

Progressive and Final Mine Closure Plan

- Mine Closure Plans will have two components viz. i) Progressive or Concurrent Mine Closure Plan, and ii) Final Mine Closure Plan. Progressive mine Closure Plan would include various land use activities to be done continuously and sequentially during the entire period of the mining operations, whereas the Final mine Closure activities would start towards the end of mine life, and may continue even after the reserves are exhausted and/or mining is discontinued till the mining area is restored to an acceptable level. The Mine Closure details of the Mining Plan should be oriented towards the restoration of land back to its original condition as far as practicable.
- Mining is to be carried out in a phased manner along with reclamation and afforestation work in the mined out area.
- Progressive mine closure plans shall be prepared for a period of every five years from the beginning of the mining operations. These plans would be examined periodically in every five years period and to be subjected to the third party monitoring by the agencies approved by the Central Government, like Central Mine Planning and Design Institute Ltd. (CMPDIL), National Environmental Engineering Research Institute (NEERI), Indian Institute of technology (IIT-ISM) or any other institutes/organizations/agencies specified from time to time for the purpose.
- Various project specific activities viz. mined-out land details & their technical and biological restoration plan, water quality management, infrastructure to be retained and demolished, disposal of mining machinery, etc. has been furnished in the relevant paras. As the backfilling of the mine void is not being carried out as part of regular mining operation, it shall not be included in the list of progressive mine closure activities. However, in case, if the backfilling of mine void is being carried out specifically for closure of the mine in future due to any reason, the same shall be included in the list of activities to be taken up for mine closure.

	<i>Parameters</i>	<i>Details</i>																	
8.1	Land Degradation and restoration Schedule																		
8.1.1	Land Degradation and Technical Reclamation (Cumulative Areas in “Ha”) N/A																		
8.1.2	Biological Reclamation (Cumulative in “Ha”)																		
	Stage/Year	Biologically Reclaimed Area					Forest land (Return)	Un Disturbed/ To be left for Public/co m Use	Total										
		Agriculture	Plantation	Water Body	Public Company Use	Total													
	Up to Base year*	0	99.29	0	0	99.29													
	Y- 1	0	2.5	0	0	2.5													
	Y- 5	0	14	0	0	14													
	Y-10	0	64	0	0	64													
	Y-15	0	114	0	0	114													
	Y-19	0	174	0	0	174													
	Post Closure																		
	PM-1		22.87			22.87													
	PM-2		22.87			22.87													
	PM-3		22.87			22.87													
			341.9																
8.2	Post Closure Water Quality management:	Routine Environmental Monitoring will be carried out for water quality analysis of following samples:																	
		<table border="1"> <thead> <tr> <th>S. No.</th> <th>Sample</th> <th>Frequency</th> </tr> </thead> <tbody> <tr> <td rowspan="2">1</td> <td rowspan="2">Mine Water</td> <td>Fortnightly</td> </tr> <tr> <td>Half Yearly</td> </tr> <tr> <td>2.</td> <td>Surface Water</td> <td>Quarterly</td> </tr> <tr> <td>3.</td> <td>Ground Water</td> <td>Quarterly</td> </tr> </tbody> </table>							S. No.	Sample	Frequency	1	Mine Water	Fortnightly	Half Yearly	2.	Surface Water	Quarterly	3.
S. No.	Sample	Frequency																	
1	Mine Water	Fortnightly																	
		Half Yearly																	
2.	Surface Water	Quarterly																	
3.	Ground Water	Quarterly																	
		If any discrepancy from statutory standards is observed, necessary corrective measures will be undertaken by the management.																	

8.3	Post Closure Air Quality management:	A total Plantation of area 341.9 Ha is being proposed at the proposed Old quarry of Muraidih Colliery. This will be carried out during the mining phase. Fortnightly Air Quality Monitoring will be carried out at 03 Air Quality Monitoring Station during three years post closure period.
8.4	Waste Management (Figures in Mm ³) Not applicable	
8.5	Top Soil Management – (Including Action Plan for Top Soil Management) Not applicable	
8.6	Management of Coal Rejects.	There is no existing or proposed washery in the Colliery.

8.7 Restoration of Land used for Infrastructure

All the other infrastructure related to both the opencast & underground coal mining operation will be dismantled, after end of the reserve/ mine life. The list of infrastructure to be dismantled at the end of the mine life is given in the following table:

Sl. No.	Particulars
1.	Office
2.	Workshop – if not used for other projects
3.	UG machinery – shifted to other collieries for use.

8.8 Disposal of Mining Machinery

After end of life of proposed Muraidih Colliery, all mining machinery will be shifted to other mines of BCCL.

8.9 Safety & Security

Fencing around Old Opencast Workings:

The top edge of the old opencast workings shall be kept fenced with wire rope strands or barbed wire, supported by posts of timber, iron or concrete (movable). The gap between the adjacent rope strand or wires shall not be more than 0.30 m and bottom most rope, strand or wire shall not be more than 0.25 m and the topmost rope, strand or wire shall not be less than 1.0 m from ground level.

