



DEC 23 2021

**DENR ADMINISTRATIVE ORDER**  
No. 2021 - 40

**SUBJECT: LIFTING OF THE BAN ON THE OPEN PIT METHOD OF MINING FOR COPPER, GOLD, SILVER AND COMPLEX ORES IN THE COUNTRY UNDER DENR ADMINISTRATIVE ORDER NO. 2017-10, AND PROVIDING FOR ADDITIONAL ENHANCED PARAMETERS AND CRITERIA FOR SURFACE MINING METHODS**

Pursuant to Republic Act (RA) No. 7942, otherwise known as the “Philippine Mining Act of 1995,” Department of Environment and Natural Resources (DENR) Administrative Order (DAO) No. 2010-21, the Implementing Rules and Regulations of RA No. 7942, and the Joint Memorandum for the President from the Department of Finance and DENR dated September 26, 2020 on the Revitalization of the Mineral Resource Industry as One Measure to Achieve Economic Growth Amidst the Crisis Caused by the COVID-19 Pandemic, the following are hereby promulgated for the guidance and compliance of all concerned:

**SECTION 1. Basic Policy.** It is the policy of the State to promote the rational exploration, development, utilization and conservation of mineral resources in the country under the full control and supervision of the State in order to enhance national growth in a way that effectively safeguards the environment and protect the rights of affected communities.

**SECTION 2. Rationale.** This Order is issued in consideration of the following:

- 2.1 Open pit mining method is a globally-accepted method of mining, considered to be the most feasible option for mining near-surface or shallow ore deposits;
- 2.2 Not all open pit mines produce acid rock drainage (ARD)/acidic contaminants;
- 2.3 There are best-practice control strategies and technologies that can help avoid or manage the negative impacts of open pit mining;
- 2.4 There are existing policies/laws that designate areas that are not allowed for mining (e.g., protected areas, critical watershed, ancestral lands and prime agricultural lands);
- 2.5 Major issues concerning mining including open pit mining cannot be attributed to the use of the method itself, but rather on the accidents involving wastes and tailings confinement;
- 2.6 Progressive rehabilitation of mined out areas is now being practiced to restore vegetative cover and reduce adverse impacts on the environment;
- 2.7 Joint Regional Assessment Reports of Mines and Geosciences Bureau (MGB), Environmental Management Bureau (EMB) and DENR Provincial Environment and Natural Resources Office/Community Environment and Natural Resources Office found the surface metallic mines compliant with

the mining and environmental rules and regulations and were implementing sound progressive and final mine rehabilitation in accordance with the approved Works Programs and conditions of the Environmental Compliance Certificate; and

- 2.8 Continuing the ban on open-pit mining may result in loss of economic opportunity.

**SECTION 3. Objectives.** This Order is issued for the attainment of the following objectives:

- 3.1 To revitalize the mining industry and usher in significant economic benefits to the country by providing raw materials for the construction and development of other industries and by increasing employment opportunities in rural areas where there are mining activities thereby stimulating countryside development;
- 3.2 To establish enhanced parameters and criteria for the types of surface mining methods under the Declaration of Mining Project Feasibility (DMPF) to address the environmental and safety issues of surface mining methods particularly with open pit mining.

**SECTION 4. Scope and Coverage.** This Order shall cover all mining tenement holders that will adopt surface mining method including open pit in their operations.

