



MEMORANDUM ORDER

No. 2025 - 001

FEB 18 2025

SUBJECT: GUIDELINES FOR THE INTEGRATION OF NATURAL SUCCESSION STRATEGIES IN THE PROGRESSIVE MINE REHABILITATION OF MINED-OUT AREAS AND OTHER DISTURBED AREAS

Pursuant to Republic Act No. 7942, otherwise known as the "*Philippine Mining Act of 1995*" and Department of Environment and Natural Resources (DENR) Administrative Order (DAO) No. 2010-21, its Revised Implementing Rules and Regulations, DAO No. 2018-19 in re: "*Guidelines for the Additional Environmental Measures for Operating Surface Metallic Mines*," and DAO No. 2022-04 in re: "*Enhancing Biodiversity Conservation and Protection in Mining Operations*," this Order is hereby promulgated for the information, guidance, and compliance of Mining Contractors and Permit Holders with the integration of natural succession strategies in the progressive mine rehabilitation of mined-out areas, and other disturbed areas not actively used for extraction and ancillary facilities purposes, ensuring that post-mining landscapes are rehabilitated in alignment with sustainable environmental practices.

Section 1. Basic Policy

It is the policy of the State that mining is recognized as a temporary land use for the creation of wealth, which leads to optimum land use in the post-mining stage, as a result of progressive and engineered mine rehabilitation carried out in cycle with mining operations. The State requires that all mining activities be guided by current best practices in environmental management, firmly committed to minimizing the impacts of mining and ensuring the effective and efficient protection of the environment.

Section 2. Objectives

This Order aims to provide guidelines for integrating natural succession strategies in the progressive mine rehabilitation of mined-out and other disturbed areas towards achieving ecological balance, conservation and protection of biodiversity, and ensuring sustainable development. Likewise, this Order provides guidelines for the implementation, maintenance and protection, monitoring and evaluation, and reporting system for the established plantation through progressive rehabilitation of mined-out and other disturbed areas.

Section 3. Scope and Coverage

This Order shall apply to all Mining Contractors and Permit Holders currently implementing or set to implement progressive mine rehabilitation in accordance with their respective approved work plans or programs. Its coverage shall be limited to surface areas and shall not extend to underground mining areas.

Section 4. Definition of Terms

As used in this Order, the following shall be defined and/or construed as indicated below:

0-3/1645



- a. "Ancillary Facilities" refers to areas located outside the active mining area, that are utilized for settling ponds, stockyards, sumps, motor pools, administrative offices and other similar facilities that support the mining operation.¹
- b. "Annual Environmental Protection and Enhancement Program (AEPEP)" refers to a yearly environmental management work plan based on the approved environmental protection and enhancement strategy.²
- c. "Climax Species" refers to plant species that dominate the final stage of ecological succession in a stable ecosystem.
- d. "Disturbed Area" means all surface areas where development/construction and utilization activities are ongoing or have been conducted.³
- e. "Environmental Protection and Enhancement Program (EPEP)" refers to the comprehensive and strategic environmental management plan for the life of the mining project on which AEPEPs are based and implemented to achieve the environmental management objectives, criteria and commitments, including protection and rehabilitation of the disturbed environment.⁴
- f. "Geographic Information System (GIS)" refers to an integrated system of hardware, software, personnel, and procedures for the capture, storage, analysis, manipulation and display of geographically referenced spatial data.⁵
- g. "Hyperaccumulator species" refers to species thriving in metal-enriched soil with high tolerance to heavy metals concentration in the biomass.
- h. "Mined-out Area" refers to a previously mined area that is no longer feasible for mineral/ore extraction based on existing economical, geological, technological and legal parameters.⁶
- i. "Multipartite Monitoring Team (MMT)" refers to the monitoring arm of the Mine Rehabilitation Fund Committee that checks the Contractors/Permit Holders' performance and compliance with the approved EPEP/AEPEP.⁷
- j. "Natural Succession" refers to the process by which ecosystems recover over time through the sequential establishment of plant and animal species.
- k. "New Plantation" refers to mined-out areas converted into tree plantations through progressive mine rehabilitation, which are one (1) year old or less.
- l. "Old Plantation" refers to mined-out areas converted into tree plantations through progressive mine rehabilitation, which are more than three (3) years old.
- m. "Pioneer Species" refers to species planted prior to the introduction of the indigenous tree species consistent with the process involved in the ecological succession.⁸

¹ DAO 2018-19, Section 5.d

² DAO 2010-21, Section 5.a

³ DAO 2018-19, Section 4.

