;
- Identification of receptors of impacts by means of
 - (a) Analysis of existing environmental status
 - (b) Consultation (direct or indirect) with interested parties /stake holders
 - (c) Identification of impacts through use of checklists, matrices, networks etc.

Prediction of Impacts: It is the distinct stage within the overall EIA process. It involves identifying and describing the type and magnitude of effects and impacts of a proposed activity and each alternative of that activity.

Prediction can be applied to:-

- Identifying / Quantifying causes of impacts
- Identifying / Quantifying direct environmental impacts in short and long term;

- Identifying / quantifying indirect and secondary impacts in short and long term.

The following impact categories are the most common and relevant: -

- Physical impacts (air, water, noise and land)
- Ecological and biological impacts (human health, animal and plant ecology)

Prediction of each type of impact can require widely different data and applicable models. The following points should be taken into account while deciding on the approach to be used in prediction: -

- Prediction is a costly exercise and often the complete results of prediction are not used in decision making. This can lead to wastage of resources. The choice of prediction should be determined by the relevance and importance of prediction in decision making;
- Prediction is also prone to uncertainty which should be taken into account in deciding how much prediction should be done;
- Sophisticated methods are not always the best and simple methods may be sufficient for the required purposes.

Various approaches have been used in predicting the environmental impacts of development projects. The major approaches are as follows: -

- **Expert Judgment:** The analyst may ask an expert to give an opinion on the nature and extent of environmental effects, for example the changes that would occur if a new road on waste disposal site were built. Such opinions are based on the expert's experience and knowledge and may be developed implicitly or formulated in an explicit expert systems model;
- **Comparisons:** The analyst may make comparisons with existing developments similar to that and carry out experiments to provide some basis for determining what will happen in the proposed location. But because EIA is concerned with proposed activities, the effects cannot be directly monitored at the planned location; however base line data before commencement of project shall be available for comparison latter with actual.
- **On - site Experiments:** In situ experiments may be carried out. The potential contaminants or other characteristics of the activity may be reproduced on – site and the effects directly monitored. For example:
 - (a) A soil column could be used to predict the movement of leachate through soil;
 - (b) An acoustic model could be used to predict the effect of different barriers and screens on road traffic noise.

Assessment of Impacts: Within the overall process of EIA, assessment involves the three stages of evaluation, mitigation and comparisons of alternatives. Assessment is made of the implications of predicted impacts. Assessment thus involves: -

- Evaluation of the significance of impacts and identification of those impacts which need to be mitigated. This may involve comparing prediction with pre – defined acceptability criteria or guidelines or making judgments on the basis of professional experience;

- Study of the mitigation measures which may be available and appropriate to remove, reduce or monitor significant impacts;
- Comparisons of alternatives through use of materials, ranking alternatives or rating alternatives on numerical scale.

Uncertainty in Prediction: -It may be noted that the prediction of environmental impacts of the proposed activity of project is very complicated in nature viz Environmental Impact Assessment study. Uncertainties are always present in prediction model.

CONTENTS OF SUMMARY ENVIRONMENTAL IMPACT ASSESSMENT

Summary of full EIA Report shall be condensed to ten A-4 size pages at the maximum. It should necessarily cover in brief the following Chapters of the full EIA Report: -

1. Project Description.
2. Description of the Environment.
3. Anticipated Environmental Impacts and Mitigation Measures.
4. Environmental Monitoring Programme.
5. Additional Studies.
6. Project Benefits.
7. Environment Management Plan.

Description of Environment: - As seen from the Structured EIA, base line information forms an integral part of the report. As per the stipulation given in the TOR, base line data is to be generated w.r.t. ambient air quality, water quality (both ground as well as surface), ambient noise quality, socio- economic profile and also the details of flora & fauna covering the core and buffer zone of the project under consideration. In addition, any specific data as stipulated in the project specific TOR also needs to be generated.

Environmental Management Plan: - The Environmental Management plan or the abatement plan would consist of all mitigation measures for each item- wise activity to be undertaken during the construction, operation and the entire life cycle to minimize adverse environmental impacts as a result of the activities of the project. It would also delineate the environmental monitoring plan for compliance of various environmental regulations. It will state the steps to be taken in case of emergency such as accidents at the site including fire.

Preparation of EMP

EMPs deal with the various pollution mitigation measures to be undertaken to mitigate the impact of pollution, in order to reduce adverse effect on environment & forest, as per requirement of the project. EMP is submitted to MoEF for obtaining Environmental clearance (EC). Various types of pollution and the corrective measures as per EMP of the coal project approved by MOEF with project specific conditions are taken up for implementation. The environmental considerations are well conceived at the project planning stage keeping in view the geography, surface drainage and other surface features. All the environmental issues are well addressed in Project Reports and EIA / EMPs.

These environmental measures are planned in EMP considering the following:

- No mining activities are undertaken in eco-fragile and eco-sensitive areas
- Optimum use of forest and cultivable land for surface infrastructure and external OB dump
- Maximizing internal dumping,
- Concurrent backfilling and progressive technical and biological reclamation
- Final mine closure plan for acceptable post mining land use
- Appropriate pollution control measures to contain the air, water, noise pollution and land degradation within the acceptable limits,
- As far as possible to minimize road transportation, more and more use of conveyor, rail head near to mine, wagon loading through silos or high speed mechanized loading are to be explored.
- Minimum use of water from natural source by reusing and recycling of water.

Forestry Clearance

4.0 Forest plays a major role in maintaining the eco-system around us as well as the environment in and around the mining projects. It should be our utmost endeavour to save and protect every bit of forest we have, be it privately owned or state owned and to generate some more. Mining industry needs land that includes forest land also, for its mining projects' developmental as well as operational activities. CIL as a responsible corporate citizen since its inception through massive plantation programme through its subsidiaries planted till 31.03.2014 more than 81 million tree saplings over an area of 34318 Ha while using only about 13800 Ha of forest land for its mining purpose. Unfortunately, coal mining is a site specific industry and there is virtually no coal bearing area in our country that does not involve some forest land while taking up for mining activities. Besides, a significant proportion of the potential coal deposits occur in the forest areas and diversion of forest land for coal mining is, therefore, an unavoidable operational necessity. All possible efforts are made to use least possible and bear minimum forest land for coal mining projects at the mine planning stage only. In other wards, if no forest land is to be used; possibly most of the coal resources cannot be extracted by open cast method by which maximum possible national coal reserves can be taken out of mother earth i.e. with very high percentage of extraction, with greater safety and economy. It may also be noted that coal is a non-renewable energy resource, so we should adopt such mining technology which can extract maximum possible coal from the reserves.

As per the Supreme Court's ruling **"No forest land can be diverted for non-forest purpose without the Central Govt.'s Approval"**. All proposals for diversions of such forest areas to any non-forest purpose, even if the area is privately owned, would require the prior approval of the Central Government.

For detailed information on forest clearance one has to consult the web address www.forestsclearance.nic.in.

4.1 Recent and relevant Office memorandum about involvement of Forest Land in any mining project are reproduced below:

4.1.1 Office Memorandum NoJ-11013 / 41 / 2006-IA.II (I) Dated the 9th Sept, 2011

Sub: Consideration of projects for grant of environment clearance under EIA Notification, 2006, which involve forestland - Procedure to be followed - further clarifications - Regarding.

Ministry of Environment & Forests had earlier issued an office memorandum vide no. J - 11015 / 200 / 2008-IA.II (M), dated - 31.3.2011 prescribing the procedure to be followed for consideration of projects for environmental clearance, which involve forestland.

2. Based on the experience gained in implementation of the instructions contained in the above referred O.M. and taking into consideration the inputs / feedback received from various stakeholders as also in light of the judgment of the Hon'ble Supreme Court dated 6.7.2011 in

the IA No. 1868, 2091, 2225-2227, 2380, 2568 & 2937 in W.P. No. 202 of 1995 - T.N. Godavarman Thirumulpad Vs. UOI 8 Ors in Lafarge Mining / Forest case, the matter has been further considered.

3. Now, therefore, in partial amendment of the above referred O.M. dated 31.3.2011, it has been decided that the following procedure shall be adopted for consideration of projects for environmental clearance, which involve forestland:

(i) At the stage of consideration of proposals for TOR in respect of the projects involving forestland, the project proponents would submit a credible proof in support of the fact that they have already submitted their application to the concerned Competent Authority for diversion of the forestland involved in the project.

(ii) At the stage of consideration of proposals for EC in respect of projects involving forestland, the project proponent would inform the respective EACs about the status of their application for forestry clearance along with necessary supporting documents from the concerned Forest Authorities. It will clearly be informed to the EAC whether the application is at the State level or at the Central level. The EAC will take cognizance of the involvement of forestland and its status in terms of forestry clearance and make their recommendations on the project on its merits. After the EAC has recommended the project for environmental clearance, it would be processed on file for obtaining decision of the Competent Authority for grant of environmental clearance. In the cases where the Competent Authority has approved the grant of environmental clearance, the proponent will be informed of the same and a time limit of 12 months, which may be extended in exceptional circumstances to 18 months, a decision on which will be taken by the Competent Authority, will be given to the proponent to submit the requisite Stage-I forestry clearance. The formal environmental clearance will be issued only after the Stage-I forestry clearance has been submitted by the proponent.

(iii) In the eventuality that the Stage-I forestry clearance is not submitted by the proponent within the prescribed time limit mentioned at para (ii) above, the proposal for environmental clearance will stand rejected and the entire process of obtaining environmental clearance will have to be initiated de-novo as per the procedure prescribed under EIA Notification, 2006.

4. The requirement of information / data / documents for such projects as specified in office memorandum no. J-11013/41/2006-IA.II(1) dated 26.4.20 11 will, however, continue to be completely followed.

This issues with the approval of the Competent Authority.

(Dr. S.K. Aggarwal)
Director

4.1.2 Office Memorandum NoJ-11013 / 41 / 2006-IA.II (I) Dated the 18th May, 2012

Sub: Consideration of projects for grant of environment clearance under EIA Notification, 2006, which involve forestland - procedure to be followed - Further Clarifications -Regarding

In continuation to this Ministry's Office Memorandum of even no. dated 9th September, 2011 regarding the above mentioned subject, the matter has been further considered and examined in the Ministry. Accordingly, para (iii) of the above referred O.M. is substituted by the following:

- (ii) In the eventuality that the Stage-I forestry clearance is not submitted by the project proponent within the prescribed time limit mentioned at para (ii) above, as and when the Stage-I forestry clearance is submitted thereafter, such projects would be referred to EAC for having a relook on the proposal on case by case basis depending on the environmental merits of the project and the site. In such a situation the EAC may either reiterate its earlier recommendations or decide on the need for its reappraisal, as the case may be. In the eventuality, a reappraisal is asked for, the committee will simultaneously decide on the requirement of documents / information for reappraisal as also the need for a fresh public hearing.

This is issued with the approval of the Competent Authority.

Dr. S. K. Aggarwal (Director)

The importances of FC need not to be over emphasized for starting a coal mining project. Requirement of forest land for the projects (both under ground and open cast) of CIL can be assessed from the fact that out of the total requirement of 159191 ha of land, the forest land is 39446 ha and the balance is Govt. non-forest land and tenancy land.

So the process of obtaining FC is to be vigorously followed up simultaneously along with EC to start a project as per schedule

As per EIA notification, 2006, Forestry Clearance is to be obtained in two stages:

- (a) Stage - I: The proposal shall be agreed to in principle by MoEF in which usually the conditions for compensatory afforestation and funds etc. for the same are stipulated.
- (b) Stage - II: On compliance of the stipulated conditions of Stage-I, formal approval under the Act is issued by MoEF.

4.1.3 Major steps for obtaining FC

- (1) Project Proponent is to make application in the prescribed format to the State Authorities for FC.
- (2) After scrutiny by the State Authorities at various levels, the proposal is sent to Central Government.
- (3) Forest Advisory Committee under MoEF considers the proposal and recommends to MoEF either for grant / rejection of FC.
- (4) The stipulated time frame is 150 days for FC of new projects and 120 days for renewal cases.

Concise Activity flow chart for obtaining FC is given in [page 46](#) and for detailed e-filing of Forest Clearance application one has to consult the website www.envfor.nic.in. The detailed flowcharts can be obtained from the article 'DPR implementation of e-filing of forest clearance application' by clicking New Releases on the left hand side of the main page.

4.1.4. Application of Forest (Conservation) Act, 1980

Definition

- i) The term 'Forest land' mentioned in Section 2 of the Act refers to reserved forest; protected forest or any area recorded as forest in the government records. Lands which are notified under Section 4 of the Indian Forest Act would also come within the purview of the Act. (Supreme Court Judgment in NTPC's case). All proposals for diversions of such forest areas to any non-forest purpose, even if the area is privately owned, would require the prior approval of the Central Government.
- (ii) The term "tree" for the purpose of this Act will have the same meaning as defined in Section 2 of the Indian Forest Act, 1927 or any other Forest Act, which may be in force in the forest area under question.

Clarifications

- (i) The cases in which specific orders for de-reservation or diversion of forest areas in connection with any project were issued by the State Government prior to 25.10.1980, need not be referred to the Central Government. However, in cases where only administrative approval for the project was issued without specific orders regarding de-reservation and / or diversion of forestlands, a prior approval of the Central Government would be necessary.
- (ii) Harvesting of fodder grasses, legumes etc. which grow naturally in forest areas, without removal of the tree growth, will not require prior approval of the Central Government.

However, lease of such areas to any organization or individual would necessarily require approval under the Act.

Investigation and Survey

(i) Investigations and surveys carried out in connection with development projects such as transmission lines, hydro-electric projects, seismic surveys, exploration for oil drilling etc. will not attract the provisions of the Act as long as these surveys do not involve any clearing of forest or cutting of trees, and operations are restricted to clearing of bushes and lopping of tree branches for purpose of sighting.

(ii) If, however, investigations and surveys involve clearing of forest area or felling of trees, prior permission of the Central Government is mandatory.

(iii) Notwithstanding the above, survey, investigation and exploration shall not be carried out in wildlife sanctuaries, national parks and sample plots demarcated by the Forest Department without obtaining the prior approval of the Central Government, whether or not felling of trees is involved.

(iv) The work of actual construction would, however, fully attract the provisions of the Act and prior clearance of the Central Government must be obtained even if such work does not require felling of trees.

(v) It is clarified that the permission to survey, exploration or prospection would not ipso facto imply any commitment on the part of the Central Government for diversion of forestland.

Explanation Regarding Non-Forest Purpose

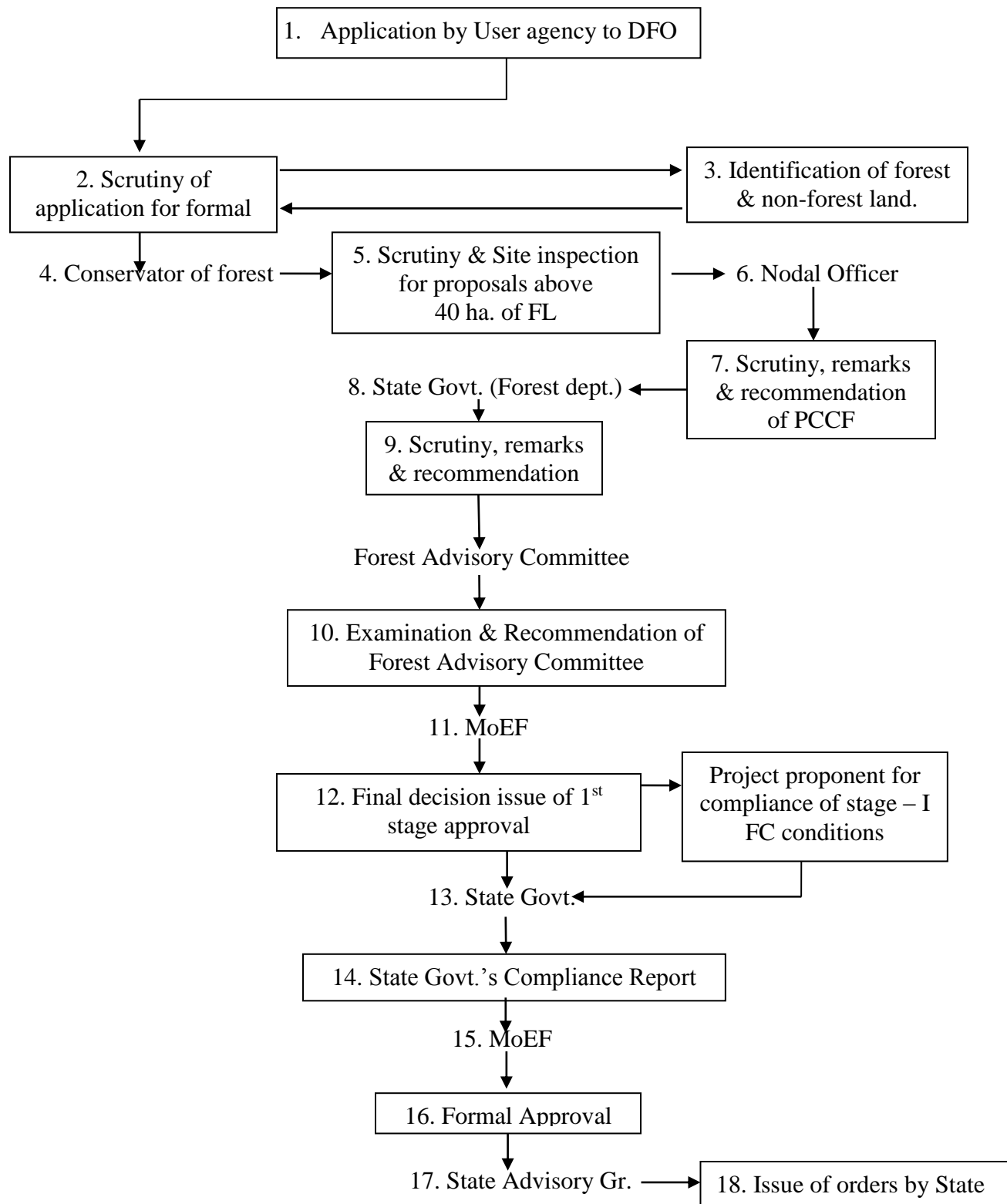
(i) Cultivation of tea, coffee, spices, rubber and palm is a non-forestry activity, attracting the provisions of the Act.