**SECTION 5. Definition of Terms.** As used in and for purposes of this Order, the following terms shall mean:

- 5.1 Bench Mining - a surface mining method in which a layer of usable product or overburden at the surface of the earth is mined by cutting the layer into a plurality of separate levels or benches, each separated from the next in height by a substantially vertical cut line. This enables cutting to be carried out at each bench line or cut line by suitable equipment simultaneously with the cut material being transported from the mine on conveyers or trucks.
- 5.2 Hydrogeology - study that focuses on the movement of subsurface water that occurs beneath a water table in soil and rocks, or in geological formations.
- 5.3 Hydrology - a science dealing with the properties, distribution, storage, and circulation of water on the earth's surface and in the atmosphere.
- 5.4 Mining Industry Coordinating Council – a council created in order to institutionalize and implement reforms in the Philippine mining sector pursuant to Executive Order (EO) No. 79 s. 2012 and its Implementing Rules and Regulations (IRR).
- 5.5 Mining Tenement - any tenorial instrument providing mining rights, such as Exploration Permit, Mineral Agreements, Financial or Technical Assistance Agreement, Mining Patents, and Special Mines Permit.
- 5.6 Open-cast Mining - a surface mining method used mainly for coal and other bedded deposits. The overburden is not transported to waste dumps for disposal, but cast directly into adjacent mined-out panels.
- 5.7 Open Pit Mining - the process of mining any near-surface deposit by means of a surface pit excavated using one or more horizontal benches.

- 5.8 Quarrying - the process of extracting, removing and disposing quarry resources found on or underneath the surface of public and private land.
- 5.9 Strip or Contour Mining - the extraction of mineral deposits lying near the surface of the earth by means of removing the overburden above the deposits in rows or strips, and where the extraction process is normally moved from place to place and does not involve the extraction of minerals at the same location over a substantial period of time.
- 5.10 Surface mining method – is the extraction of ore or stone at the surface with essentially no exposure of miners underground.

**SECTION 6. Lifting of the Ban on Open Pit Method of Mining.** This Order shall hereby lift the ban on the use of the open pit method of mining for the extraction of copper, gold, silver and/or complex ores in the country as provided under the DAO No. 2017-10.

**SECTION 7. Types of Surface Mining Methods.** The following are the surface mining methods that are commonly used in the metallic and non-metallic mining industries in the Philippines, with their schematic illustrations depicted in Annex 1:

- 7.1. Open Pit Mining
- 7.2. Bench Mining
- 7.3. Open-cast Mining
- 7.4. Strip or Contour Mining
- 7.5. Quarrying

The enumerated list of surface mining methods herein is not exclusive. Other alternative mining methods which pass the parameters and criteria stated in Annex 2 hereof may be used or applied, subject to review and approval of the MGB.

**SECTION 8. Conditionalities and Requirements for Open Pit Method of Mining.** The mining tenement holder shall be required to conduct baseline information gathering and evaluation, and incorporate the same in the Mining Project Feasibility Study and the appropriate Work Programs, which shall be the basis of the MGB to determine if the proposed mining project has satisfied the following:

- 8.1 That the use of surface mining method shall not pose possible hazard to public health and safety resulting from ground failure or physical deterioration;
- 8.2 That it shall not release hazardous chemicals into the environment, or the proponent has presented proven and acceptable techniques to control the same through internationally accepted containment, collection, and treatment methods that will outlive the life of the mine, including its complete decommissioning. Thus, the mining operation shall be able to:
  - a. Prevent the generation or acceleration of acid rock drainage and other heavy metals that may contaminate land and water bodies;
  - b. Reduce the use of freshwater resources and avoid/mitigate the disruption of the water table; and
  - c. Reduce the risk of perpetual maintenance/liability associated with the surface mining method to be used;
- 8.3 That the proponent has adequate information to conduct a comprehensive stakeholders' involvement process to ensure that all interests and concerns are considered, and has social acceptability of its project since the commencement of the exploration activities;

- 8.4 That the proponent has submitted and presented appropriate program/s for surface and subsurface slope-stability monitoring of potential slope failures, and has assured the mitigation of the effects thereof, and the safety of the personnel, community/ies, infrastructures and equipment; and
- 8.5 That the proponent has accumulated sufficient geological data to conduct proper and accurate assessment of local geology, rock mass characteristics, hydrogeology and surface hydrology.

The implementation by the mining tenement holder of the necessary measures to meet these conditions shall be subject to the quarterly and/or annual monitoring by the MGB Regional Office concerned.