⁴ DAO 2010-21 Section 5.ag

⁵ DAO 2008-24, Section 4.g

⁶ DAO 2022-04, Section 4.r

⁷ DAO 2010-21, Section 174 and 185

⁸ DAO 2004-06, Section 4.3



- n. "Progressive Mine Rehabilitation" refers to a cost-effective engineering and biological measures of rehabilitating mined-out areas, during utilization stage, in accordance with the approved post-mining land-use.⁹
- o. "Recent Plantation" refers to mined-out areas converted into tree plantations through progressive mine rehabilitation, which are more than one (1) year old but not exceeding three (3) years.

Section 5. Implementation and Integration Plan

The following measures shall be undertaken in the implementation and integration of natural succession strategies in the progressive mine rehabilitation of mined-out areas:

1. Assessment of Disturbed Areas, Existing Vegetation, and Ancillary Facilities through Ground Validation and Geospatial Techniques

The DENR-Geospatial Database Office (DENR-GDO) shall conduct satellite image analysis of the disturbed areas, existing vegetation, and ancillary facilities of Mining Contractors and Permit Holders. The DENR-GDO shall endorse the results of the satellite image analysis to MGB Central Office (CO), copy furnished the MGB Regional Offices (ROs).

MGB ROs shall then endorse the results of the satellite image analysis conducted by DENR-GDO to the respective Mining Contractors and Permit Holders within their jurisdiction.

Mining Contractors and Permit Holders shall validate the results of the satellite image analysis conducted by the DENR-GDO and submit the corresponding geospatial data of all disturbed areas, existing vegetation, and ancillary facilities in GIS shapefile format to the MGB RO no later than fifteen (15) calendar days prior to the end of each quarter.

The MGB RO shall verify the submitted geospatial data on-site during the conduct of quarterly monitoring activities of the MMT. The validated geospatial data shall be uploaded to the MGB Geospatial Database System by the respective MGB ROs within fifteen (15) calendar days after the conduct of the monitoring activities, for review and assessment of the MGB CO.

Based on the results of the on-site validation by MGB ROs, all mined-out areas, and other disturbed areas not actively used within the last three (3) years for the purpose of extraction and ancillary facilities shall immediately undergo progressive rehabilitation as part of the AEPEP implementation.

2. Application of Engineering Landform Reconstruction

To ensure the implementation of cost-effective engineering progressive mine rehabilitation measures of mined-out areas and other disturbed areas towards a stable, safe, and functional post-mining land-use, measures to be undertaken shall include, but not be limited to:

⁹ DAO 2018-19, Section 4.bb



a. Initial Contouring

Unnecessary materials (e.g., boulders, rocks, debris, and other loose materials) within the terrain or slope surface that may hinder the re-establishment of stable slope, topography and effective drainage pattern during landform reconstruction shall be cleared.

b. Landform Stabilization

During landform reconstruction, an undulating landscape may be adopted as it reduces the speed of surface water flow. However, in areas with a steeper slope, the initially contoured terrain may be benched with a slope of 20% or less to enhance stability and reduce erosion.

c. Installation of effective drainage system

Diversion canal and subsurface drainage shall be installed within the reconstructed landform to effectively manage surface runoff. The diversion canal directs runoff away from the area being stabilized, channeling it into stable waterways and preventing the formation of large gullies. Meanwhile, subsurface drainage can be installed using culverts or, if available, rock materials to channel water flow toward more stable waterways. Lastly, in areas where benching is implemented, contour canals shall be constructed to capture water runoff and redirect it to the main drainage system.

3. Surface Preparation and Soil Amelioration

To optimize plant growth and community establishment, as well as to minimize soil erosion and leaching of major and trace elements in implementing progressive mine rehabilitation of mined-out areas and other disturbed areas, measures to be undertaken shall include, but not be limited to:

a. Backfilling of Topsoil and Subsoil

The generated topsoil and subsoil materials during stripping and other earthmoving activities shall be backfilled to the newly reconstructed landform in preparation for planting. In any case, topsoil material must always be placed as the uppermost layer, as it contains essential organic matter and local seed materials.