(ii) Cultivation of fruit-bearing trees or oil-bearing plants or medicinal plants would also require prior approval of the Central Government except when:

(iii) The species to be planted are indigenous to the area in question; and

(iv) Such planting activity is part of an overall afforestation programme for the forest area in question.

FLOW CHART FOR OBTAINING FOREST CLEARANCE



4.4 Following points are to be kept in mind while processing the application for Forest land Diversion for non forest purposes:

1. Timely initiation of application for FC with all prescribed documents is a must keeping future production plan in view.
2. All required documents must have signature of the specific officer at the specific places of the documents.
3. Figures those are appearing in different texts should match to the last decimal point and this should be carefully checked and rechecked before submitting the application.
4. Most of the scrutiny and examination stages including demarcation of forest land are time consuming due to various reasons. Substantial time is also required for tree enumeration and to calculate the wood volume. So it needs close follow up and persuasion.
5. Continuous follow up at all stages is must till the formal approval of Stage - I Forestry clearance for diversion of forest land is obtained.
6. District Collector provides Govt. non-forest land for compensatory afforestation. If such Govt. non-forest land is not available, the certificate of non-availability of Govt. non-forest land will be issued by the Collector.
7. Necessary NOC required under FRA is to be issued by the collector.
8. Close follow up with the state forest officials for searching, identifying and demarcating the degraded forest land for compensatory afforestation is required
9. Compliance of Stage – I forest clearance conditions including construction of some infrastructures require tendering. So necessary preparatory work for compliance of Stage – I forest clearance in line with the previous clearances should be kept ready to reduce overall time requirement.
10. After obtaining Stage – II clearance, clearing / cutting of trees from the diverted forest land also require close coordination with the state forest department.

Consent to Establish and Operate

5.0 While the processes of obtaining EC and FC are in progress, the processes for obtaining permission for Consent to Establish, Consent to Operate and other authorizations required to be obtained from the respective State Pollution Control Board are to be initiated so that these permissions do not become hurdle / hindrance to opening / starting a mine. For these consents and authorisations specific forms are there with some minor variations / differences depending on the particular state in which the mine will be established or operated. The applications for obtaining permission for “Consent to Establish” and “Consent to Operate” are to be submitted to the member secretary of the respective SPCB.

5.1 Sample forms along with necessary documents required for submitting application for Consent to Establish, Consent to Operate and other authorizations are given below as ready reference to the environment personnel.

SCHEDULE – I

[see rule 4] No.....

**Common Application for Consent under
Water (Prevention and Control of Pollution) Act, 1974,
Air (Prevention and Control of Pollution) Act, 1981) and
Authorisation under Hazardous Wastes (Management and Handling) Rules, 1989
(Accompanying form in triplicate to be submitted by the applicant.)
(One copy may be retained by the applicant)**

Explanatory note for filling in application form for Consent / Authorisation

- 1). Any applicant knowingly giving incorrect information or suppressing any information pertaining to any of the items of the application shall be liable for punishment as per provisions under the relevant Act.
- (2) The application form shall be submitted at the head-quarter office of the Board at the address given on the first page of the application form or to the respective Zonal or Regional or Sub-Regional office or District Office of the Board / Pollution Control Committee under whose jurisdiction the applicant activity falls.
- (3) The application shall be accompanied by the consent fee in the form of Demand Draft in favour of State Pollution Control Board / Pollution Control Committee.
- (4) For the items marked strike out which is not relevant.
- (5) If any of the items is not relevant to the activity of the applicant, please state 'Not Applicable'
- (6) If the space for reply provided for any item is inadequate, use additional sheets, duly referenced.
- (7) Item 1: Give the name of the person who is authorised by the applicant to transact their business.
- (8) Item 2: Also state the concerned institutions under whose administrative area the unit falls.
- (9) The form shall be accompanied by the relevant documents specified on the last page of the application form.
- (10) Capital Investment - Consent fee is to be paid based on gross fixed capital investment of the unit without depreciation till the date of application. The gross capital investment shall include cost of land, building, plant and machinery without depreciation.

Application form for Consent / Authroisation

To
The Member Secretary
..... Pollution Control Board
.....

From:
.....
.....
.....

Sir,

I / We hereby apply for *

- (i) Consent to Establish / Operate / Renewal of consent under section 25 and 26 of the Water (Prevention and Control of Pollution) Act, 1974 as amended.
- (ii) Consent to establish / operate / renewal of consent under Section 21 of the Air (Prevention and Control of Pollution) Act, 1981, as amended.
- (iii) New / renewal of authorisation under rule 5 of Hazardous Wastes (Management and Handling) Rules, 1989, as amended in connection with my / our existing / proposed / altered / additional manufacturing / processing activity from the premises as per the details given below:

Part A: General

1.	Name, designation, office address with telephone and fax number of the applicant / occupier / Industry / Institution / Local Body.	:	
2.	(a) Name and location of the industrial unit / premises for which the application is made. (Give revenue Survey Number / plot number, name of Taluka and District, also telephone and fax number) (b) Details of the planning permission obtained from the local body / Town and Country Planning authority / metropolitan development authority. (c) Name of the local body under whose jurisdiction the unit is located and name of the license issuing authority.	:	
3.	Names, addresses with telephone and fax number of Managing Director / Managing Partner and officer responsible for matters connected with pollution control and / or hazardous waste disposal.	:	
4.	(a) Are you registered as a small-scale industrial unit? (b) If yes, give the number and date of registration.	:	
5.	Gross capital investment of the unit without depreciation till the date of application (Cost of building, land, plant and machinery). (To be supported by an affidavit, Annual Report or certificate from a Chartered Accountant. For proposed unit(s), give estimated figure) _____	:	

6.	If the site is located near sea-shore / river bank / other water bodies; indicate the distance and the name of the water body, if any.	:	
7.	Does the location satisfy the requirements under relevant Central / State Govt. notifications such as Coastal Regulation Zone, Notification on Ecologically Fragile Area, Industrial location policy etc.? If so, give details.	:	
8.	If the site is situated in notified industrial estate, (a) whether effluent collection, treatment and disposal system has been provided by the authority (b) will the applicant utilise the system, if provided (c) if not provided, details of proposed arrangement.	:	
9.	Total plot area, built-up area and area available for the use of treated sewage / trade effluent	:	
10.	Month and year of proposed commissioning of the unit	:	
11.	Number of workers and office staff.	:	
12.	(a) Do you have a residential colony within the premises in respect of which the present application is made? (b) If yes, please state population staying. (c) Indicate its location and distance with reference to plant site.	:	
13.	List of products and by-products manufactured in tones / month, kl / month or numbers / month (Give figure corresponding to maximum installed production capacity)	:	
14.	List of raw materials and process chemicals with annual consumption corresponding to above stated production figures, in tones / month or kl / month or numbers / month.	:	
15.	Description of process of manufacture for each of the products showing input, output, quality and quantity of solid, liquid and gaseous wastes, if any from each unit process. (To be supported by flow sheet and / or material balance).	:	
Part B: Waste water aspects			
16.	Water consumption for different uses (ml / day) (i) Industrial cooling, spraying in mine pits or boiler feeds (ii) Domestic purpose (iii) Processing whereby water gets polluted and the	:	

	<p>pollutants are easily biodegradable and are toxic</p> <p>(iv) Processing whereby water gets polluted and the pollutants are not easily bio-degradable and are toxic</p> <p>(v) Others such as agriculture, gardening etc. (specify)</p> <p>Total</p>		
17.	<p>Source of water supply.</p> <p>Name of authority granting permission if applicable and quantity permitted</p>	:	
18.	<p>Quantity of waste water (effluent) generated (ml / day)</p> <p>(i) Domestic</p> <p>(ii) Industrial</p>	:	
19.	<p>Water budget calculations accounting for difference between water consumption and effluent generated.</p>	:	
20.	<p>Present treatment of sewage / canteen effluent (Give sizes / capacities of treatment units).</p>	:	
21.	<p>Present treatment of trade effluent (Give sizes / capacities of treatment units). (A schematic diagram of the treatment scheme with inlet / outlet characteristics of each unit operation / process is to be provided. Include details of residue management system (sludge)</p>	:	
22.	<p>(a) Are sewage and trade effluents mixed together?</p> <p>(b) If yes, state at which stage - Whether before, intermittently or after treatment.</p>	:	
23.	<p>Capacity of treated effluents ump, Guard Pond if any.</p>	:	
24.	<p>. Mode of disposal of treated effluents, with respective quantity, m³ / day</p> <p>(i) into stream / river (name of river)</p> <p>(ii) into creek / estuary (name of creek/estuary)</p> <p>(iii) into sea</p> <p>(iv) into drain / sewer (owner of sewer)</p> <p>(v) On land for irrigation on owned land / lease land. Specify cropped area (To be supported by relevant documents)</p> <p>(vi) Quantity of treated effluent reused / recycled Provide a location map of disposal arrangement indicating the outlet(s) for Sampling</p>	:	
25.	<p>Quality of untreated / treated effluents (Specify pH and concentration of SS, BOD COD and specific pollutants relevant to the industry, TDS to be reported for disposal on</p>	:	

Part - D: Hazardous waste aspects			
30.	(a) Whether the unit is generating hazardous waste as defined in the Hazardous Waste (Management and handling) Rules, 1989, as amended. (b) If so, the category No.	:	
31.	Authorisation required for* (i) Collection (ii) Reception (iii) Treatment (iv) Transport (v) Storage (vi) Disposal of the hazardous waste	:	
32.	Quantity of hazardous waste generated (kg / day) or (mt / month)	:	
33.	Characteristics of the hazardous waste(s). Specify concentration of relevant pollutants. Enclose a copy of the latest report of analysis from the laboratory approved by State / Central Board / Central Government in the Ministry of Environment and Forests). For proposed units furnish expected characteristics.	:	
34.	Mode of storage (intermediate or final) (describe area, location and methodology).	:	
35.	Present treatment of hazardous waste, if any (give type and capacity of treatment units)	:	
36.	Quantity of hazardous waste disposed (i) Within the factory (ii) Outside the factory (Specify location and enclose copies of agreement) (iii) Through sale (Enclose documentary proof and copies of agreement) (iv) Outside State/Union Territory, if yes particulars of (i) & (iii) above (v) Other (specify)	:	
Part - E: Additional information			
37.	(a) Do you have any proposals to upgrade the present system for treatment and disposal of effluent / emissions and / or hazardous waste (b) If yes, give the details with time-schedule for the	:	

	implementation and approximate expenditure to be incurred on it.		
38.	Capital and recurring (O&M) expenditure on various aspects of environment protection such as effluent, emission, hazardous waste, solid waste, tree plantation, monitoring, data acquisition etc. (give figures separately for items implemented / to be implemented).	:	
39.	To which of the pollution control equipment, separate meters for recording consumption of electric energy are installed?	:	
40.	Which of the pollution control items are connected to D.G. set (captive power source) to ensue their running in the event of normal power failure?	:	
41.	Nature, quantity and method of disposal of non-hazardous solid waste generated separately from the process of manufacture and waste treatment. (Give details of area / capacity available in applicant's land)	:	
42.	Hazardous chemicals as defined under the Manufacture, Storage and Import of Hazardous Chemicals, Rules, 1989 (a) T:St of HC stored (imported & indigenous) (b) Details of isolated storage, if any (c) Details of emergency preparedness plans (on- site / off- site) prepared	:	
43.	Brief details of tree plantation / green belt development within applicant's premises.	:	
44.	Information of schemes for waste minimisation, resource recovery and recycling - implemented and to be implemented, separately.	:	
45.	Any other additional information that the applicant desires to give.	:	
46.	I/We further declare that the information furnished above is correct to the best of my/our knowledge.		
47.	I/We hereby submit that in case of any change from what is stated in this application in respect of raw materials, products, process of manufacture and treatment and / or disposal of effluent, emissions, hazardous wastes etc. in quality and quantity; a fresh application for Consent / Authorisation shall be made and until the grant of fresh Consent / Authorisation no change shall be made.		

48.	I/We undertake to furnish any other information within one month of its being called by the Board / Committee.		
49.	I/We agree to submit to the Board an application for renewal of consent / authorisation in two months in advance before the date of expiry of the consent / authorisation validity period.	:	
50.	I/We enclose herewith a Demand Draft for Rs..... (Rupees) drawn in favour of..... Pollution Control Board / Committee as the fee for consent / authorisation.	:	

Yours faithfully,

Signature

Name

Designation.

Documents enclosed:

1. Demand Draft towards consent fee / authorization.
2. Undertaking or affidavit or statement from Annual Report or certificate from Chartered Accountants in support of gross fixed capital investment.
3. Site plan / location map (Compulsory for all new applications and for expansions).
4. Declaration regarding the distance of the unit from the bank of the main river or high tide mark of creek estuary (declared under the Act) and in respect of stone crusher, for distance from highways and habitations
5. Layout plan showing the location of stacks (chimneys), effluent treatment plant, effluent disposal areas, air pollution control devices, and hazardous waste treatment and disposal areas.
6. Manufacturing process flow sheet, with descriptive note on the manufacturing process for each product.
7. Copies of latest consent / authorization / Environmental Impact Assessment Clearance
8. Copy of Small Scale Industries registration certificate, if applicable.
9. Copies of Letter of Intent / industrial licenses, clearances from the Department or any other relevant document⁵ (please state).
10. Copies of planning permission certificate issued by local bodies / District Town & Country Planning / Metropolitan Development Authorities.

Note: The documents at Sr.No.2 to 11 are necessary for first application. For applications for renewal only document at Sr.No.7 is necessary.

Renewable energy is the only long-term sustainable solution and an answer to issues around global warming.

Within this, the solar power specifically can address rural electrification BSE 1.86 % challenge.

Roles & Responsibilities of Environmental Personnel

6.0 CIL and its subsidiaries have well organized management structure for environment management at all levels i.e. CIL HQ, Subsidiary, Area and Project level. Environment Department has specific objectives those are enumerated below:

- The main corporate objective is to achieve the principle of SUSTAINABLE DEVELOPMENT in line with the National Environment Policy within the framework of legislations, Acts, Rules, guidelines and directives of the statutory bodies - MOEF, CPCB and SPCB. It includes carrying out activities in consonance with provisions of EIA / EMP to protect and improve the environment along with compliance of environmental statutes, guidelines and instructions of statutory agencies.
- To ensure building up required organizational capacity at all levels to meet the challenges of environmental requirements.
- To fully integrate environmental impact assessment and management plan with mine planning, design and operation.
- To mitigate the adverse environmental impacts of mining to the maximum extent possible, so that the coal sector is accepted as being social & environment friendly and responsible.
- To educate and train the personnel looking after environment activities and inculcate awareness on environment protection measures at all levels of the company, for achieving the environmental objectives.

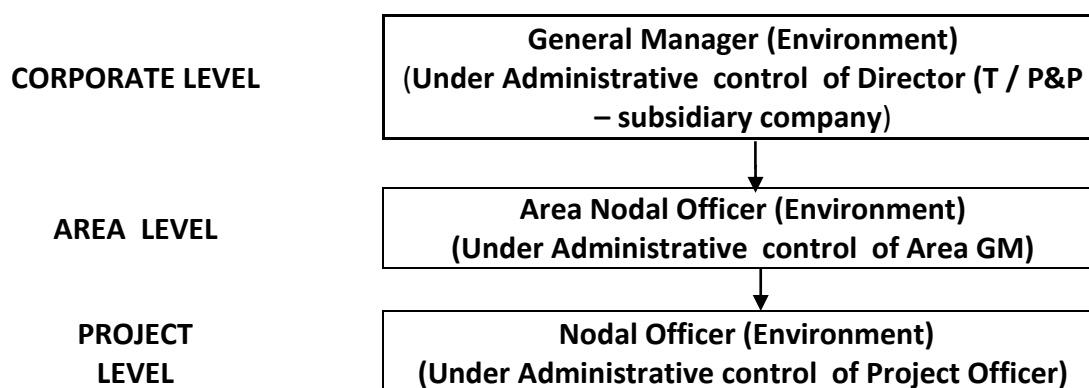
To achieve the above objectives, the following strategies have been prescribed:

- All mine planning and design should be environmentally acceptable and development should be carried out in such a way as to conform to acceptable environmental standard of quality various environment parameters during mining and eventually reclamation of the land as per mine closure plan for the end use stipulated in the Environmental Management Plan (EMP).
- Reclamation of mined out areas will aim to achieve a post mining condition consistent with the proposed terminal land use.
- Concurrent and Progressive reclamation will be carried out as soon as the mined out areas become dormant.
- Reclamation technique should be to suit Indian ecological conditions.

6.1 Objectives of the Environmental Initiatives

Reclaiming the surrounding area affected by coal mining operations so as to maintain clean air to breath in, clean water to drink and clean and quiet atmosphere for safe and healthy life of all living creatures as well as plant kingdom. This can be achieved by adhering to our corporate environment policy through integration of planning to execution and compliance of environmental standards / Statutes as well as conforming to approve ISO Manuals on environment management (ISO 14001).

Environment Department – Hierarchical Structure Chart at subsidiary level



Similarly, CIL as a holding company has its Environment management division headed by a General Manager under Administrative control of Director (Tech), CIL.