**SECTION 9. Creation of Oversight Committee.** An Oversight Committee for the assessment of surface mining in the Philippines shall be created. It shall be composed of the following:

Chair	-	Undersecretary for Field Operations and Environment
Co-Chair	-	Undersecretary for Attached Agencies, Mining and Muslim Affairs
Members	-	Director, MGB
		Director, EMB
		Director, Environmental Law Enforcement and Protection Service

The Oversight Committee shall have the following functions:


1. Review the performance of existing mining operations;
2. Ensure compliance of mining operations with environmental standards, laws, rules and regulations and to rationalize the management and utilization of minerals toward sustainable development;
3. Set the polices and parameters for the regular joint assessment of surface mining in the Philippines; and
4. Enforce laws, rules and regulations in case of violations committed by the mining companies.

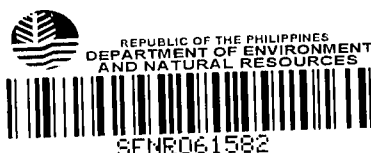
**SECTION 10. Separability Clause.** If any provision of this Order shall be held invalid or unconstitutional, the other portions or provisions hereof which are not affected shall continue in full force and effect.

**SECTION 11. Repealing Clause.** All Orders, Memoranda and Circulars inconsistent herewith are hereby revoked or amended accordingly.

**SECTION 12. Transitory Provision.** All mining tenement holders with pending DMPF/Mining Project Feasibility Study/Work Program, whichever is applicable, that will adopt surface mining method, including open pit, in their operations shall be required to comply with the pertinent provisions of this Order.

**SECTION 13. Effectivity.** This Order shall take effect fifteen (15) days after its publication in a newspaper of general circulation and upon acknowledgment of the receipt of the copy thereof by the Office of the National Administrative Register.