When topsoil is limited, evenly spreading may not be the most effective approach. A better option is to distribute the topsoil in strips along stable contours, ensuring more efficient use of the resource.

If topsoil is not available, it may be necessary to explore alternative growth media. However, this option can be costly along with importing topsoil from other areas.

b. Application of Soil Organic Matter and Amelioration

Majority of backfilling materials require the addition of organic matter and fertilizers to address deficiencies in major and trace elements for plant growth. To address this, it is essential to conduct a physicochemical analysis of these

backfilling materials to assess their current condition before implementing any soil amelioration measures.

The application of mulch, vermicompost, and other commercial bio-fertilizers (e.g., *Mykovam* and *Bio N*) may be beneficial as they enhance soil structure and fertility. Additionally, logs, branches, and other organic debris are best left on-site as they provide valuable organic matter and serve as important habitats for wildlife.

c. Application of slope stabilization measures

Slope stabilization can be achieved through vegetative methods, engineering solutions, or a combination of both, depending on the specific requirements and availability of materials. Vegetative approach involves planting grasses, vines, shrubs, and trees, to provide cover and/or create hedgerows. Other forms of vegetative approach include wattling, fascines, mulching, hydroseeding, and installation of cocomat.

Engineering solutions such as, but not limited to, gabions, check dam, retaining wall and riprap, may be implemented in areas with steeper slopes, where the risk of erosion is more pronounced. However, due to the increased costs of materials and labor, engineering solutions shall be strategically implemented in areas where their construction is justified by functionality.

4. Establishment of Initial and Permanent Vegetation

Vegetation establishment in progressive mine rehabilitation shall begin with the introduction of initial vegetation, which is primarily composed of ground cover species such as grasses, shrubs, legumes, and other fast-growing plant species. This initial phase shall be maintained for at least six (6) months, depending on the soil and climactic conditions, to facilitate organic matter accumulation, soil fertility enhancement, and soil microbial activity.

Once the site conditions become more favorable, permanent vegetation, primarily composed of native pioneer and climax tree species shall be introduced to create multi-layered vegetation, biodiversity recovery, and promote long-term ecological restoration. Pioneer tree species shall act as nurse plants to improve the area's microclimate, creating the essential conditions for the survival of climax tree species.

5. Species Selection, Seedling Production, and Planting Procedures

To assist the establishment of initial and permanent vegetation in mined-out and other disturbed areas while integrating natural succession strategies, Mining Contractors and Permit Holders shall be guided by the following:

a. Species Selection

Mining Contractors and Permit Holders shall identify endemic and indigenous pioneer and climax species within and adjacent to their contract areas as early as the project's initiation. Likewise, other plant types such as grasses, shrubs, vines, ferns, and palms shall also be incorporated in rehabilitating mined-out areas and other disturbed areas. The said plant types are essential components

of the local ecosystem, contributing to a diverse, multi-layered vegetation structure. For project sites with metal-enriched soils (e.g., ultramafic soils), the use of hyperaccumulator species, as applicable, shall be integrated into rehabilitation and phytoremediation efforts.

The final choice of plants and their species shall be based on the approved post-mining land use and the legal land classification, tailored to specific sites and conditions.

b. Production of Quality Planting Materials

Mining Contractors and Permit holders shall produce quality planting materials for the conduct of progressive mine rehabilitation through existing nurseries, clonal nurseries, gene banks, and/or collection of wildlings from natural stands within and adjacent to the contract area.

c. Planting Procedures

The following are some of the recommended planting methods to be employed for pioneer species (preferably nitrogen-fixing species) and climax species:

- Hydroseeding - a planting method that uses a slurry of seed, mulch, fertilizer, and water, often with a binding agent, to promote fast and even germination.
- Direct seeding – the process of planting trees by direct sowing or broadcasting of seeds in the soil as a means of reforestation or revegetating a given area.
- Tube-stock planting – the planting of trees using transplanted seedlings in tube-stock or containers that are raised in the nursery.
- Assisted Natural Regeneration – a forest restoration technique that involves facilitating the natural regeneration of degraded or deforested areas by protecting and nurturing existing seedlings, controlling competing vegetation, and implementing measures to prevent disturbances such as fire and grazing.
- Miyawaki Method – a method of forest restoration which relies on the high-density plantings of large numbers of species to return the structural, functional, and compositional characteristics of natural forests.