6.2 Activities to be undertaken of Environment personnel at Subsidiary HQ level:

1. Maintain liaison with Ministry of Coal, Ministry of Environment & Forest, CPCB, SPCB, other statutory bodies, CIL Hq., own subsidiary senior officials, other stakeholders, etc.
2. EMPs are to be scrutinized by the Environment department to avoid data mismatch. Ensure the Signatures are done by concerned officials with seal and sent to CIL Office, New Delhi for onward submission to MoEF.
3. Ensure successful Public Hearing in co-ordination with Area & project officials. Explain all vulnerable points in EMPs with Director (T) P&P before EAC presentation as normally D (T) P&P of the company attends the MOEF meeting.
4. Guidance & backup support to the Area / Project authorities in implementation of the conditions stipulated by MOEF in the EC as well as conditions stipulated by SPCB in the Public Consultation, Consent to Establish & Operate. Formulation of Action plan and environment capital Budget including Environmental auditing similar to financial auditing and risk assessment in the line of mine safety audit.
5. Generation of regular environmental monitoring data as per Environment (Protection) Amendment Rule and National Ambient Air Quality Standards - 2009 in technical

association with concerned RI of CMPDIL and necessary guidance to Area / Project in implementation of the same such as processing & award of monitoring work and selection of monitoring stations.

6. Processing & award of work of preparation of statutory Environmental (Audit) Statement for all the operating mines of the company in technical association with concerned RI of CMPDIL every year and co-ordinate between Area & CMPDI for collection of data and review.
7. Formulation of MOU related activities like tree plantation, formulation & approval of plantation work including its award of work and subsequent monitoring including correspondences.
8. Taking up R&D / S&T studies in technical association with premier academic institutions / research institutions for various environmental issues based on conditions laid in EC or any vulnerable and specific issues.
9. Preparation of replies / clarifications / additional information against the issues related to environment raised in the Parliament, respective State Assemblies, respective SPCB, and redress of various complaints etc. raised by villagers, RTIs obtaining the details from area / project level.
10. Attending to inspections by MOEF officials & other official teams / committees to the projects for monitoring, compliances status of environmental clearance conditions.
11. Guidance & Coordination with Areas and project authorities for timely submission of compliance reports against EC, water cess, statutory returns in respect of Bio Medical Wastes Rule, Hazardous Waste Management (Management & Handling) Rules and Battery (Management & Handling) Rules, E-Waste etc.
12. Associate with Mining Department for planning back filling of voids, Collection of details of back filling and OB dumping areas for concurrent and progressive mine closure activities.
13. Arranging environmental awareness programmes like celebration of Environment Week, World Environment Day and arranging Workshops and Seminars on environmental related topics at company headquarters level and coordination with Areas for arranging the same at Area and Project levels.
14. Collection of data pertaining to environment from all areas operating in the subsidiary as per the requirements of Internal Environment Auditing and Reporting.
15. Collection & Submission of data on various issues like Sustainable development, Energy audit and other particulars to CIL.
16. Preparation of presentations – Collection of latest Photographs & update data.
17. Co-ordinate with CMPDI for preparation of Form 1 / 1A for obtaining EC, preparation of EIA / EMP, preparation of presentation at EAC, satellite surveillance including collection of report & uploading in web site and for preparation of Mine closure Plans. Obtaining approval of the Board and submission to MoC / MoEF
18. Preparation of documents and presentation for Environmental awards.
19. Preparation for ISO 14001 or other certification including inspections and fulfillment of targets and achievements. Please read the ISO manual prepared by the consultant.
20. Co-ordination with Finance dept. to check proper maintenance of environment related expenditure and accounts in the escrow account (as applicable).

6.3 Activities to be undertaken of Environment personnel at Area (HQ) Level

1. Assist CMPDI for preparation of Form 1 / 1A for obtaining EC, preparation of EIA / EMP and preparation of presentation at EAC.
2. Conduct Public Hearing (PH) in co-ordination with SPCB including arrangement of videography, co-ordination and arrange meeting with village representatives etc.
3. Ensure submission of timely & duly filled in Application for Consent to Establish including collection of various data, arrangement of payments to SPCB etc.
4. Ensure submission of application for obtaining Consent to Operate from SPCB in association with concerned project authorities.
5. Coordination in generation of baseline data with area & CMPDIL
6. Submission of necessary details / filling up of data sheet of MOEF and submission of six monthly report to MoEF in consultation and association of concerned projects with due concurrence of company HQ.
7. Implementation of compliance conditions of EC & FC, Consent to Establish, Consent to Operate and Public Consultation in association with concerned project authorities under the guidance of company headquarters.
8. Involvement in execution of R&D / S&T work undertaken by company headquarters / CMPDIL.
9. Submission of input data for statutory yearly Environment (Audit) Statement for all the mines of the Area.
10. Identification and selection of monitoring stations in consultation with SPCB, company HQ, project personnel and CMPDIL for regular environmental monitoring.
11. Obtaining from CMPDIL & Submission of quarterly environmental monitoring data to SPCB, statutory monthly Water Consumption Return and statutory annual statement / six monthly returns to the concerned SPCB / MoEF.
12. Coordination with different departments at the Area level for ensuring implementation of the conditions stipulated in various clearances and to maintain records. Formulation of action plan and Capital & Revenue Budget.
13. Identification of sites and requirement of plantation in different mines of the Area and its submission to company headquarters for finalization of annual programme for incorporation in the MOU between CIL and subsidiary company.
14. Co-ordination with mining department for technical reclamation including proper back filling as per EMP.
15. Co-ordination with project authorities / civil departments in execution of tree plantation contracts through State Forest Corporations.
16. Co-ordination for preparation of estimates, obtaining administrative approval, tendering and award of all EMP works
17. Ensure proper disposal of Hazardous waste, battery waste, E-Waste, Battery waste and Bio-medical waste as per the stipulations of various acts in vogue along with statutory returns.
18. Collection of data pertaining to environment from all projects operating in the Area as per the requirements of Internal Environment Auditing and Reporting.

19. Ensure proper functioning of ETPs, DETPs and other infrastructure. Ensure registers of usage of alum, lime, other chemicals etc.
20. Periodic check of movement of water tankers and other dust suppression measures. Ensure Registers for their movement. Provision and supply of dust masks to workmen.
21. Ensure provision of protective measures in highly noise polluted areas. Keep record of Ear Plugs / Muffs provided.
22. Arrange environmental awareness programmes like celebration of Environment Week, World Environment Day and arranging Workshops and Seminars on environmental related topics at Area level and coordination with projects for arranging the same at Area and Project levels.
23. Maintain the details of expenditure incurred on various environment related works work wise.
24. MOU is an important yard stick. Send Progress reports especially for MOU activities.
25. Monitor the implementation of mine closure plan
26. Deficiency, if pointed / found out, should be rectified in time bound manner with appropriate action plan as per the conditions stipulated in CTE, CTO, EC & FC.

6.4 Activities to be undertaken of Environment personnel at Project Level

1. Assist CMPDI for preparation of Form 1 / 1A for obtaining EC, preparation of EIA / EMP and preparation of presentation at EAC.
2. Collection of draft EIA / EMP from CMPDIL and translate into local language and submission to SPCB including arrangement for early PC.
3. Successful conduction of Public Consultation (PC) by co-ordination with SPCB, village representatives, other stakeholders including arrangement of videography etc.
4. Ground work for PH with stake holders likely to attend in PH are to be done before hand. Ensure good arrangements in PH venue.
5. For preparing the PH proceeding on the very day of PH. Necessary arrangements i.e. computer, printer, draft PH proceedings based on earlier proceedings of PH should be kept ready.
6. Follow up with respective SPCB for obtaining Minutes of PC and Consent to Establish & operate.
7. Submission of timely & duly filled in Application for Consent to Establish including collection of various data, arrangement of payments to SPCB etc.
8. Submission of application for obtaining Consent to Operate from SPCB in association with concerned project authorities.
9. Coordination in generation of baseline data with company HQ & CMPDIL.
10. Submission of necessary details / filling up of data sheet of MoEF and submission of six monthly report to MOEF in consultation and association of concerned projects with due concurrence of company HQ.
11. Fix monitoring stations for air, water and noise in consultation with area and CMPDI
12. Associating with CMPDIL during environmental monitoring. Check for proper locations and method followed.
13. Take steps for proper functioning of ETPs, DETPs and other infrastructure and maintain registers of usages of alum, lime, other chemicals etc.

14. Regular check of movement of water tankers and other dust suppression measures. Ensure Registers for their movement. Provision and supply of dust masks to workmen.
15. Maintain records of both physical and financial in respect of all environmental capital and revenue works undertaken as compliances to the statutory requirements.
16. Proper execution of tree plantation works as per work order, counting of trees periodically, ensure proper replacement and recording the work done and process bills.
17. Keep proper record of Top Soil preservation, Area excavated; Back filled and OB dump areas reclaimed technically and biologically etc. obtaining from surveyor at least once in a quarter.
18. Coordination with different departments for maintaining different records and data in compliance of various statutory returns and obligations.
19. Observation of data pertaining to environment as per the requirements of Internal Environment Auditing and Reporting. It requires personal visit to different parts of the project and collect environmental data for onward submission.
20. To have an overview and suggest corrective actions for efficient operation of environment protection measures practiced in the project.
21. Co-ordinate with SPCB officials during inspection and timely replies to queries of various statutory bodies.
22. Preparation of Six monthly report and sending the same to MoEF
23. Furnishing data to CMPDI for Environment Statement such as water consumption, Diesel and electricity consumption
24. Collection of Water consumption details for assessing Water Cess and submit to SPCB
25. Submitting timely application for Consent renewal. Keep track of dates.
26. Collection of details from store and filling of Battery disposal Return.
27. Ensure timely lifting of waste oil by only authorized agency. Check for copy of the authorization and validity date and proper record keeping of waste oil recovered at store (prescribed forms to be maintained).
28. Disposal of Hazardous waste oil Sludge, Waste cotton from Work Shop and oil filters through authorized agencies. Check for copies of the authorization and validity.
29. Filling of return to SPCB on Hazardous waste
30. Preparation of site for bio-medical disposal or Collection and transportation of bio-waste from dispensaries and Hospitals through authorized agencies.
31. Submission of details / data on various measures such as pollution control measures, area of back filling, reclamation, energy consumption and many such items as desired by subsidiary HQ and CIL.
32. Ensure compliance of MOU parameters with updated records of activities.
33. Periodical Review of compliance status for reporting to subsidiary HQ for the information and observance the concerned of Director (Tech.).

CMPDIL is assigned the job of preparation of Base line data and preparation of Form – 1 / 1A, draft EMP, final EMP and monitoring of pollution parameters and ground water monitoring. Besides they are engaged for preparation of Mine Closure Plans etc. They take up R& D works on Environment and Environment management.

Co-operation with CMPDIL is necessary for smooth functioning. Details of specific co-ordination with CMDPI at all levels of subsidiaries have been mentioned in the role of different level executives.

6.6 The following assistance is required to be extended by the subsidiaries:

- 1) For exploration work carried out by CMPDI
- 2) Providing data for Form 1 / 1 A and other mine details for E C
- 3) Assist in Base line data generation, in fixing stations / locations for monitoring and source of power supply for monitoring
- 4) Translation of draft EMP in the local language
- 5) For preparation of presentation for EAC / SEAC meetings
- 6) Fixation of Pollution parameters monitoring stations
- 7) Making arrangements for power supply & verify the monitoring locations.
- 8) Furnish data to the CMPDIL officials visiting for making Environment Statement
- 9) Resolve difficulties and problem encountered by them during monitoring
- 10) Execution of R&D works and other studies
- 11) For dealing with municipal solid and hazardous waste.

Environment Management Plan

-Implementation

(Details of Mitigation Measures)

7.0 Environmental Management including Pollution Control measures

During coal mining, transportation and other allied operations, different types of pollutants are generated. The Pollution control and mitigation measures to be taken are specified in EMP. Besides EC, consent to establish and to operate also specifies various measures to be taken in the process of various operations.

In general, the pollution in UG mines is less and it is due to mainly for coal handling on the surface. However, major Environment related mitigative measures and activities are required to be taken in Open Cast Mines.

Broadly the various types of pollutants generated during mining operations and control measures undertaken to mitigate the pollution are given as below:

- Land degradation and Mine Reclamation
- Air Pollution and Control measures
- Water Pollution and Control measures
- Noise Pollution and Control measures.

7.1 Land degradation and Mine Reclamation

Mining being a site specific industry needs large tracts of land that includes forest land, Govt. non-forest land and tenancy or private land for its developmental as well as operational activities. While using land for the project activities, land degradation due to change in land use pattern takes place. Mainly in the open cast projects in the process of mining activities and excavation of land & removal of earth to extract coal, an external dump is created and it is continued till the internal dumping or back filling is started. Beside the land is required for infrastructure, CHP, coal stock yards, buildings both residential as well as residential, road etc. Entire land for open cast project is excavated for removal of over burden and extraction of coal and disturbed. In case of underground mines mine entries, infrastructure, buildings both residential as well as residential, road, CHP, coal stock yards, subsidence etc. disturbs the land. But the area disturbed is insignificant in comparison to open cast mine. Besides, a significant proportion of the potential coal deposits occur under the forest land.

The use of forest land is compensated & controlled by plantation on physically & biologically reclaimed mined out areas & on the external OB dump areas, plantation in & around mines, road sides, township / residential areas, available vacant spaces and implementation of conservation plan for protection of flora & fauna as per EC. This is apart from the payment made for compensatory afforestation to the state Forest departments on the equivalent non-forest land or in case the non-availability of non-forest land, on double the degraded forest land. Further studies are being taken up to re-convert the reclaimed land to agricultural land.

Used and degraded land of Open cast mine is reclaimed technically and biologically to bring the land surface as close to pre-mining profile as practicable. The stages of reclamation are narrated on the next pages:

7.1.1 Land Management

- Top soil management
- Technical Reclamation of External OB dump
- Technical Reclamation of Internal dump / backfilled area
- Management of void left after completion of extraction
- Technical Reclamation of subsidence due to U/G mining
- Plantation i.e. Biological reclamation on technically reclaimed dumps
- Monitoring of reclamation by Satellite surveillance,

7.1.2 Top Soil Management

Top soil is the upper and outer most layer of soil, usually the top 5.0 cm to 20.0 cm. It has the highest concentration of organic matter and micro-organisms and this is where most of the earth's biological soil activity occurs. It takes approximately 1000 years for one inch of topsoil deposit to be formed. Given the time taken to generate and the importance of topsoil, MoEF has stipulated that topsoil should be stacked at earmarked specific sites with adequate measures to preserve and should be used as top layer for reclamation of mined out areas.

The topsoil also contains a range of nutrients and trace elements essential to plant growth that are not normally found in required measure or absent in the excavated soil deeper in the soil profile. The mine spoil dumps are not having required or void of the basic nutrients like Carbon, Nitrogen, potassium etc. which is essential to sustain any vegetation to grow and more so the microorganism which give back the carbon from the litters. Further the top soil may contain native seeds and are concentrated in the top 50 mm of the soil profile. In order to re-establishment of native species, the thin layer of surface / top soil should be removed prior to the removal / stripping of overburden and the thin layer is called topsoil.

Hence, the top soil is removed, is stacked separately and preserved carefully for beneficial soil organisms and future vegetation. However, the duration of stockpiling should be minimized, since excessive time of storage may cause structural degradation and death of seeds and microorganisms, especially when soil moisture content is high.

A record of top soil where it has been stored along with date should be available in the project and the top soil should be stacked in such a way that it can be used as first come first go basis.

7.1.3 Technical Reclamation of External OB dump

Open cast mining activities start with dumping OB in the designated external dump as per plan and this operation is continued till back filling / internal dumping is started and gradually external dump becomes inactive. After becoming inactive, the external OB dump is reclaimed by leveling, grading and terracing the slopes for stabilization with the help of dozers & graders and spreading preserved / fresh top soil on the surface of the dump top and slope sides for biological reclamation i.e. plantation. Wherever required for stabilization purposes following techniques as a part of technical reclamation are normally used:

- a) Gully plugging – to minimise gully formation
- b) Top Surface drainage – to minimize the seepage of water from top
- c) Filling of cracks and fissures – to minimize the seepage of water
- d) Check dams – to arrest silt, clay, sand particles etc.
- e) Garland drains – to channelize the silt bearing rain water to the sedimentation tanks or to the desired destination

However, at times geo-synthetic mats or bio-degradable jute mats are used for early stabilization of dump slopes.

7.1.3 Technical Reclamation of Internal dump / backfilled area

Internal dumping / backfilling of quarry starts once the required space is available in the de-coaled area for continuing mining operations and internal dumping / backfilling simultaneously. Gradually external dump becomes inactive. Internal dumping / backfilling is continued as per plan with the overburden progressively and concurrently till the exhaustion of coal or completion of the project. In the process of progressive and concurrent internal dumping the area of internal dump increases and after attaining the planned height, a portion of the internal dump / backfilled area becomes inactive. These inactive areas are leveled and graded with the help of dozers & graders. Preserved / fresh top soil are spread on the surface of the dump and is continued progressively for biological reclamation i.e. plantation, till the mine is exhausted.

Once the mine is exhausted, the entire internal dump / backfilled area including the slopes becomes inactive. The remaining area of inter dump / backfilled area are Technically Reclaimed by leveling & grading and terracing the slope area for stabilization. There after, spreading preserved / fresh top soil on the surface of the dump top and slope sides is done for biological reclamation i.e. plantation, is done.

7.1.4 Management of void left after completion of extraction

Once the mine is exhausted, the entire internal dump / backfilled area including the slopes becomes inactive. Besides the dump, mine is left with a void, often called Pit Lake, of about 15 to 20% of the total mine area depending on the geo-mining conditions of the mine. While the final mine closure plan is being implemented and since no more dewatering is required, the

void is allowed to fill gradually with seepage water and direct rain water. It may take years to fill the void with water up to the top most water tables.

It is worth mentioning that during mining operations, some times natural water courses of 3rd and 4th generation are also disturbed. Wherever possible, these water courses can be channelized or surface run off can be diverted to fill up the void with water at shortest possible time to use it as rain water harvesting structure and water resource of the area.

7.1.5 Technical Reclamation of subsidence due to U/G mining

For Under Ground mining activities, degradation of land is bare minimum. Due to extraction of coal by caving method, there is possibility of subsidence on the surface. Magnitude of subsidence depends on the geo-mining conditions and no. of coal seam / seams under extraction. Subsided area can be used for normal agricultural activity and generation of forest without reclamation also. Normally subsidence area is filled with local soil materials, by dozing & leveling the area for filling the cracks developed due to subsidence to arrest the water seepage through the cracks and fissures to the UG workings and to restore the land to its near original land profile.