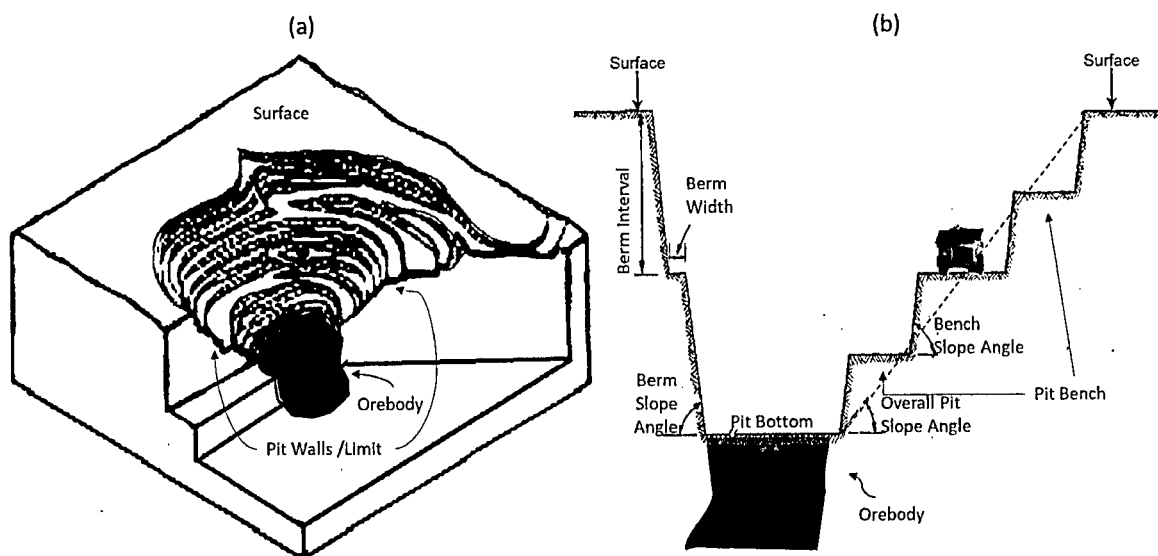
  
**ROY A. CIMATU**  
 Secretary



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 January 3, 2022

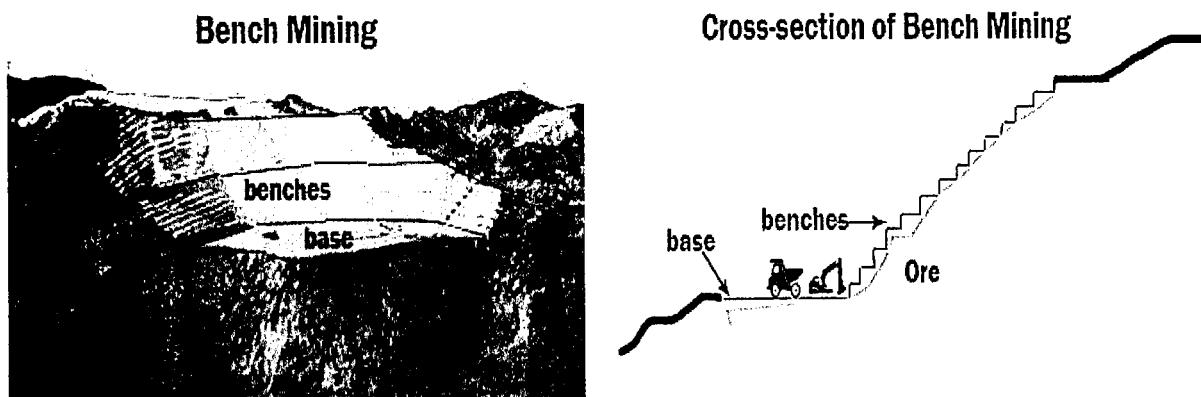
## ANNEX 1: TYPES OF SURFACE MINING METHODS

### a. Open Pit Mining



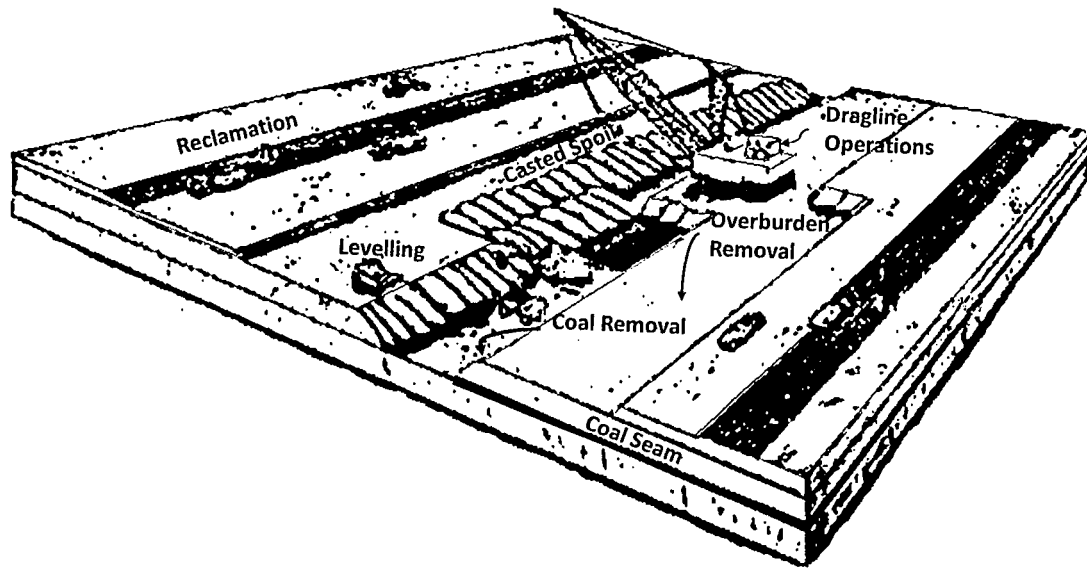
**Figure 1:** Schematic illustration of the Open Pit mining method: (a) a conical configuration of the surface excavation (figure adapted from source: Zendeboudi, S., & Bahadori, A. (2017). *Production Methods in Shale Oil Reservoirs. Shale Oil and Gas Handbook*, 285-319. doi:10.1016/b978-0-12-802100-2.00008-3) and (b) the typical cross-section of an open pit (modified from source: Mining Engineering Site. *SURFACE MINING*. 20 July 2016, [miningengineeringsite.wordpress.com/2016/07/20/surface-mining/](http://miningengineeringsite.wordpress.com/2016/07/20/surface-mining/))

