

**Action Plan for Restoration of Environment in Areas Affected by Coal Mining in Meghalaya**

Sl. No.	Activity	Implementing Agency(ies)	Monitoring/Verification			Estimated Time Required (in months)	Physical Target		Rate (Rs./unit)	Financial Targets (Rs. in lakhs) for				Remarks
			Agency (ies)	Methodology	Performance Indicator(s)		Estimated Qty.	Unit		Respective Mine Owners	State Govt. - From Own Resource	State Govt. - From MEPRF	Total	
1	2	3	4	5	6	7	8	9	10	11	12	13		
<b>L. PREVENTION OF HUMAN AND ANIMAL DEATHS BY ACCIDENTAL FALLING IN COAL MINE SHAFTS</b>														
A.1	Identification and delineation of coal fields as well as each coal mine, coal shaft, coal dump etc.	NESAC, Mining & Geology Dept., Forests & Env. Dept., District Administration	MSPCB, CPCB	Examination of reports, ground truthing	% of total number of districts where such areas have been identified/ delineated	6	1	No.	12,02,500	-	12.03	-	12.03	
A.2	Creation of awareness about ill-effects of unregulated coal mining	Education Department, District Administration	Mining & Geology Dept. MSPCB, CPCB	Examination of reports	% of total number of villages where coal mines or areas affected by coal mines	12	220	No.	25,000			55.04	55.04	
A.3	Installation of sign boards in areas having presence of coal mines	Mining & Geology Dept., District Administration	MSPCB, CPCB	Physical visits	% of total number of coal mining areas where sign boards have been installed	4	1,646	No.	15,000	-	-	246.90	246.90	2 sign board per sqkm in entire 823 sqm coal mining affected area
A.4	Erection of physical barriers at periphery of shafts of mines where coal reserve has not been exhausted	Mine owners, Mining & Geology Dept., District Administration	MSPCB, CPCB & District Administration	Physical visits	% of total such coal mines shafts provided with physical barriers	6	30,000	No.	25,000	6,750.00	-	750.00	7,500.00	Mines will be covered by respective mine owners and State Govt. in ratio of 80: 20
A.5	Closure of shafts of mines where coal reserve has already been exhausted by :-													
A.5.1	controlled blasting:-													
A.5.1.1	development of safe and cost-effective controlled blasting techniques	MSPCB, CIMFR-CSIR	Forests & Env. Dept.	Examination of reports, evaluation of pilot field	Unit cost of mine closure, safety hazards	6	1	No.	14,75,000		14.75		14.75	
A.5.1.2	closure of coal mine shafts by controlled blasting	Mine owners, Mining & Geology Dept., District Administration	MSPCB, CPCB	Physical visits, high resolution satellite imageries	% of total number of such mine shafts which have been closed	36	4,000	No.	1,00,000	2,000.00	-	2,000.00	4,000.00	Mines will be covered by respective mine owners and State Govt. in ratio of 50: 50
A.5.2	refilling of debris/overburden					36	1,000	No.	2,00,000	1,000.00	-	1,000.00	2,000.00	
<b>Total for 'A'</b>										<b>9,750.00</b>	<b>26.78</b>	<b>4,051.94</b>	<b>13,828.72</b>	
<b>B. PREVENTION OF ACID MINE DRAIN (AMD) GENERATION BY:-</b>														
<b>B.1 Coal dumps of cement factories and their captive power plants</b>														
B.1.1	Covering of dumps by permanent sheds/ water proof tarpauline	Management of Respective Cement Factories	MSPCB, CPCB and NER RO of MoEFCC		pH level in streams originating from cement factories and their captive power plants	4	11	No.	2,00,00,000	2,200.00	-	-	2,200.00	
B.1.2	Construction of garland drains along with acid mine drain storage tanks													
B.1.3	Treatment of acid mine drain collected in storage tanks													
B.1.4	Amendment of Environmental Clearance (EC) to stipulate additional conditions to provide for above measures, in case same have not been stipulated	SEIAA or the MoEFCC, GoI as the case may be	Forests & Env. Dept.	Examination of EC	% of ECs to Cement Factories and their captive power plants	4	11	No.	-	-	-	-	-	
B.1.5	Amendment of consent to establish (CTE) to stipulate additional conditions to provide for above measures in case same have not been stipulated	MSPCB	Forests & Env. Dept.	Examination of EC	% of ECs to Cement Factories and their captive power plants	4	11	No.	-	-	-	-	-	
B.1.5	Revocation/withdrawal of EC and launch of prosecution in case of non-implementation of afore-mentioned measures	SEIAA or the MoEFCC, GoI as the case may be	Addl. Chief Secretary (Forests and Env.) Dept. GoM	Review of periodic reports on violations observed and follow up action	Percentage of cases where punitive measures have been initiated	Within 15 days of detection	11	No.	-	-	-	-	-	