7.1.6 Plantation i.e. Biological reclamation on Technically Reclaimed dumps

The degradation of land due to opencast mining is taken care of by

- 1) Technical reclamation – Detailed discussed earlier in this chapter and
- 2) Biological reclamation – In order to stabilize the dump against erosion or to minimize soil erosion and to put the land to best use, biological reclamation is done on the external over burden dumps & the back filled areas by afforestation through the techniques briefed as under:
 - a) Broadcasting of grass seeds – Normally done on the inaccessible dump slopes. Seeds with fertilizers and water are sprayed on the dump slopes mechanically with the machine named Hydro-seeder. This truck mounted seeder moves along the terraced road or other convenient places and sprayed the seed on the slope terraced at larger interval before monsoon so that seeds germinate before on set of monsoon and do not get washed by rain.
 - b) Plantation / Afforestation – This is done on the nearly flat surfaces & terraced slopes at short spacing. Since, the state forest corporations are the expert agencies, the work of plantation is normally carried out on turnkey basis through the State Forest Corporations.

There are four types of locations where the Tree plantation is taken up as biological reclamation:

- 1) On external OB Dumps including terraced slope
- 2) On Back filled / internal dump areas including terraced slope
- 3) On plan land or vacant land as mitigative measures

- 4) Avenue Plantation or Green Belt generation as mitigative measures as it is one of the cost effective remedial measures to mitigate air and noise pollution

For better growth Bio-fertilizers and inorganic fertilizers are applied. Recent study shows that the fly ash has got good fertilizer property and the fly ash can be used as manure and save expenditure on fertilizer to a certain extent.

7.1.7 Multi Species Plantation

Instead of mono culture, CIL develop heterogeneous mix of forest with local species so that the survival rate is high and remain evergreen. Since the fruit of plantation will be used by the future generations, it may be insisted to plant value added tree saplings.

It may be noted that in these species many have combined properties like having medicinal properties as well as timber yielding or medicinal and fruit bearing. But in order to plant indigenous species, specific categorization has been done and this is specified in the contract categorizing some under medicinal, some as timber yielding and fruit bearing usually for proper implementation of the contract with less ambiguity.

Please verify the species during plantation and plantation grid should be species specific to allow the plants to grow to its potential canopy area.

7.1.8 Joint Counting

During the contract period, as per the contract conditions, joint counting is done to ensure proper survival and proper growth. At the end of the contract period, the plants satisfying the height criteria are considered for counting and the survival rate is calculated as per the contract conditions.

7.1.9 Maintenance period

The contract conditions specify the period of maintenance. In order to ensure proper growth and to make the tree self-sustaining, in most of the contracts maintenance period is extended to 5 years. Proper system of recording, handing over and taking over of the tree plantation after the maintenance period should be ensured.

7.1.10 Certain Tips

A look into reclaimed areas in the Open cast areas in the Coalfields should give a feeling of visiting picnic spots. Some of them have been converted into Eco-park, Butterfly Park, Pit lakes as water reservoirs to recharge sub-surface water level.

7.1.11 Some ready tips for healthy plantation:

- 1) Care should be taken for proper leveling, grading and terracing with top soil spreading before taking up any plantation.
- 2) It is important to dig pits in March / April and proper exposure to sun before rains.
- 3) Plantation of saplings in these pits may be done in June-July at the onset of monsoon
- 4) In the OB slopes it is better to plant fiber rooted plants like Bamboo and *Gliricidia*, as these control erosions.
- 5) Very tall and broad trees on steep slopes should be avoided since these are likely to be uprooted easily.
- 6) Arjun can be planted near streams or at the foot of the OB Dump.
- 7) Generally, Neem grows well on all degraded soil such as OB and back filled areas.
- 8) Planting of fast growing trees and slow growing trees side by side can be avoided as this will block the growth of slow growing trees
- 9) Small trees like Awala near dense branched trees can be avoided
- 10) In avenue plantation, the first row can be bushy trees and ever green trees on the next row.
- 11) It is necessary to stagger the rows of trees so that each plant gets more sunlight.
- 12) Plantation grid should have enough space for future and healthy growth of the plants.
- 13) Wherever possible three tier plantation should be adopted with local species.

A list of familiar and frequently planted trees with their Biological name and its family names are given below:

Family name	Botanical name	Local / Trade name
Anacardiaceae	<i>Mangifera indica</i>	Am / Mango
Caesalpinaceae	<i>Tamarindus indica</i>	Imli / Tamarind Tree
Cecarubiaceae	<i>Ailanthus excelsa</i>	Maharukh
Euphorbiaceae	<i>Phyllanthus emblica</i>	Awla / Indian goose berry
	<i>Pongamia pinnata</i>	Karanj / Beech tree
Meliaceae	<i>Azadirachta indica</i>	Neem
Mimosaceae	<i>Acacia catechu</i>	Khair
	<i>A. aculeiformis</i>	Babool
	<i>Albizia lebeck</i>	Shirish
Rhamnaceae	<i>Zyzyphus jujube</i>	Bhor
Anacardiaceae	<i>Semecarpus anacardium</i>	Bibba
Annonaceae	<i>Annona squamosa</i>	Sitaphal
	<i>Cassia fistula</i>	Amaltas
Cecarubiaceae	<i>Ailanthus excelsa</i>	Maharukh
Combretaceae	<i>Anogeissus latifolia</i>	Dhawda

Ebenaceae	<i>Diospyros melanoxylon</i>	Tendu
Fabaceae	<i>Butea monosperma</i>	Palas
	<i>Dalbergia paniculata</i>	Dhobin
	<i>D. sisso</i>	Sisam
	<i>Pterocarpus marsupium</i>	Bija
Graminae	<i>Bambusa arundinaceae</i>	Katang bamboo
Lecythidaceae	<i>Careya arborea</i>	Kunbhi
Lytheraceae	<i>Lagerstroemia parviflora</i>	Lendia / lenda
Meliaceae	<i>Azadirachta indica</i>	Neem
Mimosaceae	<i>Acacia araculiformis</i>	Babul
	<i>A. catechu</i>	Khair
	<i>A. nilotica</i>	Babul
	<i>Albizzia lebbeck</i>	Sirish
	<i>Cassia siamea</i>	Kashid
	<i>Leucaena leucocephala</i>	Subabul
Moraceae	<i>Ficus ben galensis</i>	Vad
	<i>F. religiosa</i>	Pipal
Moringaceae	<i>Moringa critifolia</i>	Aal
Myrtaceae	<i>Syzygium cumini</i>	Jamun
Palmae	<i>Borassus flabellifer</i>	Sindhi
Rhamnaceae	<i>Zizyphus mauritiana</i>	Ber
Rutaceae	<i>Chloroxylon swietenia</i>	Bhirra
Sapindaceae	<i>Schleichera oleosa</i>	Kusumb
Sterculiaceae	<i>Sterculia urens</i>	Karaj
Tiliaceae	<i>Grewia tilifolia</i>	Dhaman
Verbenaceae	<i>Tectona grandis</i>	Sagwan

7.1.12 Monitoring of Land reclamation through Satellite Surveillance

Monitoring of Land reclamation through Satellite Surveillance is being conducted by CMPDI for authenticated and realistic information of Land restoration / reclamation under taken in CIL mines. 50 major opencast coal mines of CIL producing 5.0 MM3 (Coal + OB) and more are monitored regularly on annual basis and other Open cast mines once in three years. Latest position of the Satellite Surveillance is available in CMPDI as well as in the subsidiary web sites. Please ensure that the reports are made available to the concerned OCPs and compare the results to take appropriate action based on the analysis.

Objectives of the land restoration / reclamation monitoring are to assess correctly the backfilled areas, plantation areas, social forestry areas, active mining areas, water bodies and distribution of wasteland, agricultural land and forest in the surrounding and leasehold area of the projects. This will help in assessing the progressive status of mined out land reclamation and to take up remedial measures, if any, required for environmental protection. Monitoring reports are up loaded regularly in the web sites.

7.2 Air pollution

7.2.1 Sources of pollution

In Coal mining and allied activities, the main source of air pollution is movement of OB / coal in road transportation, transfer points at crushers, loading & unloading operations in CHP. Drilling and blasting also causes some air pollution. These operations generate air borne dust which is technically called Suspended Particulate Matter (SPM - now re-designated as PM 10) and Respirable Particulate Matter (RPM - now re-designated as PM 2.5). Some fugitive emission of gases like Carbon dioxide, CO, Sulphur-dioxide and oxides of Nitrogen etc. are caused by automotive, generators and blasting operations. A few mines fires in underground & open cast mines are the sources of air pollution in coal mines.

Generally, since there is no chemical reaction or burning takes place in the normal operations, Dust is the only major pollution.

Methods adopted for mitigating air pollution due to dust is mentioned in the table below:

Location & Causes of Pollution	Type of measures to be taken
Drilling & Blasting	<ul style="list-style-type: none"> Drills equipped with dust extractor or wet drilling arrangements. Wetting of area before drilling Proper Maintenance of Drills and drilling bits Appropriate design of blast holes Use of proper amount of explosives with proper initiation as per the geo-mechanical conditions of the blast site.
Loading & unloading points and during dozing	<ul style="list-style-type: none"> Proper wetting before loading is started Wetting of top surface of loaded tracks by sprinklers Provision of air conditioned Operator's cabin
Coal Handling Plant & Washeries	<ul style="list-style-type: none"> Suppression of dust by fine nozzle / mist spray, fixed sprinklers at crusher loading / unloading & transfer points. Covering of the sides at dust generating places can be done by side sheeting / hessian / plastic cloths Greenbelts using ever green shady trees around Coal Handling Plant & Washeries
Coal Stock yard & Railway sidings	<ul style="list-style-type: none"> Use of varying angle and long throw water spraying rain guns mounted on Concrete stand post capable of rotating 180/360 deg. Use of Silo for rapid and dust free loading of coal into wagons.
Haul Roads	<ul style="list-style-type: none"> Mobile tankers are used to wet each spot at less than one hour interval. In summer the interval is reduced. Fixed 180 deg. rotating sprinklers installed. Ensure good drainage. Use more and more conveyor in place of road transportation
Coal Transportation	<ul style="list-style-type: none"> Surfacing of all haul roads/permanent roads by Bitumen or concrete Water sprinkling on transport road by Mobile tankers.

	<ul style="list-style-type: none"> ▪ Mechanical Blooming / industrial cleaner can be used instead of Water Spraying on bitumen roads. ▪ Greenbelts using ever green shady trees around quarry, industrial sites, service building area besides avenue plantation along roads. ▪ Covering of trucks with tarpaulin / mechanical cover or wetting of coal surface of the loaded trucks.
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7.2.2 Greenbelt Development

There is no specific guide line for mining industry. However, there are some guidelines of MoEF to develop greenbelt in eco-sensitive; coastal areas, major settlements etc. are mentioned as below:

- Green belt is to be developed all around the power plant boundary. The total green area including landscaping area will be 1/3rd of the plant area inclusive of lay down area for further green development.
- MoEF mandates that community buildings and townships should build 1-1.5 KM of greenbelt to control air and noise pollution.
- Green belt is to be developed on the sides of roads, railway lines, rivers and streams / canals and on other unutilized lands under state / corporate, institutional or private ownership. In urban & in industrial areas and in arid tracts green belt to be developed to control erosion & desertification and for the improvement of micro-climate (Source : NFP,1988).
- The green belt between two adjoining large scale industries shall be 1.0 KM and it should be 0.5 KM wide around the effective limit of the industry and shall be 1.0 KM in odour problem areas. Sufficient size of land acquisition to be made for DETP with zero discharge to use treated waste water in growing vegetation and to create water bodies for improving aesthetics, recreation and aquaculture development with proper storage for solid waste to reuse.

7.2.3 Control of air pollution from the planning stage:

Prevention of pollution at source is given due importance in the planning stage itself. Road transportation of coal can be minimized by introduction and use of more & more belt conveyors, pipe conveyors, rail head up to as near as possible of the mine etc. resulting less and less air pollution caused due to road transportation. It should also be noted conveyor transportation is cheaper than truck transportation with additional advantage of less air pollution due to dust. Shifting from road transportation to other means such as marry go round, conveyor from mine to thermal power stations, conveyors from mine & in-pit movements etc. can be done. Tube conveyors, not only eliminates air pollution but also theft proof and can negotiate both horizontal as well as vertical curves, can be introduced where techno-economically feasible. However, in old mines these infrastructures can be constructed / developed at latter stage also to reduce the pollution.

7.2.4 Monitoring

Monitoring is critical to know whether the quality of our environment is improving. Therefore, to know the real time status of any pollution, regular measurement of such pollutant is required. Monitoring helps us to know the level of pollution and based on which necessary steps can be taken to maintain or reduce the level of pollution within the specified limit. EC conditions clearly specify the frequency and methodologies to be followed for air quality, water quality, noise level etc.

7.2.5 Frequency

- (1) Air quality monitoring for the above mentioned parameters once in a fortnight (24 hourly sampling) at the identified locations near the dust generating sources.
- (2) As a result of monthly monitoring, if it is found that the concentration of the pollutants is less than the 50% of the specified standards for three consecutive months, then the sampling frequency may be shifted to two days in a quarter year.
- (3) In case the value has exceeded the specified standards, the air quality sampling shall be done twice in a week. If the results of four consecutive weeks indicate that the concentration of pollutants is within the specified standards, then fortnightly monitoring may be reverted to.

7.3 Water Pollution

7.3.1 Sources of Water Pollution: The major source of water pollution in coal mines is the suspended solids in the drainage system of mine water and storm water. In very few mines of CIL mine water is acidic due to the presence of sulphur / pyrites / pyritic compounds. Effluent from washeries and coal preparation plants generally contains fine coal particles, suspended solids; washery medium, reagents (if any) and some times oil & grease to form other sources of water pollution.

In HEMM and light vehicles' workshops, the washing of HEMMs and light vehicles and Workshop floors mixes oil and oily matter with water along with dirt that is being washed. This oil and oily matter is separated through oil & grease trap.

Besides, the sewage from residential complexes contaminates water with mainly organic matter.

7.3.2 Pollution Control Measures:

7.3.2.1 Mine water Treatment: The Mining operations neither involve any chemical reaction nor add any chemical coagulant / pollutant to the effluent except workshop effluent and captive power plants. Mainly the Suspended Solid Particles including coal dust, clayey materials and sand particles are present in the water which needs to be cleaned. The separation of suspended solid particles is done generally by gravitational segregation of clear water & pollutants by construction of settling tanks.

7.3.2.2 Design Principles:

The principle of separation of suspended solids is based on difference in densities of the Suspended particles and water. Most of the sediments are coal dust, clay, sand particles which are heavier than water. By simple sedimentation techniques, mine water is allowed to be detained in the settling tank for a desired period for settling the suspended particles at the bottom of the tank. For settlement of silt type particles, generally a detention period of 2 Hours will be sufficient. Earthen tanks with pitching on the slopes will be sufficient. Generally twin sedimentation tanks are constructed so that one is allowed to dry to remove the sediments with ease while the other one is in operation. Coagulation can be induced by adding alum, poly chlorite and lime through a flash mixer before entering sedimentation tank, if high quality discharge water is the end requirement. The best way to place the dewatering pumps on floats in OCPs which can reduce the Suspended particles at the source as the pumps on floats dewater practically suspended solid free clean water from the top of the water body.

7.3.2.3 Acid Mine Water:

Acid mine water originates from the oxidation of sulphide minerals present in coal and associated rocks. A series of chemical reactions involving the sulphide minerals with atmospheric oxygen, water and iron-sulphur oxidizing bacteria resulting in production of acid mine water. The sulphur compounds change from Ferrous to Ferric state and finally Sulphuric acid. However, a very few mines in CIL produces Acidic Mine Water.

7.3.2.4 Conventional acid neutralization

This is a commonly used treatment method whereby acid mine drainage is pumped to a central location to be mixed with an alkaline chemical, such as lime or sodium hydroxide, and mechanically aerated in large basins. The pH is raised to a level between 6 and 8. The chemical reaction of acid and alkali precipitate as sludge. Some metals, such as iron, must be oxidized to be precipitated as a stable compound, for which aeration is required. The resultant sludge-water mixture then flows to a clarifier or a series of settling ponds.

Some times Lime bed lining is used in the neutralizing pond. When the effluent of acid mine water passes through the lime bed it gets neutralized. Periodically the sludge has to be removed and the lime bed lining is to be replaced.

7.3.3 Disposal of Treated Mine Water:

As explained earlier the treated water should be recycled for reuse. The mine water is normally used for industrial purposes like dust suppression, gardening, vehicle washing etc. If the mine water is to be used for drinking purpose to the residential area or to near by villages further necessary treatment along with disinfection must be done. As per availability, treated water may be supplied to nearby villages for their domestic as well as agricultural uses.

7.3.4 Use of Mine voids at the end of mining:

Voids created by mining are reclaimed progressively as per the project plan with OB and final voids left after completion of mining operation are used as Mine Water Storage. The mine

water stored in voids helps to recharge the ground water table, after treatment & filtration can be used for domestic & industrial use, cultivation purposes etc. These ponds are also source of water for villagers. However, excess water available is supplied for agricultural purpose & there after, it can be discharged into natural course like nalla / river after ensuring that it meets the standard quality norms.

Many examples exist where mines provide water to community members. This can range from domestic uses to formal supply of larger volumes for irrigation through infrastructure designed, constructed and managed under CSR. CIL CSR policy is given in the Appendix.

Pre-mining, during mining and post mining period, there is a need to understand the Community environment - how water is used, who uses the water, seasonality of use, and existing and future stakeholder and community demands. Regular interactions and ongoing dialogues help the mine operators and these communities understand each others needs for water.