### b. Bench Mining



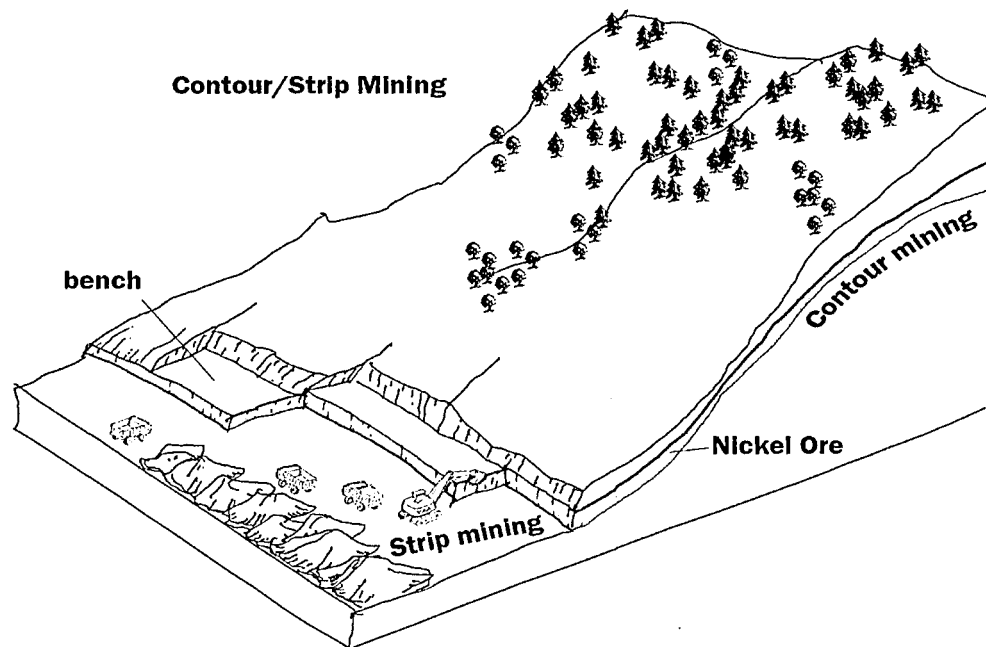
**Figures 2 to 3:** Illustration of Bench Mining method used by Filminera Resources Corporation and TVI Resources Development (Phils) Inc., to be adopted by Sagittarius Mines, Inc.

c. Open-cast Mining



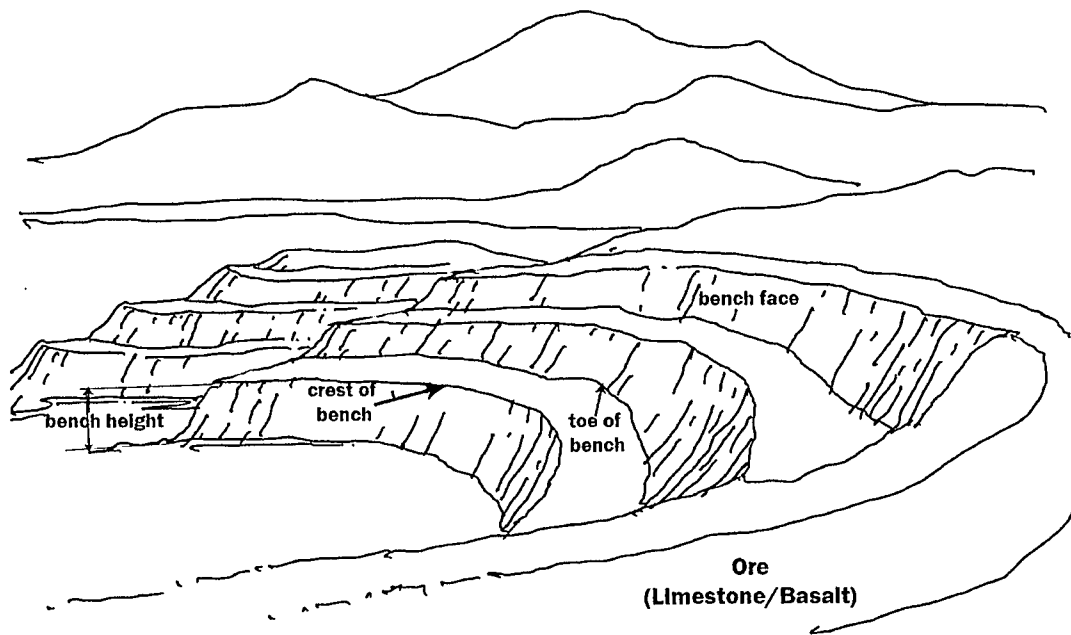
**Figure 4:** Schematic depiction of the unit operations in a surface coal mine using the Open Cast mining method. (Source: "Read 'Coal: Research and Development to Support National Energy Policy' at NAP.edu." National Academies Press: OpenBook, [www.nap.edu/read/11977/chapter/15#161](http://www.nap.edu/read/11977/chapter/15#161))