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			Agency (ies)	Methodology	Performance Indicator(s)		Estimated Qty.	Unit		Respective Mine Owners	State Govt. - From Own Resource	State Govt. - From MEPRF	Total	
B.1.6	Revocation/withdrawal of CTE and launch of prosecution in case of non-implementation of afore-mentioned measures	MSPCB	Addl. Chief Secretary (Forests and Env.) Dept. GoM			Within 15 days of detection	11	No.	-	0	0	0	-	
<b>Sub-Total for 'B.1'</b>										2,200.00	-	-	2,200.00	
<b>B.2</b>	<b>Dumps of assessed coal</b>													
B.2.1	Covering of dumps by water-proof tarpaulin/ permanent sheds	Respective owners	District Administration	Physical visits	Number of cases registered for violation of order issued by the Dy. Commissioner	2	500	No.	2,00,000	1,000.00			1,000.00	
B.2.2	Construction of garland drains along with acid mine drain storage tanks													
B.2.3	Treatment of acid mine drain collected in storage tanks													
B.2.4	Promulgation of order under section 144 or any other relevant section(s) of IPC to prohibit open/uncovered dumping of assessed coal	Deputy Commissioners	CPCB, MSPCB	Examination of documents	Number of districts where such orders have been issued	1	11	No.	-	-	-	-	-	
<b>Sub-Total for 'B.2'</b>										1,000.00	-	-	1,000.00	
<b>B.3</b>	<b>Dumps of seized coal</b>													
B.3.1	Construction of permanent depots for seized coal	Mining & Geology Dept.	CPCB, MSPCB	Site visits	pH level in streams originating from the areas used for dumping of seized coal	24	6	No.	2,50,00,000	-	-	1,500.00	1,500.00	
B.3.2	Covering of dumps by tarpaulin/ permanent sheds													
B.3.3	Construction of garland drains along with acid mine drain storage tanks	Mining & Geology Dept.	CPCB, MSPCB	Site visits	pH level in streams originating from the areas used for dumping of seized coal	24	6	No.	2,50,00,000	-	-	1,500.00	1,500.00	
B.3.4	Treatment of acid mine drain collected in storage tanks													
<b>Sub-Total for 'B.3'</b>										-	-	1,500.00	1,500.00	
<b>B.4</b>	<b>Dumps of illegally extracted coal</b>													
B.4.1	Immediate seizure of illegally extracted coal and transfer of the same to permanent depots	District Administration	CPCB, MSPCB	Site visits, high resolution satellite imageries	Number of dumps of illegally extracted coal	3	Not applicable		-	-	-	-	-	Function is to be performed as sovereign responsibility of the State
<b>Sub-Total for 'B.4'</b>										-	-	-	-	
<b>B.5</b>	<b>Coal in transit</b>													
B.5.1	Covering of coal by waterproof tarpaulin while its transportation by road	Respective Truck Owners	District Administration	Inspection of trucks at police check points	Percentage of trucks carrying coal under covered conditions	1			-	-	-	-	-	Functions are to be performed as sovereign responsibility of the State
B.5.2	Seizure of trucks carrying coal without covering it with waterproof tarpaulin	District Administration	CPCB, MSPCB	Random observation of trucks transporting coal	Percentage of trucks carrying coal under covered conditions	1			-	-	-	-		
B.5.3	Promulgation of order under section 144 or any other relevant section(s) of IPC to prohibit open/uncovered dumping of assessed coal	Deputy Commissioners	CPCB, MSPCB	Examination of documents	Number of districts where such orders have been issued	1			-	-	-	-		
<b>Sub-Total for 'B.5'</b>										-	-	-	-	
<b>B.6</b>	<b>Rat hole coal mine openings</b>													
B.6.1	Closure of opening of mines where coal reserve has already been exhausted by :-	Respective mine owners and Mining & Geology	MSPCB, CPCB	Physical visits, high resolution satellite	Percentage of such mines whose openings have been									