7.4 Other Effluent treatments:

7.4.1 Work Shop Effluent Treatment Plants:

Unlike, Mine water, the treatment of Work Shop Effluent is slightly more complicated because of the presence of Oil & grease from washing and floor cleaning. This effluent is treated for removal of Oil & grease. After removal of TSS by coagulation and clarifier to remove the fine suspended solids, oil & grease trap is used. These treatment Plants should re-circulate the treated water for washing purpose generally designed for ZERO DISCHARGE concept i.e. reused within work shop.

First there is a chamber to remove any floating solids from entering the system followed by a pre-sedimentation tank to remove sand and easily settleable suspended solids. Then it is led to oil & grease trap where the oil & grease are removed. It works on the principle that oil & grease are light compared to water and floats. It gets accumulated and thickens. The thickened oil & grease can be removed through a small gate valve fixed at proper level. Then the fine sediments are removed by adding coagulants in flash mixer and flocculator and settlement in settling tank.

The sludge from the ETP is generally classified as Hazardous waste and has to be removed in sludge farm for proper disposal as may be required by act.

7.4.2 Domestic Effluents: Normally the residential complexes in coalfields are small and having less than 1000 quarters. For handling the sewage from these quarters Septic tanks are constructed which has the established treatment form. However, in major residential complex sewerage treatment plants have been provided.

These Sewerage treatment plants are designed as extended aerate lagoon or using activated sludge method. Usually the design is done by experts and executed through Turnkey contract.

7.4.3 Reuse of treated domestic effluent water:

In some areas, the agriculturalist prefers the treated water for irrigation purpose. If the villagers give written consent the same can be diverted. This can be used for plantation work.

The residue from the domestic effluent treatment plants is generally good manure and collected residue can be auctioned.

7.4.4 Monitoring

EC conditions clearly specify the frequency and methodologies to be followed for water quality i.e. for pH, Chemical Oxygen Demand (COD), Total Suspended Solids (TSS) and Oil & Grease (O & G), monitoring.

7.4.5 Frequency

Monitoring of the above mentioned parameters shall be done once in a fortnight.

All the 33 Parameters as given in Part-A of General Standards for discharge of Environmental Pollutants, GSR 801 (E) EPA 1993, prescribed by CPCB shall be monitored once in a year.

7.4.6 Phreatic water level monitoring

Phreatic water levels are being monitored in and around mining areas during pre-monsoon and post-monsoon seasons to assess the impact of mining on ground water regime.

7.5 Noise Pollution

Noise pollution refers to a type of energy pollution in which distracting, irritating or damaging sounds are freely audible. With this type of pollution, contaminants are not physical particles, but rather waves that interfere with naturally-occurring waves of a similar type in the same environment. Industries, automobiles and some entertainment joints are some of the sources of noise pollution. In coal mining noise is generated from vibration of improperly maintained machineries used for coal and OB extraction and transportation, crushing, drilling and blasting etc.

7.5.1 Methods adopted for mitigating noise pollution are mentioned below:

- a) Proper maintenance of machineries to reduce vibration.
- b) Provide air conditioned Operator's cabin
- c) Provide green belt around the working places.
- d) Properly designed blasting patterns with proper initiation and quantity of explosives.
- e) Provide ear plugs / muffs in high noise generating places

- f) Rotate between different places of work to avoid high level of noise exposure

7.5.2 Monitoring

Frequency has been clearly specified by EC conditions for noise pollution monitoring, during day and night times.

7.5.3 Frequency

Monitoring frequency for noise levels shall be once in a fortnight.

For Environmental Standards of air, water and noise, applicable to the coal mines, the relevant MOEF notification should be referred and consulted.

Environment Management - Mine Closure Plan

8.0 MINE CLOSURE PLAN

"Mineral deposits being exhaustible, once the process of economical extraction of mine is complete, there is a need for its closure. Especially, where the mineral activity has been spread over a few decades, mining communities get established and closure of mines means not only loss of jobs but also disruption of community life. Mine closure planning is necessary. It should be orderly and systematically done. It should also be so planned as to help the workers and the dependant community rehabilitate themselves without undue hardship."

In order to address the situation, the Ministry of Coal had issued the detailed guide lines for preparation of Mine closure plan and implementation. The latest amended guidelines issued vide letter 55011-01-2009-CPAM dated 07/01/13. This can be downloaded in www.coal.nic.in/sites/upload_files/coal/files/webform/notices/070113b.pdf

8.1 Different attributes of Mine Closure Planning:

- Mine closure plan should include Safety measures of mining i.e. Water / fire dams & seals, barriers of air flow, control of gaseous emissions and protection by boundary, safe & effective decommissioning of infrastructures, control of contaminated effluents & post closure monitoring.
- Technical aspect - Progressive closure activities & its review every 5 years, Safety hazards including management of fire & subsidence, Management of OB dumps (Technical & Biological reclamation), Hydrogeology, Decommissioning of infrastructures, Closure of entries to the mine.
- Environmental aspect - Management of final voids, Reclamation of forests / vegetation, Utilization of accumulated water, Alternative use of land, Maintenance of Civic facilities to PAPs and dependent people.
- Social aspects - Redeployment and suitable compensation to existing manpower, Management of Common facilities to direct & indirect manpower etc.
- Financial Aspects - Cost of progressive closure activities, Organization cost, cost of final Mine closure plan including monitoring.
- Closure Action Plan - It is a life cycle experience that begins with the start of mine and continues post closure. Closure planning should include all features described above.
- Closure cost - Cost of Progressive mine closure is included in the Project report whereas Final Mine closure is to be managed by creation of a Corpus fund created by deposition of a stipulated amount in the Escrow fund.

MINE CLOSURE SHOULD AIM AT LEAVING THE AREA SAFE AND NOT AS A BURDEN TO THE SOCIETY - ENSURE THAT IT IS A SOURCE OF SUSTANABLE LIVELIHOOD OF LOCAL COMMUNITY & IT IS A SELF-SUSTANING ECO-SYSTEM.

There are a number of key areas, which require careful consideration during closure planning.

A) Stakeholder involvement

The following stakeholders should be involved.

- Company - the employees, management and shareholders.
- Community – people directly affected by mining activities, people providing goods and services to the mine, neighboring landowners etc.
- Government - Local, State and Central Government and their relevant ministries.

B) Planning

Mine closure should be integral to the whole life-of-mine plan. In order to ensure an orderly, cost-effective and timely closure the following has to be kept in consideration:

- To protect the environment and public health and safety by using safe and responsible closure practices.
- To reduce or eliminate environmental effects once the mine ceases operations.
- To establish conditions which are consistent with the predetermined end uses of land
- To reduce the need for long term monitoring and maintenance by establishing effective stability of disturbed areas.

EMPs for all operational mines are having inbuilt mine closure plan. For older mines where there is neither EMP nor EMS, the preparation of a separate mine closure plan will be necessary.

C) Final mine closure plan Design - Underground

3 elements are incorporated in final closure plan.

- Measures designed to prevent or minimize impacts of mining
- Engineering requirement for safe & effective decommissioning.
- A specification for closure to be used by contractors & supervised by CIL.

Preventive measures

- i) Water or fire Dams to be constructed.
- ii) Seals or barriers to control airflow and / or gas migration.
- iii) Type of shaft sealing treatment i.e. unfilled / filled with inert materials
- iv) Type of Incline roadway treatment.
- v) Post closure control of gaseous emissions and / or mine water.

Engineering requirements

Type of shaft, type of winders, haulage systems, other surface infrastructures etc. - how best these can be used, dismantled / stripped as a last option.

Hazardous substances – Treatment of Hazardous substances, if any

Financial provision - The objective of financial provision is to ensure the cost of closure is adequately represented in company accounts and the cost of closure is met from that fund and opening of Escrow account as per the provision.

Action to be taken as per approved mine closure plan prepared in line with MoC Directives

Misc. Chapter

Rain Water Harvesting, Energy Audit, Renewable Energy, ISO - 14001, Action Plan & Budget Preparation

9.0 In the process of mining, natural resources in the form of water, energy, land etc. are used over the life of the mine. Some part of the land is covered by impervious materials for constructing infrastructures and that part of land loses its natural property of water percolation to recharge the ground water. So, necessary arrangements are to be made to use optimum water after water audit / assessing water foot print & adopting water conservation techniques / methodologies and compensate the damage done to the nature through systematic water harvesting. Mining activities require substantial energy and the energy is generated mostly from exhaustible fossil fuel with the production of green house gases (GHG) which are one of the major components of global warming. It is our duty to our future generation to make some arrangements to conserve the fossil fuel and reduce GHG by the way of renewable energy generation from the inexhaustible natural energy resources i.e. solar, wind, geo-thermal etc. and use optimum energy through energy audit, assessing carbon foot print and adopting energy efficient methods / technologies. To improve the quality of environment and its management, we have already started certifying our units with ISO 14001 and plan to do it for all units of CIL. However, without budget provision no activity can be undertaken. So preparation of both capital and revenue budget is one of the essential responsibilities of any environment personnel.

9.1 RAIN WATER HARVESTING

What is Rainwater harvesting?

The term rainwater harvesting is being frequently used these days. However, the concept of water harvesting is not new for India. Water harvesting techniques had been evolved and developed centuries ago in our country.

Ground water resource gets naturally recharged through percolation. But due to indiscriminate development and rapid urbanization, exposed surface for soil has been reduced drastically with resultant reduction in percolation of rainwater for ground water recharge, thereby depleting ground water resources. Rainwater harvesting is the process of augmenting the natural percolation and filtration of rainwater into the underground formation by some artificial methods and techniques. "Conscious collection and storage of rainwater in the mother earth or artificially created reservoirs to cater to demands of water, for drinking, domestic purpose & irrigation is termed as Rainwater Harvesting."

Broadly there are two ways of harvesting rainwater:

- (i) Surface runoff harvesting
- (ii) Roof top rainwater harvesting

Surface runoff harvesting:

During rain major part of the rain water flows away as surface runoff as the ground is not able to percolate. This runoff could be preserved and used for recharging aquifers by adopting appropriate methods and techniques.

Recharging ground water aquifers

Ground water aquifers can be recharged by various structures to ensure more percolation of rain water in the ground instead of draining away from the surface. Commonly used recharging methods are:-

- a) Recharging of bore wells / dug wells / percolation tanks or reservoir / Recharge pits / trenches
- b) Construction of micro / mini dams in the path of seasonal nallas or water ways.
- c) Pick up weirs in the perennial rivers / nallas.

There are several aquifers in the ground. Surface storage tanks charge only the top aquifer. This generally gets dried up in summer. So we should aim at charging deep aquifers except saline water. This can be done by making check dams or ponds to divert the unused redundant or making bores, so that the water can charge the lower aquifers.

In Open cast mines, after exhaustion of coal reserve and cession of mining activities, a void having an area of nearly 15 – 20% of the excavated area is left even after concurrent and progressive back filling as water body in the form of Pit lakes. As such irrespective of the depth of pit lakes created, after mining activities, should not be filled by OB re-handling which will disturb the already settled and biologically reclaimed dumps. OB re-handling will generate further dust pollution besides destroying the huge water reservoir. In India most of the coal is available in drought prone areas. The pit lakes created in the process of mining, as a huge water reservoir and storage structure, will only prove a boon to the nearby locality as the water resources and recharges the ground water as well.

This void created after mining activities is normally filled over time with water percolated from the strata. However, adjacent nalla, water course etc. can be diverted during rains for faster filling and water conservation. The extra and unused treated mine water from adjoining mines can also be pumped to these voids. This water body is used as water storage for recharging sub-surface water table, by the local people, for industrial purposes, pisciculture, recreation centers etc.

Roof Top Rainwater Harvesting (RTRWH)

It is a system of collecting rainwater using the roof top as catchments area. It can either be stored in a reservoir build for the purpose or diverted to artificial recharge system. This method is less expensive and very effective and if implemented properly, helps continuously in augmenting the ground water level of the area.

Since, water is one of the major natural inputs, judicious use of water for industrial as well as domestic use is the need of the day. As a base line data **Water Foot Print** for any industry is to be assessed and based on this assessment steps are to be taken for reduction of water consumption in various activities related to mining and allied processes.

9.2 Energy Audit

Energy audit is a technique used to establish pattern of energy use, identify how and where losses are occurring and suggest appropriate economically viable engineering solutions to enhance energy efficiency in the system studied. Energy Audit though not compulsory for Coal Industry presently, it is a very useful tool to save valuable energy. This is renamed as **Carbon Foot print** for assessing both direct as well as indirect GHG emission.

Diagnostic energy audits aim ranging from identifying ways of conserving energy to evolution of a new blue print for the energy system provide insight into the modes of better utilization of fossil resources and high-grade energy and exploration of renewable energy options.

The Energy audit consists of

- ❖ Preliminary data analysis and Measurement at site
- ❖ Data analysis and Recommendations based on economic viability-short term, medium term & long-term measures.
- ❖ Report submission, discussion of recommendation with the client & finalizing the report with the client.

In some selected mines, CMPDIL is conducting the energy audits. Energy saved not only saves money, but it is all more important that this leads to saving the non-renewable energy source i.e. coal, oil and other fuel.

As environmentalist, we should guide people to save Energy. Energy saved is energy generated.

Some standard techniques used to save Energy are:

1. Connect Street lights to auto timer based off & on system.
2. Replace high energy consuming lamps with CFL, LED or any other energy efficient lamps.
3. Insulated wire for low voltage (LV) distribution to prevent hooking & pilferage.
4. Provision of float valves in Overhead water tanks of the Residential Buildings (RB) and Non-residential Buildings (NRB) to save water as well as power for pumping.
5. Use roof tops of RB & NRB, hospital / dispensary and canteen etc. for generating electricity with the help of Photo Voltaic Cells or any other conversion method i.e. water heating, to utilize solar energy.
6. Install dewatering pumps of OC mines on float or pontoon and UG mines in positive suction
7. Maintain Power Factor at 0.97 + level with required Auto Power Factor Correctors (APFC)
8. Add any other suggestion you want to implement.

9.3 Renewable Energy

Renewable energy is the sustainable energy source that comes from natural environment and it has the following aspect:

- It exists perpetually and in abundant in the environment

- Ready to be harnessed and inexhaustible
- It is a clean alternative to fossil fuels
- It is derived from natural process and replenished constantly

From the above definition it can be noted that Renewable energy is the only source of future energy as it is inexhaustible, derived from natural process and replenished constantly and clean. Faster adoption of the Renewable energy can save the world from the acute problem of climate change. So we should start using as much Renewable energy as possible for our daily use in mining activities.

Various Renewable sources & viability in coal mining area is as under:

1. **Solar Energy** – Solar Energy can be easily tapped through Photovoltaic (PV) cells with small as well as big investment. Solar energy can be easily used for water heating. Concentrated Solar heat can be used for generation of steam that in turn generates electricity through turbine, but it requires high investment.
2. **Wind energy** – This depends upon geographical locations and requires substantial investment.
3. **Bio Fuel** – This is bio fuel from Jatropha, Karanj and neem seeds. Plantation can be taken up in planned way for producing bio-fuel.
4. **Geothermal Energy** – It can be used for centralized air conditioning systems by using the temperature below earth. Normally 10 – 20 m below the surface, the temperature remains almost constant i.e. $24 \pm 2^{\circ}\text{C}$ through out the year.
5. **Hydro power** – Micro / mini Hydro power generation possibility may be explored
6. **Bio Mass** – can be used in rural India.
7. **Municipal Sewerage / Solid Waste** – are being done only in big cities.
8. **Tidal Energy** – not possible in Coalfields and it is not popular source.

In line with Ministry's direction to promote Renewable energy and MOU on SD, installation of solar power plants may be taken up in the roof top of non-residential / Residential buildings, as a green energy initiative. However, solar power plant can be installed on vacant land also. Cost of solar power is gradually reducing and will come down to Rs 5.50 / kwh in near future from the present tariff of Rs.7.50 / kwh in Grid system.

CIL has taken initiatives for installation of PV cells of 2.0 MW at Sambalpur, Mahanadi Coalfields Ltd. and 0.25 MW at Ranchi, CMPDI and these are in advanced stage of commissioning. All subsidiaries should install similar type of power generation system as part of Green Initiatives with the aim to achieve at least 5.0 MW by the end of 12th plan period.

9.4 ISO 14001

ISO 14001- is a voluntary international standard for Environmental Management Systems ("EMS"). An EMS is a tool designed to enable organizations to target, achieve and demonstrate continuous improvement in environmental performance. It is one integrated management process with a number of stages which include an environmental audit.

ISO 14001:2004 outlines the requirements for an EMS. Organizations implementing ISO 14001 usually seek to obtain [certification](#) by independent Certification Bodies. Certification indicates that the documentation, implementation and effectiveness of the EMS conform to the specific requirements of ISO 14001. CIL has started integration of Environment Management System (ISO: 14001) with Quality Management System (ISO: 9001) and OSHA 18001 with a target to complete in its all units by 2016-17.

Action like implementation, certification and re-certification of different units of CIL against ISO 14001 is continuing.

9.5 ACTION PLAN & BUDGET PREPARATION

All activities related to environment can be implemented only if it is planned well in time along with fund provision for making necessary funds available in time, so the action plan can be executed as per schedule. So annual action plan should be prepared well in advance at project level which is to be vetted at area and there after in subsidiary HQ. Generally, all new infrastructures and other activities are taken up under Capital Budget head as per the Project Report. However, to maintain the capital assets and other revenue activities etc. are under taken under Revenue Budget head.

Since the engineer at project level knows the exact requirement of activities to be taken as per the mitigation measures mentioned in accordance to the project report and /or as per EC / Consent to operate conditions, then the activities are to be prioritized accordingly.

Based on the above requirement, the list of works / activities to be taken up in the financial year are made out along with necessary Budget provisions in the approved Capital / Revenue Budget of the financial year. Once the activities are identified and included in the Capital as well as Revenue Budget, a detailed estimate has to be initiated by the Project through Env't. / Civil / E&M engineer as the case may be for competent (normally Area General Manager) approval, tendering and execution. The preparation of environmental budget should be started well in time so the activities and expenditure can be booked in proper accounting code for environment.