Securing all Old & new inclines for UG Workings: all old existing and new inclines will be sealed off properly at the end of mine life.

8.10 Cost and Financial Assurance

8.10.1 Activities to be taken up for closure of the mine**

Head	Parameters	Unit	Quantity
A. Progressive Mine Closure	Barbed wire fencing around mine (Pit and Dump)	m	2200
	Waste Management	MCum	70
	Filling of Void - Rehandling of Dump (Not carried out as part of regular mining operation)	MM3	-
	Top Soil Management	MM3	0.59
	Technical and Biological Reclamation of mined out land and OB Dump	Ha	200
	<i>Plantation over Virgin Area including green belt</i>	Ha	12.62
	Manpower Cost and supervision	Year	19
	Toe wall around the dump	m	500
	<i>Garland Drain</i>	m	3000
	<i>Stowing</i>		-
	Subsidence monitoring and management	LS	-
	Water quality management	LS	1
	Air quality management	LS	1
	Isolation Stoppings	LS	-
	<i>Any other Activity</i>		-
		SUB TOTAL (A)	
B. Post Closure Activities			
Dismantling of Infrastructure & Disposal / rehabilitation	<i>Dismantling of Workshop</i>	LS	1
	<i>Dismantling of CHP</i>	LS	-
	<i>Dismantling of Mine Structures</i>	LS	1
	<i>Dismantling of Civil structures</i>	LS	1
	<i>Rehabilitation of the dismantled facilities</i>	LS	1

Head	Parameters	Unit	Quantity
of Mining Machinery	<i>Dismantling of pumps and Pipes / other facilities</i>	LS	1
	<i>Dismantling of Stowing bunkers, provisioning of pumps for bore well pumping arrangement</i>		1
	<i>Dismantling of UG equipment</i>	LS	1
	Rearranging water pipeline to dump top park Agricultural land	LS	1
	<i>Dismantling of Power lines (33 KV H.T. Line)</i>	LS	1
	SUB TOTAL		
Safety and Security	Barbed wire fencing around mine (Pit and dumps)	m	1500
	Concrete wall with Masonry / Concrete pillars around the pit	m	-
	Securing entries (shafts/inclines)	Nos.	2
	Securing of Inclines	Nos.	2
	Appropriate fencing around the water body	m	-
	Installation of bore well pump		-
	Stabilisation (viz. benching, pitching etc) of side walls of the water body	LS	1
	Toe wall around the dump	m	500
	Garland Drain	m	1000
	Drainage Channel from main OB Dump	m	500
	SUB TOTAL		
Technical and Biological Reclamation of Mined Out of land and OB Dump	Filling of Void	Mm3	-
	OB Rehandling for backfilling	Mm3	-
	Terracing, Blanketing with soil and vegetation of External OB Dump	Ha	-
	Peripheral road, gates, view point, cemented steps on bank	m	500
	Expenditure on development of Agricultural land		-
	Landscaping and Plantation	Ha	230
SUB TOTAL			
Post Closure Monitoring and supervision	Power Cost	LS	1
	Post Mining Water quality management		114
	Post Mining Air quality management		216
	Subsidence monitoring for 5 years	LS	1
	Manpower Cost and supervision	Year	3
SUB TOTAL			
Sustainability	Skill Development and Trainings (Alternative source of livelihood)		
	Fruit bearing, medicinal & local species plantation / Afforestation		
	Agriculture and other other Allied activities		
	Eco - Tourism Development		
	Flora and Fauna Conservation / Wildlife conservation		
	Water Resource Management / Conservation		
	Clean Energy Projects		
	Art and culture		
	Women Empowerment		
	Welfare of aged and disabled people		
	Sustainbale Living		
	Sanitation		

The money deposited in the Escrow Account has to deal with the following:

- Cost of closure activities.
 - Cost towards organization for executing the closure activities.
 - Cost of the post project monitoring.
 - Creation of a corpus fund for final mine closure
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- ***A Mine Closure Plan of Muraidih Colliery has already been approved and escrow account with account number 00150100008816 has already been opened with Bank of Baroda. The same escrow account may be continued for this revised mine plan.***
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- **Implementation of the approved Mine Closure Plan shall be sole responsibility of the mine owner.** Mining is to be carried out in a phase manner i.e. continuation of mining activities from one phase to another indicating the sequence of operations depending on the geo-mining conditions of the mine. Up to 50% of the total deposited amount including interest accrued in the escrow account may be released after every five years in line with the periodic examinations of the closure plan. The amount released should be equal to expenditure incurred on the progressive mine closure in past five years or 50% whichever is less. The balance amount shall be released to the mine owner//leaseholder at the end of the final mine closure on compliance of all provisions of Closure Plan. This compliance report should be duly signed by the lessee and certify that said closure of mine complied all statutory rules, regulations order made by the central or state government, statutory organizations, court etc. and certified by the coal controller.

Final Mine Closure would be considered to be completed only after acceptance of the third party audit report by the coal controller on the compliance of all provisions on Mine Closure Plan. Any institute/ Organization/ Agency as may be notified by the Government for this purpose may be engaged for third party audit.