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			Agency (ies)	Methodology	Performance Indicator(s)		Estimated Qty.	Unit		Respective Mine Owners	State Govt. - From Own Resource	State Govt. - From MEPRF	Total	
B.6.1.1	controlled blasting or	Dept.		imageries	closed	36	800	No.	10,000	40.00	-	40.00	80.00	Mines will be covered by respective mine owners and State Govt. in ratio of 50: 50
B.6.1.2	refilling of debris/overburden					35	200	No.	2,00,000	200.00	-	200.00	400.00	
B.6.2	Treatment of AMD originating from openings of rat hole mines where coal reserve has not been fully extracted													
B.6.2.1	Development of cost effective models for treatment of AMD originating from openings of such rat hole mines	MSPCB, CIMFR-CSIR	Forests & Env. Dept.	Examination of reports, evaluation of pilot field trials	Unit cost of mine closure, safety hazards	6	1	No.	50,00,000	-	50.00	-	50.00	
B.6.2.2	Treatment of AMD originating from openings of such rat hole coal mines	Respective mine owners, Mining & Geology Dept., District Administration	MSPCB, CPCB	Physical visits	pH of drain originating from such mines	36	3,000	No.	1,00,000	2,400.00	-	600.00	3,000.00	Mines will be covered by respective mine owners and State Govt. in ratio of 80: 20
<b>Sub-Total for 'B.6'</b>										<b>2640.00</b>	<b>50.00</b>	<b>840.00</b>	<b>3,530.00</b>	
<b>B.7</b>	<b>Coal mine shafts located in river/ stream bed</b>													
B.7.1	Closure of such mine shafts by:-	Respective mine owners and Mining & Geology Dept.	MSPCB, CPCB	Physical visits, high resolution satellite imageries	Percentage of such mine shafts closed									
B.7.1.1	controlled blasting or					36	800	No.	1,00,000	400.00	-	400.00	800.00	
B.7.1.2	refilling of debris/overburden					36	200	No.	2,00,000	200.00	-	200.00	400.00	
<b>Sub-Total for 'B.7'</b>										<b>600.00</b>	<b>-</b>	<b>600.00</b>	<b>1,200.00</b>	
<b>Total for 'B' (B.1 + B.2 + B.3 + B.4 + B.5 + B.6 + B.7)</b>										<b>6,440.00</b>	<b>50.00</b>	<b>2,940.00</b>	<b>9,430.00</b>	
<b>C.</b>	<b>RESTORATION OF WATER QUALITY IN RIVERS/STREAMS AFFECTED BY ACID MINE DRAIN (AMD)</b>													
C.1	Identification and prioritisation of rivers/streams to be restored	District Administration, PHE Dept., MBDA	MSPCB, CPCCB	Examination of documents	Percentage of total AMD affected streams selected for treatment	6	6	No. of districts	2,00,000	-	-	12.00	12.00	Cost include expenditure tto be incurred in meetings/ public consultations
C.2	Development, refinement and transfer of AMD treatment technology	Dept. of Environmental Studies, NEHU and MBDA	Mining & Geology Dept.	Examination of documents, evaluation of pilots	Unit cost of treatment of per million litre of AMD affected water	12	3	No.	20,00,000	-	-	60.00	60.00	
C.3	Restoration of prioritised stretches of rivers/streams	District Administration, PHE Dept., Dept. of Environmental Studies, NEHU and MBDA	MSPCB, CPCB	Periodic assessment of pH of water	pH of water in treated streams	36	500	No.	10,00,000	-	-	5,000.00	5,000.00	
<b>Total for 'C'</b>										<b>0</b>	<b>0</b>	<b>5,072.00</b>	<b>5,072.00</b>	
<b>D.</b>	<b>PROVISION OF SAFE DRINKING WATER IN AREAS AFFECTED BY ACID MINE DRAIN</b>													
D.1	Development of portable water purifier to treat acidic water to ensure availability of good quality potable water in affected areas	NEHU, PHE Dept., Mining & Geology Dept, IIT Guwahati	MSPCB, CPCB	Examination of documents, evaluation of prototype	Unit cost of equipment and unit cost of treatment of per litre of AMD affected water	12	1	No.	50,00,000			50.00	50.00	
D.2	Distribution of portable water purifier in areas affected by acid mine drain	District Administration, PHE Dept., MBDA	MSPCB, CPCB	Examination of documents, evaluation of prototype	Percentage of affected household covered	36	5000	No.	15,000			750.00	750.00	
D.3	Financial assistance for construction of roof top rain water harvesting structures to store rain water to meet requirement of potable water in areas affected by acid mine drain	District Administration, PHE Dept., MBDA	MSPCB, CPCB	Physical visits, examination of documents	Percentage of affected household covered	36	2000	No.	2,00,000			4,000.00	4,000.00	