10.0 Self - evaluation - Environmental Audit Check List –

10.1 Open cast

Name of the Mine:

Environment Clearance Reference:

Approved Production capacity:	MTY	Production in last FY:	MTY
Area as per approval:	Ha	Actual Acquired:	Ha
Consent to establish: Approved Capacity:	MTY	Valid Up to:	
Consent to operate: Approved Capacity:	MTY	Valid Up to:	

10.1.1 AIR POLLUTION:

10.1.1.1 MINE AREA

Drilling & blasting and Haul Roads

- Whether the drills are fitted with wet drilling arrangements or Dust extractors; its effectiveness including arrangements for supply of water for wet drilling.
- Whether Water Spraying is done at the Face and proximity before Blasting;
- Check No of mobile tankers and number of trips per shift and length of Haul road in KM covered.
- Fixed Sprinklers installed at the haul road with nos. of sprinklers & their effectiveness including the throw and length in KM of haul road covered.
- Check water source for sprinklers including pumping arrangement etc.

10.1.1.2 COAL HANDLING PLANT:

- Check the functioning and efficiency of water sprinklers in all the transfer points, loading & unloading points
- Check covering of trucks with tarpaulins.
- Whether sides of CHP receiving hoppers are covered (preferable)
- Whether crushers are fitted with misters / dust extractor / bag filter (in any)
- Check Overall house keeping

10.1.1.3 COAL STOCK YARD:

- Whether fixed Sprinklers are installed at the yard and nos. of sprinklers & their functioning including the throw degree of rotation etc.
- Check condition of approach road and its maintenance
- Overall house keeping

10.1.1.4 COAL TRANSPORTATION ROAD

- Length of transportation road within the colliery premises black topped / Concrete (Keep record of total length of transportation road within the colliery and beyond under company's control)

- b) Whether fixed Sprinklers are installed and nos. of sprinklers & their functioning including the throw
- c) Check No of mobile tankers and number of trips per shift
- d) Check whether roads properly maintained / pot holes repaired.
- e) Check how the dust in road is cleaned. Is it by manual / mechanical cleaning?
- f) Check dust control arrangements provided at Weigh Bridges and its effectiveness
- g) Check for avenue plantation and suggest improvement, if required.

10.1.1.5 RAILWAY SIDING

Whether fixed Sprinklers are installed at siding and no of sprinklers & their functioning including the throw and distance between sprinklers.

- a) Whether adequate space is there for storage and transportation arrangements.
- b) Check for plantation and suggest improvement if required.

10.1.1.6 MONITORING OF AIR POLLUTION:

- a) Check for proper locations of air, water and noise monitoring stations and suggest for modification, if required
- b) Check the reports for any exceptional readings. Action taken for mitigation
- c) Whether parameters specified in EC and Consent to establish and operate are being monitored

10.1.2 WATER POLLUTION

10.1.2.1 MINE DISCHARGE:

- a) Check the treatment system for mine discharge. Its capacity vis-à-vis pumping arrangement; discharge water velocity & discharge pipe dia.
- b) Check arrangements for neutralization, if the discharge is acidic.
- c) Chemicals are added for neutralization and its measuring system? Whether stock register is being maintained for chemicals?
- d) Check the system for removal of sludge and method & place of disposal.
- e) Observe the outlet water for suspended matters. Suggest measure if required.
- f) Is there any system to reuse the water? % of recycling?
- g) Is there any scope for using the water for the purpose of cultivation / agriculture?
- h) Check the reports for any exceptional readings. Action taken to mitigate
- i) Overall house keeping

10.1.2.2 WORK SHOP ETP / OIL & GREASE TRAP

- a) Check the source of effluent
- b) Whether the drain from oil changing room is connected to OGT / ETP.
- c) Check oil changing process, for spillage & disposal method of oil filters & cotton waste.
- d) Coagulant / chemicals are added for the treatment and its measuring system? Whether stock register is being maintained for chemicals
- e) What are the system for removal of sludge and also the place of disposal of sludge?
- f) Check storage of sludge and disposal method.
- g) Check quality of outlet i.e. final discharge water

- h) Whether Zero Discharge system is adopted and implementation status.
- i) Check % of recovery of burnt oil.
- j) Whether proper records are maintained and disposed off in 90 days.
- k) Overall house keeping of the premises
- l) See the reports for any exceptional readings. Action taken to mitigate.

10.1.2.3. DETP / STP

- a) Check DETP arrangement and its functioning
- b) Check whether all the pumps are working along with Standby arrangements
- c) Check quality of final treated water pond (tertiary pond)
- d) How is the sludge removed? Check for records of disposal. It is manure and can be distributed to nearby villagers.
- j) Whether the treated water is used for gardening / cultivation. % of recycling.
- e) Overall housekeeping of the premises including garden, if any
- f) See the reports for any exceptional readings. Action taken to mitigate

10.1.3 NOISE POLLUTION

- a) Check decibel level at working places. Suggest measures to mitigate.
- b) Check blasting vibration. Suggest mitigative measures, if required.
- c) Check from record of regular monitoring of noise level at Work shop and other noise generating places
- d) Whether DG sets are provided with acoustic arrangement and emission norm of DG sets are followed

10.1.4 LAND DEGRADATION & TREE PLANTATION;

10.1.4.1 BACK FILLED AREAS & OB DUMPS:

- a) Check top soil storage arrangement. Check records for such storage.
- b) Inspect Back filled area and see for leveling and top soil spreading
- c) Check Biological reclamation and tree plantation arrangement, spacing between plants
- d) Check for varieties of species planted and compare with agreement
- e) Take a sample plot for counting to check the survival %
- f) Check the growth in new plantation and arrangement for watering
- g) Check for garland drain
- h) Whether plantation has been done around the work shop and type of plantation for reducing noise pollution

In case, show cause notices have been received for any violation, action taken in this regard.

10.2 Environmental Audit Check List - Under Ground

Name of the Unit:

Environment Clearance Reference:

Approved Production capacity:	MTY	Production in last FY:	MTY
Area as per approval:	Ha	Actual Acquired:	Ha
Consent to establish: Approved Capacity:	MTY	Valid Up to:	
Consent to operate: Approved Capacity:	MTY	Valid Up to:	

10.2.1 AIR POLLUTION:

10.2.1.1 COAL FACE: DRILLING & BLASTING

- Check for the water pipe line for water spraying.
- Whether Water spraying is done before Blasting at the Faces and proximity

10.2.1.2 CHP:

Water sprinkling arrangements - Check all the transfer, loading and unloading points, for sprinkling arrangements and functioning

10.2.1.3 COAL STOCK YARD

Whether fixed sprinklers have been installed around coal stock yard and nos. of sprinklers their functioning including the throw

10.2.1.4 TRANSPORTATION OF COAL (Specify Dust Spraying Arrangements)

- The length of transportation road within the colliery and beyond under company's control
- Check for maintenance of road / pot holes
- Is the dust cleaning done by manually / mechanically?
- Check Covering of trucks with tarpaulins / auto covering
- Check for Dust control arrangements at Weigh Bridges and its effectiveness

10.2.1.5 MONITORING OF AIR POLLUTION:

Check the reports and records for exceptional readings. Action taken for mitigation

10.2.2 WATER POLLUTION

10.2.2.1 MINE DISCHARGE: (Specify Water Treatment arrangements)

- The treatment system for mine discharge and capacity
- Whether it is acidic? Check for the corrosions in the pipes / steel structures
- Whether adequate detention time is ensured for proper sedimentation.
- Chemicals used for treatment - Its measuring system / Stock register
- Check system for removal of sludge.

- f. Observe the outlet water quality for suspended solids
- g. Is there any system to reuse the water after treatment?
- h. Whether there is proper protection to prevent intruders / animals.
- i. Check the reports and records for exceptional readings. Action taken for mitigation

10.2.2.2 DETP / STP

- a. Check DETP arrangement and its functioning
- b. Check whether all pumps are working along with Standby arrangements
- c. Check quality of final outlet treated water pond (tertiary pond)
- d. How the sludge is removed? See for records of disposal
- e. Is there any system to reuse the water after treatment?
- f. Overall housekeeping of the premises
- g. Check the reports and records for exceptional readings. Action taken for mitigation

10.2.3 NOISE POLLUTION

- a. Check decibel level at working places. Suggest measures to mitigate, if required.
- b. Whether DG sets are provided with acoustic arrangement and emission norm of DG sets are followed

10.2.4 LAND DEGRADATION & TREE PLANTATION

Subsidence:

- a) Check for subsidence and methods adopted to deal with i.e. dozing, leveling, sealing of cracks, arrangement of drains to divert water from going to UG through cracks
- b) Check record and do sample verification for tree plantation on subsided area, avenue plantation and other locations
- c) Whether plantation has been done around the work shop and type of plantation for reducing noise pollution

In case, show cause notices have been received for any violation, action taken in this regard.

10.3 Various Information often required by the stakeholders (Please keep the information ready in the formats given below)

TABLE 1										
AIR POLLUTION CONTROL FACILITIES (QUARTERLY STATUS)										
NAME OF MINE / AREA	PRODUCTION CAPACITY (COAL / OB MT / CUM)	FIXED SPRINKLING ARRANGEMENT			MOBILE WATER SPRINKLER			STATUS OF SPRINKLER IN CHP / BUNKER		
		LOCATION	LENGTH (METER)	NO. OF POSTS & THROW	NO.	CAPACITY	LENGTH COVERED IN A DAY			
TABLE 2										
WATER POLLUTION CONTROL FACILITIES (QUARTERLY STATUS)										
NAME OF MINE / AREA	PRODUCTION CAPACITY (COAL / OB MT / CUM)	MINE EFFLUENT TREATMENT PLANT			DOMESTIC EFFLUENT TREATMENT PLANT			STATUS OF WORKSHOP		
		NO.	CAPA-CITY	USAGE OF RECYCLED WATER - QTY	NO.	CAPA-CITY	WORKING STATUS	NO.	CAPA-CITY	WORKING STATUS
TABLE 3										
MINE WATER WITHDRAWAL / DISCHARGE (QUARTERLY STATUS)							(In KLD)			
NAME OF MINE / AREA	PRODUCTION CAPACITY (COAL / OB MT / CUM)	DAILY MINE WATER DISCHARGE / GENERATED	TREATMENT FACILITY, TYPE & CAPACITY		REUSED WATER WITHIN THE PREMISES	DAILY QUANTITY DISCHARGED OUTSIDE	QUANTITY UTILISED BY SURROUNDING COMMUNITY			
			INDUSTRIAL				DOMESTIC	DOMESTIC		
TABLE 4										
NO OF TREES PLANTED (AS ON 31/03/)							(In Ha.)			
NAME OF MINE / AREA	PRODUCTION CAPACITY (COAL / OB MT / CUM)	TARGET PLANTATION IN NOS.	ACHIEVEMENT IN NOS.			AREA PLANTED				
			RES. AREA	NON DUMP AREA (INCLUDING ROAD SIDE)		DUMP AREA	RES.	NON DUMP	DUMP	
TABLE 5										
LAND RECLAMATION DETAILS (AS ON 31/03/)							(In Ha.)			
PRODUCTION CAPACITY(T)	AREA EXCAVATED		AREA RECLAIMED		AREA TO BE RECLAIMED					
			TECHNICALLY	BIOLOGICALLY	TECHNICALLY		BIOLOGICALLY			

Appendix -I

CIL REHABILITATION AND RESETTLEMENT POLICY - 2012

Preamble

The location and quality of coal reserves, and their distance from major consumers determines to a great extent the selection of mine sites. For reserves that are close to the surface, opencast mining has proven to be the most efficient mining method. Opencast mines require relatively large areas of land. Population growth, particularly in India's eastern region, has made it increasingly difficult for the subsidiary coal companies to acquire the land they need for expanding their operations under the present Resettlement and Rehabilitation policy, 2008 of Coal India.

The resettlement and rehabilitation policies followed by the subsidiary companies have evolved over time and undergone numerous changes in response to changing circumstances. As and when the Central or State Governments enact amendments to the Land Acquisition Act, issue new guidelines for resettlement and rehabilitation, as per its requirement Coal India reviews and modifies its resettlement and rehabilitation policy taking into account the changing conditions in coal producing areas.

In addition to compensation for land coal companies provide Rehabilitation and Resettlement (R&R) package for project affected persons to compensate for loss of livelihood. Apart from compensation for house site, house, trees, cow shed, cost of shifting etc., employment is also provided to land oustees. In addition to this, efforts are made to rehabilitate them by construction of houses, building roads, streets, schools, providing water etc. wherever feasible. However, demand for both more land compensation and better R&R package has been raised by project affected persons and has been highlighted in various Parliamentary Committees. Coal Companies often have to face representations and agitations by these land oustees who obstruct the smooth working of existing mines and come in the way of expansion of new projects.

In the past, subsidiaries found it relatively easy to acquire land, if they were able to offer employment. Partly because of this practice, subsidiaries have built up a largely unskilled labour force beyond their needs. This has contributed to the heavy losses many mines are incurring and has also affected their efficiency and viability. The subsidiaries may still need to hire people in selected locations and continue to give preference to those whose livelihood will be affected by coal mining operations. However, increasingly subsidiaries will need to develop other ways and means to compensate land owners and others adversely affected by their projects and give them the option to choose which method of compensation best suits their needs. Greater emphasis will also need to be given to community requirements like schools, hospitals etc. Only proper resettlement and rehabilitation will elicit the required cooperation of project affected people, and make it possible for Coal India to acquire the land it needs to fulfill the ever increasing demand of coal for the economic development of the Country.

The purpose of the Resettlement and Rehabilitation Policy 2012 is to revise and provide greater flexibility to the basic principles for the resettlement and rehabilitation of people affected by coal mining projects i.e. Project Affect People (PAPs). It attempts to consolidate the different resettlement and rehabilitation practices that are being followed by subsidiaries as per the different State Land Acquisition Acts and various decisions of the Coal India Board and to modify the Policy of 2008 so as to give the Board of the subsidiary Companies greater flexibility to deal more effectively with resettlement and rehabilitation issues and determine the rehabilitation packages best suited to local needs in line with this policy. The provisions of the National Rehabilitation and Resettlement Policy, 2007 and the Land Acquisition, Rehabilitation & Resettlement Bill, 2011 have also been kept in mind while framing the policy.

While Coal India's basic philosophy for compensating land losers and other project affected people remains substantially unchanged, the revised policy emphasizes the need to cultivate and maintain good relationships with the people affected by Coal India's projects starting as early as possible; it also underscores that the subsidiaries have a responsibility towards the land oustees whose livelihood is often taken away. On the other hand, subsidiaries need to protect themselves more effectively against unjustified claims, redundant manpower and swelling Wage Bills. To this end, the statement proposes that subsidiaries prepare detailed resettlement and rehabilitation action plans (RAPs) that clearly identify, at an early stage, the entitlements of the people affected by coal projects and enables them to exercise a choice between various options. The concept of Annuity in lieu of compensation/employment is also being introduced to mitigate, if not eliminate the ever dependence of Project Affected Families (PAFs) on CIL for provision of employment.

(1) The revised Resettlement & Rehabilitation Policy, 2012 is based on the deliberations of the inter Ministerial Committee set up vide O.M. 490191/2011-PRIW-I dated 01-07-2011 of Ministry of Coal, deliberations of the CMDs meet held on 05/03/2012 at New Delhi and has been approved by the CIL Board in its 279th meeting held on 12th.and 13th March, 2012.

(2) Objectives and general principles of Coal India's Resettlement and Rehabilitation Policy- 2012

- A.** To re-visit CIL's existing R&R policy 2008 and evolve a PAP friendly policy by incorporating such provisions of the National Policy and The Draft Land Acquisition, Rehabilitation and Resettlement Bill-2011 as considered suitable in light of the growing difficulties many subsidiaries face in land acquisition.
- B.** To accord the highest priority for avoiding or minimizing disturbance of the local population while taking decisions to open new mines or expand existing ones too (exploring alternative sites and project designs) and to ensure that wherever people are likely to be adversely affected by a project, the subsidiaries will prepare resettlement and rehabilitation action plans for the project.
- C.** To ensure a humane, participatory, informed consultative and transparent process for land acquisition for coal mining and allied activities with the least disturbance to the owners of the land and other affected families.

- D. To provide just and fair compensation to the affected families whose land has been acquired or proposed to be acquired or are affected by such acquisition and make adequate provisions for loss of livelihood of such affected persons including their rehabilitation and resettlement.
- E. To ensure that the cumulative outcome of compulsory acquisition should be that the affected persons become partners in development leading to an improvement in their post acquisition social and economic status and matters connected therewith or incidental thereto.
- F. Through the preparation of resettlement and rehabilitation action plans, subsidiaries will safeguard that project affected people improve or at least regain their former standard of living and earning capacity after a reasonable transition period. The transition period is to be kept to a minimum. However, the involvement of subsidiaries in resettlement and rehabilitation activities may continue until all the actions specified in the rehabilitation plan have been completed.
- G. Involuntary resettlement is conceived and executed as a development programme with project affected people being provided sufficient resources and opportunities to share in a project's benefits. The efforts of subsidiaries are complementary to the Government's schemes in rural development and the concurrence, approvals and support from concerned Government authorities will be sought.
- H. In parallel, subsidiaries will work closely with non-governmental organizations of proven repute which are legally constituted and recognized and also have the confidence of the project affected people, in the preparation and implementation of rehabilitation plans.
- I. Corporate Social Responsibility (CSR): Activities shall be intensified in and around the villages where land is being acquired in accordance with the CSR Policy of Coal India.
- J. Actual implementation of R&R package must follow a detailed survey of the project-affected villages to formulate the list of persons/families affected by the project, nature of the affect, the likely loss of income, etc. For this purpose, if necessary, the services of a reputed NGO with an impressive record of integrity and performance may be engaged.

3. SCOPE:

This Policy may be called "Rehabilitation and Resettlement Policy of Coal India Limited-2012". It extends to the Coal India Limited and its subsidiary companies in India. It shall come into force from the date of its approval by the CIL Board and is applicable to all cases in which land is taken after the date of approval by the CIL Board. While implementing the policy it is to be ensured that the provisions of the concerned Acts applicable and Rules mentioned there under shall not be violated.