Section 6. Maintenance and Protection

The maintenance and protection phase shall commence immediately upon the establishment of the initial vegetation within the declared mined-out areas and other disturbed areas. For new plantations, Mining Contractors and Permit Holders shall conduct monitoring of the survival rate three (3) months after planting. Similarly, Mining Contractors and Permit Holders shall conduct annual monitoring of the survival rate on the anniversary date and at regular intervals thereafter, for both recent and old plantations. The above monitoring schedule shall align with the guidelines of the Mining Forest Program.



The maintenance and protection phase ensures that the rehabilitated areas will remain stable, ecologically functional, and capable of sustaining natural vegetation growth. Measures to be undertaken shall include, but not be limited to:

- a. Regular watering of established vegetations;
- b. Application of bio-fertilizers;
- c. Replanting activity within new and recent plantations;
- d. Enrichment planting within old plantations to enhance density;
- e. Regular vegetation maintenance (i.e., brushing, weeding, pruning, etc.);
- f. Pest and disease management;
- g. Fire protection and prevention (i.e., fire line establishment, fire break plantation);
- h. Site protection from human and animal interference;
- i. Installation of plantation signages/markers;
- j. Infrastructure and drainage system maintenance;
- k. Updating of dataset for geospatial database system; and
- l. Patrolling of Deputized Environment and Natural Resource Officers or Company-designated Environment and Natural Resource Officers

Section 7. Reporting System

To ensure accurate, consistent, and standardized reporting, all Mining Contractors and Permit Holders shall accomplish a Progressive Mine Rehabilitation Program (PMRP) Data Capturing Sheet (attached as Annex A), which shall serve as the official reporting tool for documenting progressive rehabilitation progress, environmental conditions, and compliance with approved rehabilitation plans.

This shall be submitted quarterly to the MGB RO as annex of Module 7.a (RA No. 7942 Compliance Monitoring – EPEP/FMR/DP Implementation) of the Self-Monitoring Report, for review and subsequent validation/verification.

Section 8. Monitoring and Evaluation

The progressive mine rehabilitation activities of the Mining Contractors and Permit Holders shall be monitored by the MGB RO during the conduct of the quarterly MMT monitoring activities. All findings and observations of the MMT shall be detailed in the PMRP Validation Report (Annex B), which will be submitted to the MGB CO, as an attachment to the Compliance Monitoring Validation Report, for review and assessment. The Report shall provide a detailed account of the rehabilitation progress, including compliance with approved rehabilitation plans, effectiveness of implemented measures, and any observed deficiencies requiring corrective action. To enhance accountability and compliance, the findings from the previous MMT monitoring activity shall be revisited and verified in the succeeding monitoring activities. Following the validation process, MGB RO shall update the geospatial dataset in the MGB Geospatial Database System, if warranted, based on the results of the validation.

Further, the implementation of progressive mine rehabilitation activities and other environmental measures provided in this Order shall be assessed by the MGB RO during the conduct of the periodic Safety and Health, Environment and Social Development and Management monitoring pursuant to MGB Memorandum Circular No. 2018-02. The target/s and accomplishment/s for the progressive rehabilitation commitments and for the compliance with other related requirements shall be reflected in the Environmental Monitoring Checklist and Compliance Scorecard.



MINES &
GEOSCIENCES
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021825-0006



Memorandum Order

Section 9. Transitory Provision

All Mining Contractors and Permit Holders shall immediately comply with the provisions of this Order by integrating them into their existing AEPEP.

Moreover, all AEPEP submissions currently under review by the MGB RO shall be returned to the respective proponents for revision, to ensure alignment with this Order.

Section 10. Separability Clause

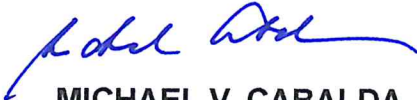
If any clause, sentence, or provision of this Order is held or declared to be unconstitutional or invalid by a competent court, the remaining parts shall not be affected thereby.

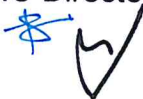
Section 11. Repealing Clause

This Order supersedes previously issued memorandum circulars and orders which are inconsistent with the provisions herein stated.