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D.4	Assessment of feasibility to provide safe drinking water in AMD affected areas through deep bore-wells	CGWB, PHE Dept., District Administration	MSPCB, CPCB	Examination of reports	% of hydro-geological clustered covered	36	50	No.	1,65,000			82.50	82.50			
D.5	Provision of safe drinking water in AMD affected areas through deep bore-well wherever found feasible	PHE Dept., District Administration	MSPCB, CPCB	Examination of reports	Percentage of affected household covered	36	100	No.	1,50,000			150.00	150.00			
<b>Total for 'D'</b>												5,032.50	5,032.50			
<b>E.</b>	<b>BIOLOGICAL RECLAMATION OF AREAS AFFECTED BY COAL MINING</b>															
E.1	Identification/ delineation of areas affected by coal mining	NESAC	PCCF & HoFF	Periodic reports	Percentage of districts affected by coal mining where such areas have already been identified	6	1	No	-					Estimated cost is already included in item No. A.1		
E.2	Development of cost effective models for biological reclamation of coal mining affected areas															
E.2.1	Identification and prioritisation of AMD resistant species	PCCF (CC, R & T)	Forests & Env. Dept.	Periodic reports	Number of species identified/prioritised	6	1	No.	10,00,000			10.0	10.00			
E.2.2	Development, standardisation, field demonstration and documentation of cost effective nursery and plantation techniques for prioritised species	PCCF (CC, R & T)	Forests & Env. Dept.	Periodic reports	Unit cost of assured biological reclamation of coal mining affected areas	24	1	No.	1,00,00,000			100.0	100.00			
E.3	Biological reclamation of identified/delineated areas	APCCF (SF & E)	Forests & Env. Dept.	Periodic reports, high resolution satellite imageries	% of total AMD affected areas reclaimed	60	16,460	Hectares	1,50,000			24,690.0	24,690.00			
<b>Total for 'E'</b>												24,800.00	24,800.00			
<b>GRAND TOTAL (A+B+C+D+E)</b>												16,190.00	76.78	41,896.44	58,163.22	

**NB: 1.** Unless the context otherwise requires, term 'District Administration' wherever appearing includes both civil and police administrations in a revenue District in the State of Meghalaya

**2.** Time Lines and Physical & Financial Targets are subject to vary once actual survey and mapping of coal mines, coal dumps, coal depots and areas affected by coal mining is completed and site-specific detailed estimates for each activity are prepared

**List of Abbreviations:**

- APCCF (SF & E)** : Addl. Principal Chief Conservator of Forests (Social Forestry & Environment)
- CGWB**: Central Ground Water Board
- CIMFR - CSIR**: Central Institute of Mine Fuel Research- Council of Scientific and Industrial Research
- CPCB**: Central Pollution Control Board
- CTE**: Consent to Establish
- EC**: Environmental Clearance
- GoI**: Government of India
- MBDA**: Meghalaya Basin Development Authority
- MoEFCC**: Ministry of Environment, Forest and Climate Change
- MSPCB**: Meghalaya State Pollution Control Board
- NESAC**: North Eastern Space Application Centre
- PCCF & HoFF**: Principal Chief Conservator of Forests & Head of Forest Force
- PCCF (CC, R & T)**: Principal Chief Conservator of Forests (Climate Change, Research & Training)
- PHE Dept.**: Public Health Engineering Department
- SEIAA**: State Environmental Impact Assessment Authority

25/02/2019  
Additional Principal Chief Conservator of Forests  
Planning Development & Legal Matters  
Meghalaya, Shillong