4. Definitions

(a) **"affected family"** means:

- (i) a family whose primary place of residence or other property or source of livelihood is adversely affected by the acquisition of land (including direct negotiation) for a project or involuntary displacement for any other reason; or
- (ii) any tenure holder, tenant, lessee or owner of other property, who on account of acquisition of land (including plot in the *abadi* or other property) in the affected area or other wise, has been involuntarily displaced from such land or other property; or
- (iii) any agricultural or non-agricultural labourer, landless person (not having homestead land, agricultural land, or either homestead or agricultural land), rural artisan, small trader or self-employed person, who has been residing or engaged in any trade, business, occupation or vocation continuously for a period of not less than three years preceding the date of declaration of the affected area, and who has been deprived of earning his livelihood or alienated wholly or substantially from the main source of his trade, business, occupation or vocation because of the acquisition of land in the affected area or being involuntarily displaced for any other reason.

(b) **“family”** includes a person, his / her spouse, son including minor sons, dependant daughters, minor brothers, unmarried sisters, father, mother residing with him or her and dependent on him/her for their livelihood; and includes **“nuclear family”** consisting of a person, his/her spouse and minor children. Provided that where there are no male dependants, the benefit due to a land loser may devolve on dependent daughter nominated by the land loser.

(c) “land owner” includes any person—

- (i) whose name is recorded as the owner of the land or part thereof, in the records of the concerned authority; or
- (ii) who is entitled to be granted Patta rights on the land under any law of the State including assigned lands; or
- (iii) who has been declared as such by an order of the court or District Collector;

(d) Displaced person - means and includes any person who is deprived of his homestead on account of acquisition. Provided that the person / family who does not ordinarily reside in the homestead land acquired for the project can be termed “Displaced” but he will be eligible for compensation only for homestead and not for livelihood.

(e) Ordinarily resides” shall mean residing in the homestead / acquired land for a period more than 6 months every year for at least the preceding 5 years.

5. Socio-economic Survey and preparation of RAP.

A baseline socioeconomic survey will be carried out to identify the PAPs who are enlisted to receive benefits in line with Coal India's Resettlement and Rehabilitation Policy. This survey will

be conducted within two months of notification under the relevant land acquisition Acts by the subsidiaries with the help of reputed independent institutional agencies, who are well versed with the social matrix of the area.

The basic objective of the socio-economic study will be to generate baseline data on the social and economic status of the population who are likely to lose their means of livelihood or homestead due to the acquisition of the land for the project. The data base will be used to formulate a viable and practical Rehabilitation Action Plan (RAP) for the affected persons in line with their entitlements. Digital Satellite Maps would also be prepared of the project Area freezing the dwelling units and habitations existing at the time of negotiation for Land Acquisition wherever feasible. The RAP will also address the following-

(A) Implementation, Monitoring and Evaluation, Dispute Mechanism

The rehabilitation action plan will address the following:

- i) The project design, including an analysis of alternative designs aimed at avoiding or minimizing resettlement;
- ii) Socio-economic survey and activities to ensure restoration of incomes of PAPs in line with Coal India's Resettlement and Rehabilitation Policy;
- iii) Description of the institutional and other mechanisms for provision of entitlements;
- iv) Time table for the acquisition and preparation of the resettlement site(s);
- v) The cost and budgets for the resettlement and rehabilitation of PAFs;
- vi) Project specific arrangements to deal with grievances of PAFs; and
- vii) Time tables, benchmarks and arrangements for monitoring the resettlement and rehabilitation effort.

The RAP will be formulated in consultation with PAPs and State government.

(B). Environment Impact Assessment (EIA) will be conducted as per any law, rule and regulation of the locality in which the land has been acquired.

6. Eligibility Criteria -

(A) Eligibility Criteria for Economic Rehabilitation Benefits

This benefit shall accrue only to Entitled Project Affected Person. Entitled Project Affected Person shall be one from the following categories.

- (i)** Persons from whom land is acquired including tribals cultivating land under traditional rights.
- (ii)** Persons whose homestead is acquired.
- (iii)**, Sharecroppers, land lessees, tenants & day labourers.
- (iv)** Tribal dependent on forest produce as certified by the District Forest Officer / Revenue Authorities.

(B) Eligibility Criteria for Resettlement Benefits

1. Only a 'Displaced' family / person shall be eligible for resettlement benefits.
2. A family / person shall be termed 'displaced' and hence eligible for resettlement benefits if such family / person has been a permanent resident and ordinarily residing in the project area on the date of publication of notification U/S 9 of CBA (A&D) 1957 / U/S 11 of LA Act, 1894 / Or both / on the date of the land vested with the State / Central government as the case may be.

and

- (a) on account of acquisition of his / her homestead land / structure is displaced from such areas **OR**
 (b) He / she is a homestead less or landless family / person who has been / is required to be displaced

7. Census & Identification of displaced families:

1. Within two months of publication of notice U/S 4(1) of the Land Acquisition Act or U/S 7(1) of CBA (A.D) Act 1957 for acquisition of land for the project a census would be undertaken in the manner to be decided by the Collector / project authority for identification of displaced families and for preparing their socio-economic profile and list of eligible persons for the purpose of receiving Rehabilitation & Resettlement Benefits.
2. A photo identity card to each Entitled Project Affected Person shall be issued under the signature of the Collector / project authority concerned indicating the following particulars:
 - (a) Name of the village/GP/PS :
 - (b) Name, Father's name and address of the head of the family :
 - (c) Category of entitlement :
 - (d) Whether SC / ST / OBC / General :
 - (e) Age, Sex, educational qualification of the members of the family :

8. Types of Compensation and Rehabilitation Entitlement

Option to the land losers regarding Rehabilitation & Resettlement Benefit - The land losers shall have the option for Rehabilitation and Resettlement benefits in accordance with the awards for each affected family in terms of the entitlements passed by the Concerned Collector of the State or as per this Policy with the consent of the concerned Collector.

8.1 Eligibility and Compensation

The table below shows the compensation and rehabilitation benefits will be offered by the subsidiaries for each Project Affected Person or family, affected by one of their projects. Evidence to the effect that a person is a legitimate PAP will need to be provided in the form of a written legal document, or reference to a record, such as a revenue officer certificate, electoral roll, ration card or school record.

Category of Persons affected by the Project	Compensation and Rehabilitation entitlement option (Provisions)
(i) Persons (including tribal cultivating land under traditional rights) from whom land is acquired.	<p>All land owners with titles will receive monetary compensation for the land acquired from them. The value of the land is determined on the basis of prevailing legal norms. <i>In respect of tribal cultivating land under traditional rights, authentication of land held under traditional rights by state authorities will be necessary.</i> In addition to above the following shall apply.</p> <p>A) Land Compensation - Land compensation shall be paid as per the provisions of the concerned Act or State Govt. notification. Where no notification of the State Govt. is available the concerned subsidiary Board may decide on the rate of compensation keeping in view the compensation provided by the neighboring states. Authentication of land held under traditional rights by state authorities will be necessary.</p> <p style="text-align: center;">In addition to above Solatium will be paid as per provisions of the concerned</p>

Category of Persons affected by the Project	Compensation and Rehabilitation entitlement option (Provisions)
	<p>Act / as imposed by the Concerned State Govt.</p> <p>Escalation of land compensation – Escalation will be paid as per provisions of the concerned Act / as imposed by the Concerned State Govt. or Escalation at the rate of 12% per annum for a maximum period of three years.</p> <p>(B): Employment provision: Apart from payment of the land compensation, employment may be given in the following manner –</p> <ol style="list-style-type: none"> 1) The maximum total number of employments that may be provided to the land losers would be limited to the total no. of acres of land acquired divided by two. However, employments will be released in proportion to the land possessed. 2) For every two acres of land one employment can be considered; 3) Subsidiaries of CIL may give an option to the Land losers having less than two acres of land to club together their land to the extent of two acres and nominate one of the land losers among the groups or their dependent for employment under package deal or employment under Descending order system by preparing the list of eligible land oustees in the descending order of land lost subject to the cut off equivalent to the total number of permissible employments or any other method with the approval of the respective Board of the subsidiary. 4) The land loser must be a domiciled resident / Mool Niwasi and the certificate to this effect shall be issued by the concerned State Authority 5) The modalities for offering employment shall be such as may be approved by the Board of the Subsidiary companies as per the unique conditions of the subsidiary provided that - <ol style="list-style-type: none"> a) The initial employment shall be given with pay of Category-I pay scale of NCWA, with training period of 6 months. b) In the seniority list, the seniority of the appointee should be reflected in appropriate manner in order to keep the senior most as senior. c) The land loser trainees shall be posted as per requirement, including underground duties. <p>(C): Lumpsum Monetary Compensation –</p> <ol style="list-style-type: none"> 1. All the land losers who are not eligible for employment as above shall be entitled to receive monetary compensation in lieu of employment at the rate of Rs.5,00,000/- (Five Lakhs) for each acre of land on pro-rata basis. 2. Land losers who are offered employment as per principle specified in point No (8.(i)B) above will have the option either to opt for employment or to forego employment and opt for monetary compensation at the rate of Rs.5,00,000/- (Five lakhs) for each acre of land on pro-rata basis with minimum of Rs. 50,000 (Fifty thousands) provided that the employment thus surrendered shall not be available for offer to any other person and will stand lapsed from the total sanctioned number of employments as specified in point No.(8.(i)B1). 3. The Land losers who have clubbed their land in Package Deal can claim

Category of Persons affected by the Project	Compensation and Rehabilitation entitlement option (Provisions)
	<p>employment for only one land loser of the clubbed two acres of land and remaining land losers of the package cannot claim either employment or lump sum monetary compensation in lieu of the land contributed by them.</p> <p>4. Annuity – All land losers who are entitled to get lump sum monetary compensation may opt for payment of compensation amount in the form of annuity made payable to the land losers monthly, annually or at such intervals (not less than one year) as may be opted for by him. The annuity be paid for a maximum period extending to 60 years of age or the life of the project for which the land has been acquired, whichever is earlier.</p> <p>Note: <u>A person receiving a job forgoes all claims to above compensation and a person receiving above compensation forgoes all claims to employment.</u></p>
(iii) Share croppers, land lessees, tenants and day labourers	<p>The subsidiary will assist PAP to take-up non farm self employment through petty contracts or formation of cooperatives. If such co-operatives will not be entitled for awarding work as per Manual for lack of experience, the said co-operative will be facilitated by awarding small jobs to acquire experience after relaxation of the provisions of the Manual pertaining to experience with approval of the Subsidiary Boards. Subsequent jobs may be awarded after getting report of the timely completion / quality / of the awarded jobs from the concerned Department or contractors.</p> <p>Contractors will also be persuaded to give job to eligible PAPs on a preferential basis, where feasible as per terms of contract.</p>
(iv) Landless tribal, Tribal dependent on forest produce	<p>The subsidiary will assist PAP to establish non farm self employment through the provision of infrastructure, petty contracts or formation of cooperatives and encourage provisions of Jobs with contractors. Contractors will be persuaded to give jobs to eligible PAPs on preferential basis, where feasible.</p> <ul style="list-style-type: none"> - In addition, the subsidiaries will shift the tribal community as a unit and provide facilities to meet the specific needs of the tribal community that will allow them to maintain their unique cultural identity. - Tribal affected family will be given one time financial assistance of 500 days of MAW for loss of customary right or usages of forest produce. Loss of customary rights needs to be authenticated by the district authority. - Tribal affected families resettled out of the district shall be given 25% higher rehabilitation and resettlement benefit.

9. Resettlement & Rehabilitation Committee - A Committee will be constituted at project Level under the chairmanship of the Collector to be called the Rehabilitation and Resettlement Committee with the following objectives to monitor and review the progress of implementation of the Rehabilitation and Resettlement scheme and to carry out post-implementation social audits in consultation with the village panchayat in rural areas and municipality in urban areas in the manner will be decided by the concerned State Govt.

- I. To approve the list of land losers and other PAPs;

- II. To approve the list of persons eligible to be offered employment as per R&R Policy;
- III. To approve the detailed Rehabilitation Plan for the project in consultation with the displaced persons and Gram Sabhas;
- IV. To expedite issue of domicile certificates and other necessary documentation required for State Authorities;
- V. To monitor and review the progress of the Rehabilitation Scheme, grant of benefits and handing over of possession of land in a smooth manner;
- VI. To facilitate the land acquisition process in any other manner as may be required including resolution of disputes;
- VII. To carry out post implementation social audit in consultation with the authorities.

10. Community facilities - The subsidiary will provide at the resettlement site a school, road with street light, pucca drain, pond, dug well and / or tube well for drinking water supply, community center, place of worship, dispensary, grazing land for cattle and play ground. Similar infrastructural facility, if necessary, will be extended to the host locality. The community facilities and services would be available to all residents of the area, including PAPs and the host population.

The approach for operation of community facilities would be flexible and all efforts will be made to involve the State and local self Government / Panchayat for operating the facilities. To achieve this, subsidiaries will pursue with these agencies to ensure the same. The planning of the community facilities and their construction should be undertaken in consultation with the affected community.

11. Corporate Social Responsibilities - This should be as per Company's Corporate Social Responsibility (CSR) Policy.

12. Monitoring and Evaluation Mechanism.

The RAP will be monitored and evaluated periodically after the completion of the land acquisition process.

- I. The resettlement and rehabilitation activities are the responsibility of a separate group, both at the projects and corporate level, which will be constituted for planning, implementation, monitoring and evaluation of the Rehabilitation Action Plan. At the corporate level the group will be headed by a senior manager, whereas at the project, an executive of the rank of manager will head the group. The project group should have at least one member with social science qualification / experience and skills.
- II. The project group will closely interact with the state authorities during the implementation of the RAP. Although the subsidiaries will develop the plots and infrastructural facilities in the resettlement colony and actively implement the RAP, assistance of State authorities will be taken for administrative services such as allotment of land. Implementation will be planned; monitored and corrective measures will be incorporated in the RAP, if needed. In addition to the State Government, the PAPs, the

village leaders including the Pradhans and NGOs will be consulted and associated with the implementation of the RAP.

- III. The Resettlement and Rehabilitation Cell at the corporate level will evaluate the implementation of the RAP after its completion.

13. Flexibility to the Subsidiary Companies – The Subsidiary Companies Boards have been authorised to approve necessary modifications in the R&R Policy with reference to unique conditions prevailing at the concerned Subsidiaries as the policy is not exhaustive.

(The above list is only indicative and not exhaustive)

Appendix -II

CIL Sustainable Development Policy – 2013

1. Scope

This Policy may be called “**Sustainable Development Policy (SDP) of Coal India Limited - 2013**”.

This policy will be applicable to Coal India Ltd (CIL) and its subsidiary companies in India. It shall come into force from the date of its approval by the CIL Board.

2. Policy Statement

CIL shall promote and pursue sustainable mining integrating Environmental, Socio-Cultural and Economic factors which comprise the basic fabric of sustenance in our society. It shall also incorporate views and opinions of stakeholders ensuring compatibility and implementation.

3. Objectives and Strategies

The objectives of the SDP of CIL shall be in line with the Govt. of India principles and directives on Sustainable Development encompassing mainly three components:

- a. Environmental Sustainability
- b. Socio-Cultural Sustainability
- C. Economic Sustainability

The SDP of CIL affirms its commitments to protect & safeguard the environment and conserve the biodiversity for maintaining the ecological balance besides effecting Socio-Cultural and Economic betterment of the surrounding of its operations.

In order to do so CIL will ensure the following:

- i) Adopt world class eco & friendly technologies for mining
- ii) Conserve of natural resources by Reducing, Reusing, Recycling, Redefining and Replacing
- iii) Neutralize the impact on environment due to mining through afforestation, rain water harvesting & regeneration of cultivable land and other suitable mitigative measures
- iv) Create Income Generation avenues / skill development programmes for the project affected people
- v) Ensure society a better quality life by providing basic infrastructures and management of the services like water, waste management, healthcare, education etc
- vi) Organise programmes especially for the project affected Tribal people to maintain their culture, heritage and identity
- vii) Strive to conduct the business in an ethical and transparent manner
- viii) Delegation of Powers to take decisions at the Project level for SD related activities for timely implementation through monitoring / evaluation mechanism
- ix) Create awareness among the stakeholders by incorporating a system of communication for obtaining feedback and assessing the opinions / ideas / suggestions.

4. Implementation: Subsidiaries and CIL Head Quarters shall prepare an annual action plan detailing the activities to ensure the above strategies are implemented in a planned way with the approval of concerned SD committee. The progress of the activities shall be reviewed periodically by the SD Committee.