Section 12. Effectivity.

This Order shall take effect immediately.


MICHAEL V. CABALDA
Assistant Secretary for Mining Concerns,
and concurrent OIC Director





PROGRESSIVE MINE REHABILITATION PROGRAM
Data Capturing Sheet
(From January 2025 to March 2025)

I. **NAME OF COMPANY** :
Location :
Tenement No. :
Project Name :

II. **ACCOMPLISHMENTS**

A. **LAND USE REPORT**

Land Use	Area (ha.)
Greening Activities	
Progressive Rehabilitation (PR)	
1. Previous Mined-out Areas subjected to PR	
2. Previous TRP Areas converted to PR	
Reforestation within tenement	
Temporary Revegetation	
Bamboo Plantation within tenement	
Final Mine Rehabilitation	
SUB-TOTAL	
Actual Disturbed Areas	
Active Mine Area	
Mined-out Area	
Exploration Areas	
Idle Disturbed Areas	
Ancillary Areas	
1. Mine Camp/Facilities (all types of buildings and structures)	
2. Mine Yard	
3. Stockyard	
4. Topsoil Stockyard	
5. Pieryard	
6. Silt Ponds	
7. Nurseries	
8. Road Networks	
9. Tailings Storage Facility	
10. Waste Dump Facility	
11. Other ancillary facilities	
SUB-TOTAL	
Other Conservation Areas	
Buffer Zones	
Reference Ecosystem	
SUB-TOTAL	
GRAND TOTAL	

Compliance with Section 5-D of DAO No. 2018-19 (For Nickel Mines only):

Maximum Disturbed Area (ha) (A)	Actual Disturbed Area (ha) (B)	Ancillary Facilities (ha) (C)	Mining Disturbed Area (ha) (D=B-C)	Target Area subject to TRP (ha) (E=D-A)
60.00	170.00	70.00	100.00	40.00

1. TEMPORARY REVEGETATION PROGRAM ACCOMPLISHMENT

Target area for TRP: 40.00 ha			
TRP Area Location	Area (ha)	Date of establishment	Species Planted
Mining Area 1	10.00	01/01/2025	Napier grass, Vetiver grass
Mining Area 2	30.00	01/08/2025	Napier grass, Vetiver grass

Note: All information highlighted in red is for illustration purposes only.
All established TRP areas must be subjected to progressive rehabilitation, if not mined within three (3) years.
Attach geo-tagged photos of the TRP areas in the annexes.

B. APPLICATION OF ENGINEERING LANDFORM RECONSTRUCTION

Activities	Unit of Measure	Target	Accomplishment to Date
Initial contouring			
Landform stabilization			
Installation of effective drainage system			
Others (specify)			

C. SURFACE PREPARATION

Activities	Unit of Measure	Target	Accomplishment to Date
Backfilling of topsoil			
Application of soil-based bio fertilizers			
Installation of effective drainage system			
Application of slope stabilization measures			
Others (specify)			

SOIL PHYSICOCHEMICAL ANALYSIS

Laboratory:
Date of Sampling:
Date of Analysis:

Parameter	Measurement/ Value	Remarks
Water Holding Capacity		
pH		
Organic Matter, %		
Total Nitrogen, %		
Phosphorus, P (mg/kg)		
Potassium, K (cmol/kg)		
Others (specify)		

D. PROGRESSIVE REHABILITATION ACCOMPLISHMENT

1. ESTABLISHMENT OF INITIAL VEGETATION

Pioneer Species Planted	Scientific Name	Area Planted (ha.)

2. ESTABLISHMENT OF PERMANENT VEGETATION

TOTAL TARGET AREA (ha)	TOTAL PLANTED AREA (WITHIN MPSA) (ha)	REMAINING AREA (ha)

Previous Plantation	
New Plantations/Expansions	
TOTAL	

	Plantation Category							Grand Total
	Old	Recent				Latest	Sub-total	
	(<JJ21)	JD21-JJ22	JD22-JJ23	JD23-JJ24	Sub-Total	JD24-JJ25	(Recent + Latest)	
No. of Seedlings Planted								
No. of Seedlings Replanted								
No. of Surviving Plants								
Survival Rate								

Climax Species Planted	Scientific Name	Area Planted (ha.)