NOTES

NOTES

TWO TIERS OF OB DUMPING



BACKFILLING & DOZING



Stages of Reclamation

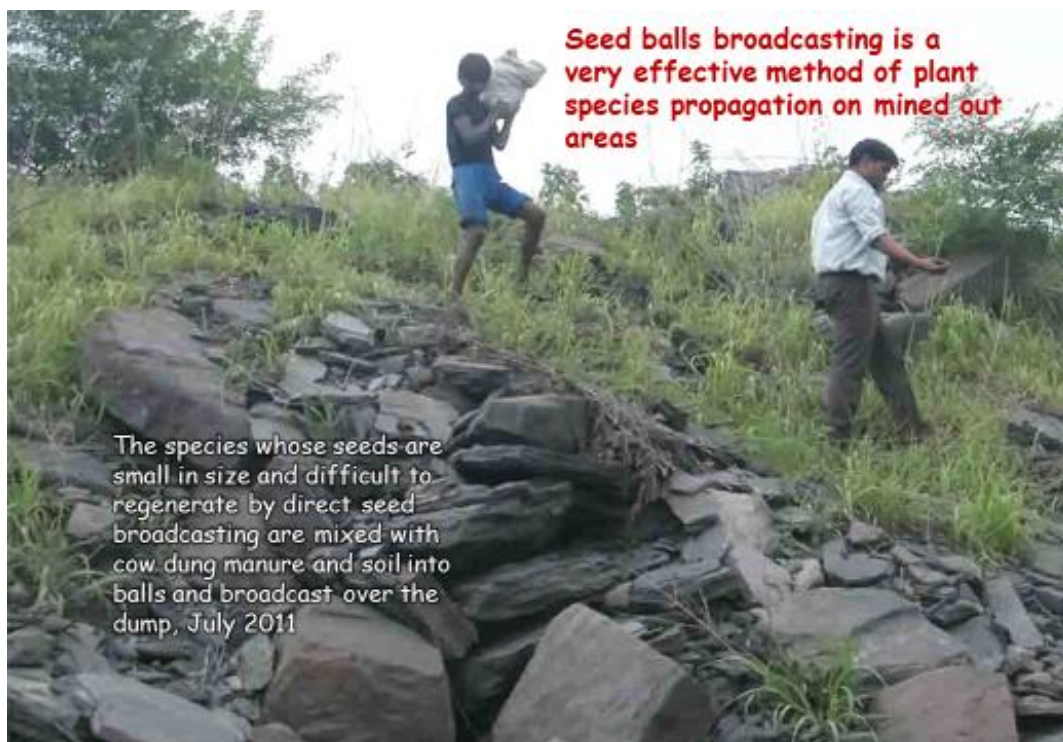


JUTE MATTING FOR OB DUMP STABILIZATION & REVEGETATION















Utilization of mine discharged water for irrigation

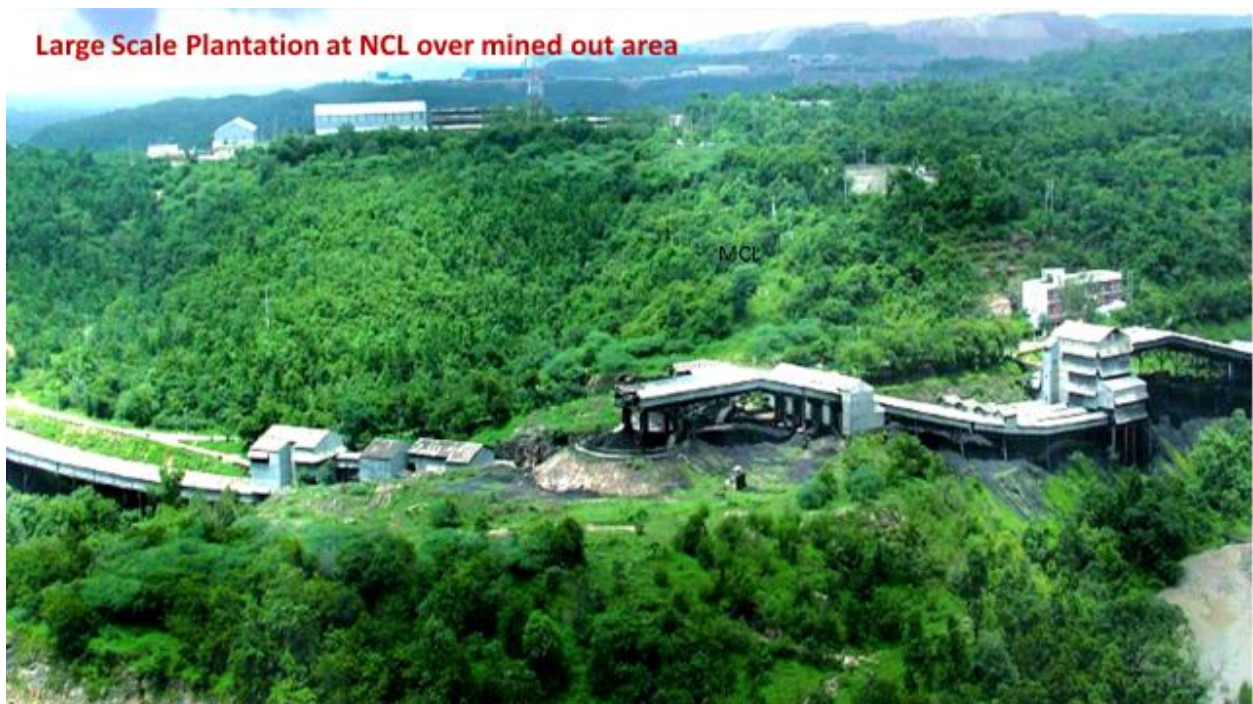


Plantation around Mine



Lake in Mined out Area







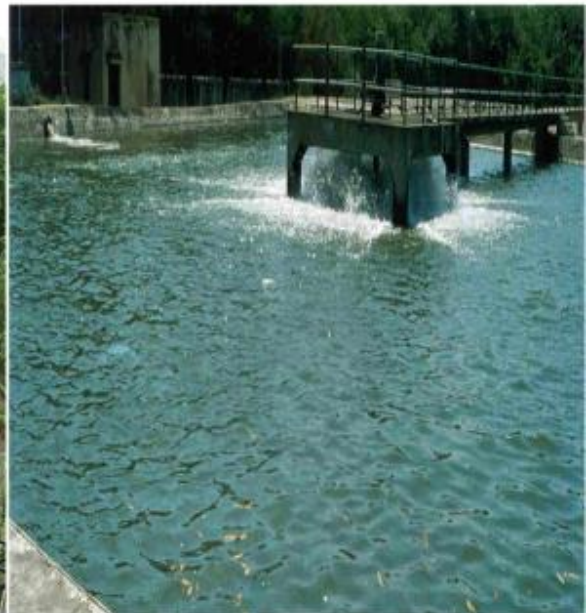
Water sprinkling-A way for dust suppression-with a green belt –Practiced in- CIL MINES-



Abandoned pits and lakes in SECL



Effluent treatment Plant-An approach to waste water management





PIEZOMETERS AT KUSMUNDA OCP



WATER SPRINKLING SYSTEM BY MOBILE SPRINKLERS HAVE BEEN PROVIDED TO CHECK FUGITIVE EMISSIONS FROM HAUL ROADS.



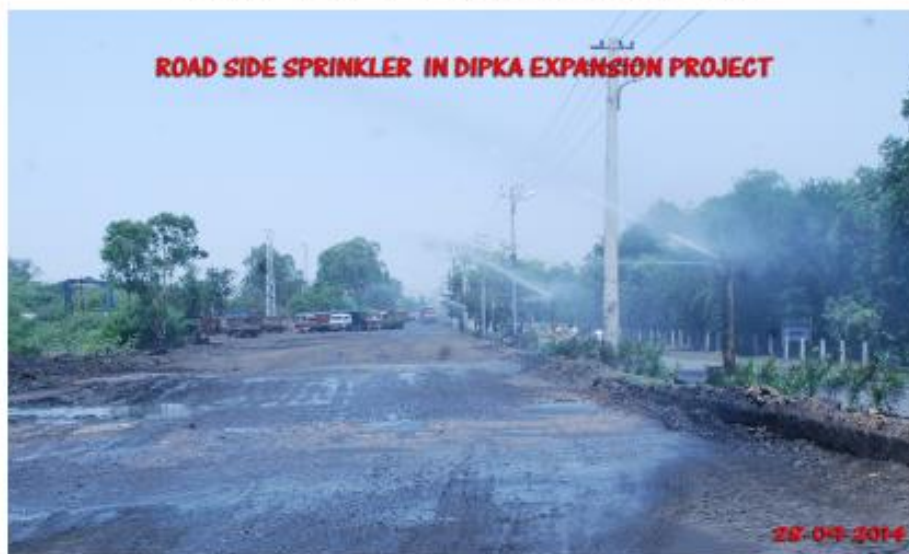
**WATERS SPRINKLING SYSTEM HAVE BEEN
PROVIDED TO CHECK FUGITIVE EMISSIONS FROM
CRUSHING OPERATION**



**VIEW OF WATER SPRINKLER(FOG BASED) USED IN
FEEDER BREAKER**



**WATER SPRINKLING SYSTEM BY FIXED SPRINKLERS
HAVE BEEN PROVIDED TO CHECK FUGITIVE
EMISSIONS FROM HAUL ROADS.**



15

FIXED SPRINKLERS AT RAILWAY SIDING -



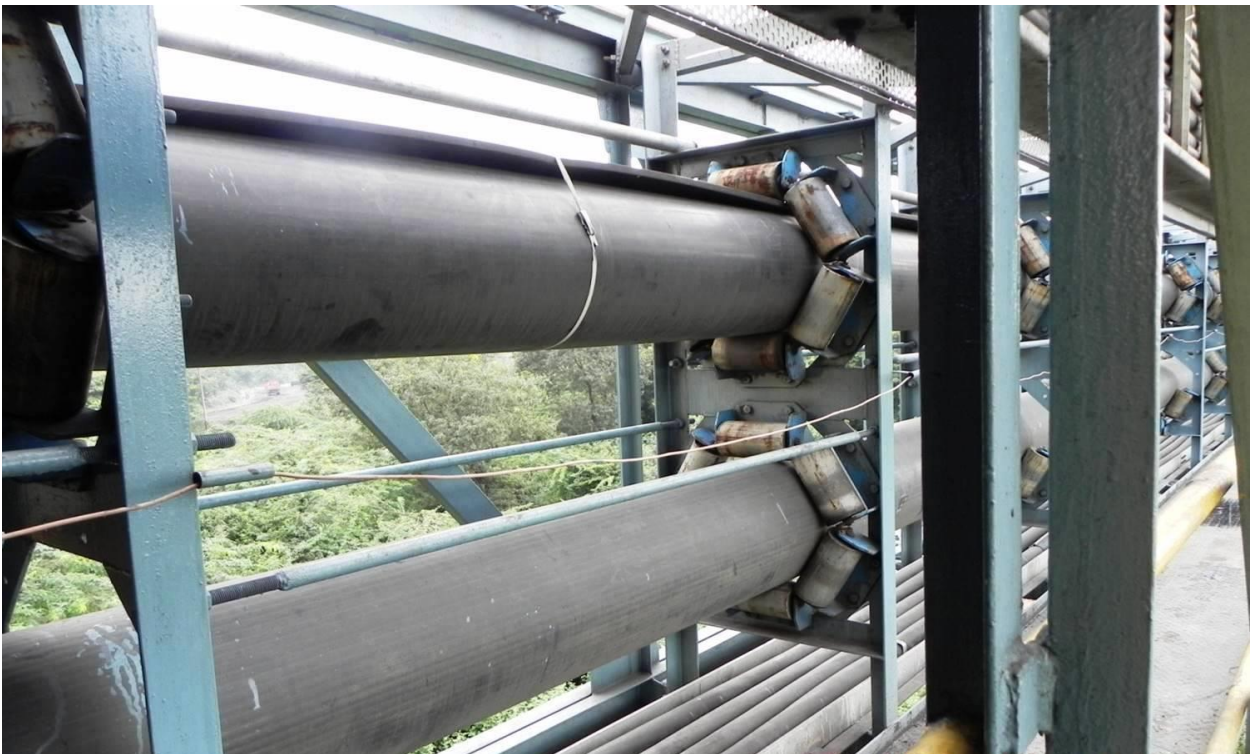
COVERED CONVEYORS



**COAL TRANSPORTATION FROM COAL MINE PIT TO RAILWAY SIDING
BEING DONE BY IN-PIT CLOSED CONVEYOR AND FROM THERE BY
RAIL/ MGR TO CONSUMERS.**



Tube conveyor in NCL



COVERED CONVEYOR BELT



TARPAULIN COVERED TRUCK-Dust free coal transportation



Longwall Shearer in ECL



Continuous Miner used for Mass Production in CIL U/G Mines



Highwall Mining in SECL



Surface Miners used in O/C mines of CIL

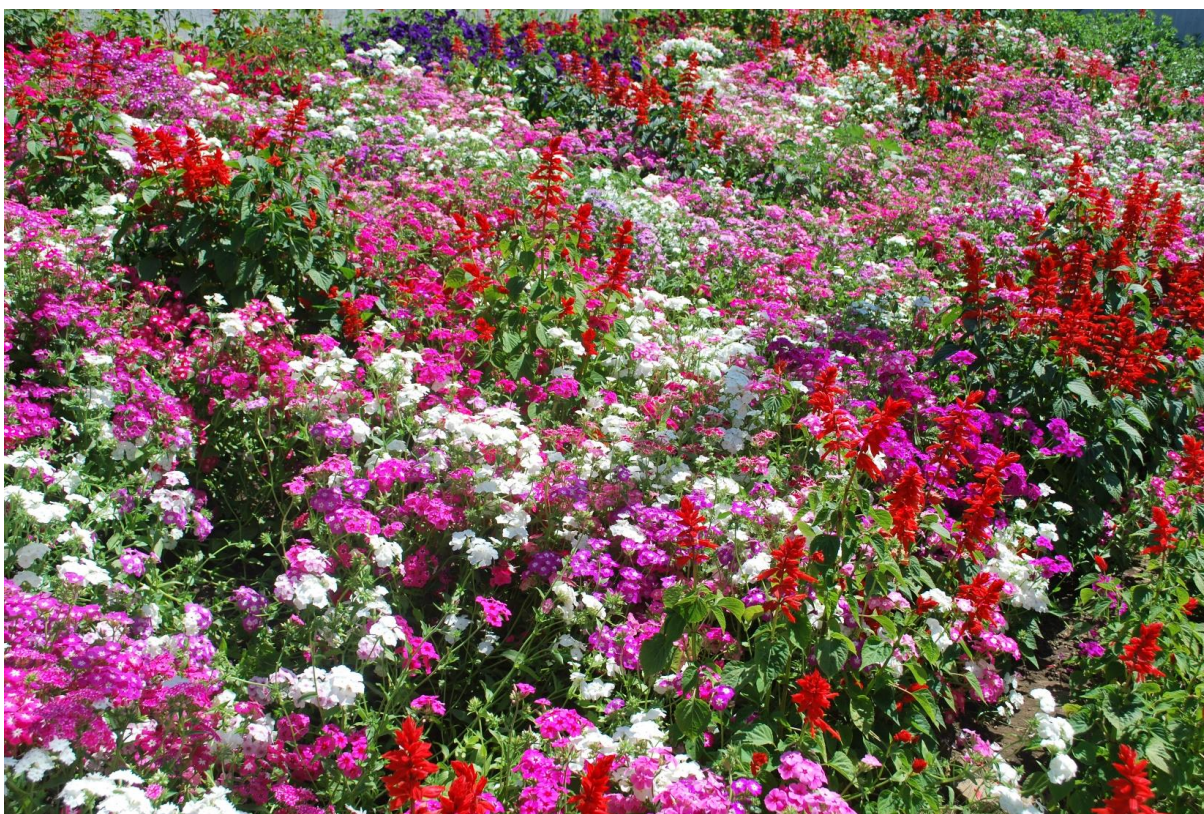
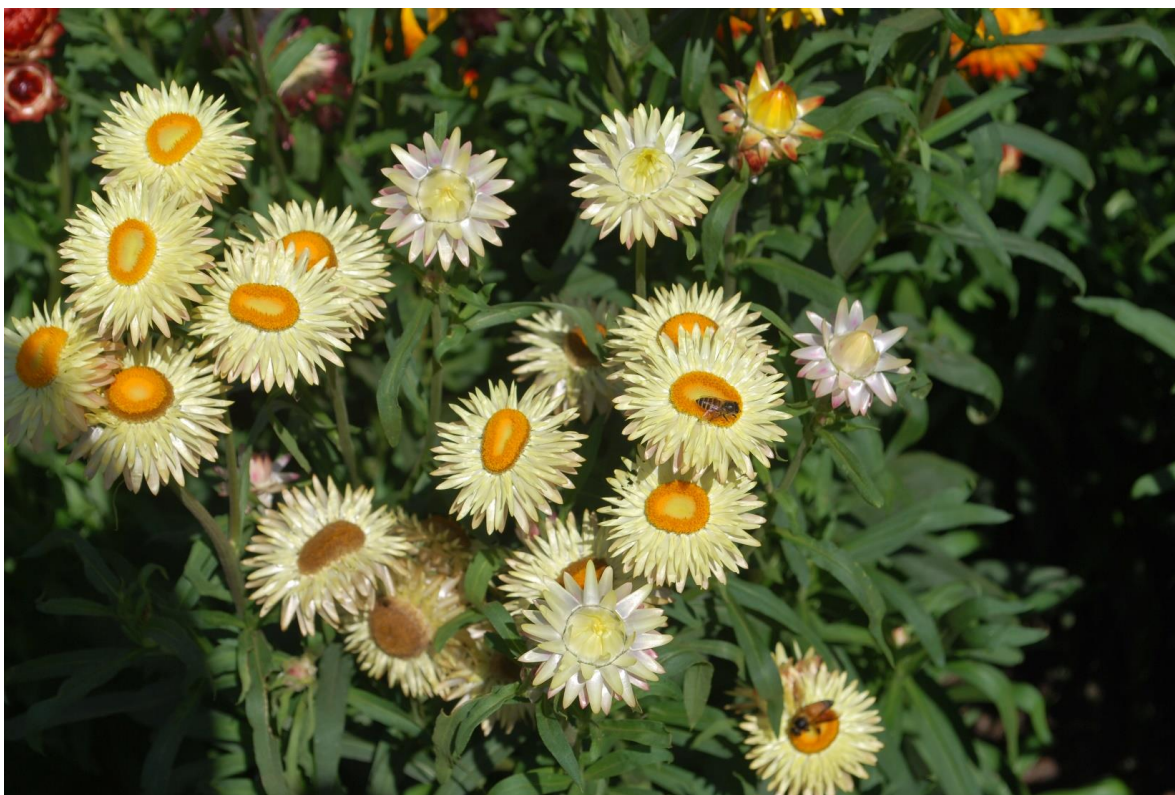


Mined out reclaimed area converted to Ananya Vatika in SECL

















Mined out reclaimed area converted to ECO Park in WCL











CIL's RENEWABLE ENERGY INITIATIVES: 1000 MW Solar Power by 2019