E. PHOTO DOCUMENTATION

Attach geo-tagged photos of the rehabilitated areas.

Prepared by:

NAME _____
Position/Designation _____

Noted by:

NAME
MEPEO / Resident Manager

Date

PROGRESSIVE MINE REHABILITATION PROGRAM
VALIDATION REPORT

NAME OF COMPANY
Location
Tenement No.

Date of Validation:
Period Covered:

I. ASSESSMENT OF SUBMITTED GEOSPATIAL DATA

Land Use	Reported area (ha.)	Validated area (ha.)
Greening Activities		
Progressive Rehabilitation (PR)		
1. Previous Mined-out Areas subjected to PR		
2. Previous TRP Areas converted to PR		
Reforestation within tenement		
Temporary Revegetation		
Bamboo Plantation within tenement		
Final Mine Rehabilitation		
SUB-TOTAL		
Actual Disturbed Areas		
Active Mine Area		
Mined-out Area		
Exploration Areas		
Idle Disturbed Areas		
Ancillary Areas		

1. Mine Camp/Facilities (all types of buildings and structures)		
2. Mine Yard		
3. Stockyard		
4. Topsoil Stockyard		
5. Pieryard		
6. Silt Ponds		
7. Nurseries		
8. Road Networks		
9. Tailings Storage Facility		
10. Waste Dump Facility		
11. Other ancillary facilities		
SUB-TOTAL		
Other Conservation Areas		
Buffer Zones		
Reference Ecosystem		
SUB-TOTAL		
GRAND TOTAL		

II. ASSESSMENT OF PROGRESSIVE REHABILITATION ACCOMPLISHMENT

Activity	Compliance		Field Observations and Recommendations
	Yes	No	
A. Geospatial Data Submission and Assessment			
1. Submitted the geospatial data in GIS shapefile format no later than fifteen (15) calendar days prior to the end of each quarter			
2. The submitted geospatial data is found to be accurate and consistent with the results of the conducted on-site validation by MGB RO.			
3. Others			
B. Compliance with DAO No. 2018-19 (for nickel mines only)			

1. Complied with the maximum disturbed area per Section 5-D of DAO No. 2018-19				
2. Established the required TRP area (<i>if mining disturbed area exceeded the maximum disturbed area</i>)				
3. Others				
C. Application of Engineering Landform Reconstruction				
1. Conducted initial contouring of the target area for plantation				
2. Observed proper benching to stabilize target area for plantation				
3. Installed effective drainage system within the target area for plantation				
4. Others				
D. Surface Area Preparation and Soil Amelioration				
1. Observed proper and adequate backfilling of topsoil/subsoil in the area for plantation				
2. Introduced soil organic matter and amelioration in the area for plantation				
3. Applied slope stabilization measures in the area for plantation				
4. Conducted soil physicochemical analysis				
5. Others				
E. Establishment of Initial and Permanent Vegetation				
1. Established initial vegetation that is primarily composed of ground cover species such as grasses, shrubs, and legumes				
2. Utilized endemic and indigenous species for permanent vegetation				
3. Observed multi-layered vegetation (presence of grass, shrubs, vines and trees in an area) in the established plantations				
4. Others				
F. Maintenance and Protection				
1. Conducted regular watering of established plantations				
2. Introduced bio-fertilizers in established plantations				
3. Conducted replanting activity within new and recent plantations				
4. Conducted enrichment planting within old plantations to enhance density				

5. Conducted regular vegetation maintenance (i.e., brushing, weeding, pruning, etc.)			
6. Observed proper pest and disease management			
7. Implemented fire protection and prevention plan through establishment of fire lines and fire break plantations			
8. Installed proper plantation signages/markers			
9. Conducted regular maintenance of infrastructure and drainage system			
10. Employed Deputized Environment and Natural Resource Officers (DENRO) to patrol established plantations			
11. Others			
G. Reporting			
1. Submitted the Progressive Mine Rehabilitation Program Data Capturing Sheet as an annex of Module 7.a (RA No. 7942 Compliance Monitoring – EPEP/FMR/DP Implementation) of the Self-Monitoring Report			
H. Other Findings/Observations			
1.			
2.			
3.			

Validated by:

Noted by:

NAME

Personnel Position/Designation

NAME

MSESDD Chief