d. Strip or Contour Mining



**Figure 5:** Schematic illustration of the Contour Mining method as practiced in the Philippines

e. Quarrying



*Figure 6: Schematic illustration of the Quarrying method as practiced in the Philippines*

## ANNEX 2. Design Parameters and Criteria of Surface Mining Methods

Detailed and accurate baseline information must be considered to determine the expected and acceptable impacts of the proposed mining activities related to surface mining. This information is necessary in selecting the most appropriate and effective environmental protection and enhancement strategies, based on existing best practices in surface mining operations.

The following requirements shall be complied with:

### A. Baseline Information Gathering and Evaluation

- a. Topography
  - i. Form and arrangement of the natural and artificial physical land features on the area, e.g., hills, valleys, roads, lakes and etc.;
  - ii. Part of the baseline information gathering for topography shall include the raw survey data, remote sensing data, topographic mapping, digital elevation modelling, and topological modelling of the area;
- b. Vegetation
  - i. Species of trees for progressive rehabilitation and final mine rehabilitation, e.g., for Nickel mines: Mancono (*Xanthostemon verdugonianus*), Mountain Agoho (*Gymnostoma montana*); for Gold and Copper mines: Mayapis (*Shorea palosapis*), Narra (*Pterocarpus indicus*); Limestone: Molave (*Vitex parviflora*)
- b. Climatic Conditions
  - i. Records of precipitation, flooding and storm cycles, i.e., as stipulated under Section 17 of the Department of Environment and Natural Resources (DENR) Memorandum Order No. 1999-32 (5-yr, 10-yr, 100-yr); and
  - ii. Soil saturation monitoring;
- c. Geology
  - i. Nature, configuration of the orebody and host rock, i.e., telescoped, funnel, blanket, vein;
  - ii. Regional and Local structural geology, i.e., faults, fractures; and
  - iii. Stripping ratio, i.e., volume of waste needed to extract a given volume of ore;
- d. Hydrology/Hydrogeology
  - i. Surface and groundwater characterization and assessment, i.e., flow direction, movement, occurrence;
  - ii. Physical and chemical properties of surface and groundwater;
  - iii. Hydrogeological characteristics of aquifers, i.e., thickness, hydraulic conductivity, transmissivity; and
  - iv. Location of local groundwater recharge zones;
- e. Biodiversity
  - i. Species diversity, i.e., identification and population (e.g., endemic, rare or migrating);
  - ii. Ecosystem diversity, i.e., habitats (e.g., forests, grasslands, rainforests), biotic communities, and observed ecological processes; and
  - iii. Vulnerability to or degree of degradation, e.g., critically endangered, endangered, vulnerable, threatened;



- f. Social
  - i. Livelihood and local economies, e.g., fishing, farming;
  - ii. Existing cultural sites and peace and order, i.e., cultural conditions;
  - iii. Demographic information, social services and support programs, i.e., socio-economic condition; and
  - iv. Possible resettlement, i.e., existing household on proposed project area.

The said baseline information and gathering report shall be used as the indicative tool to determine possible and potential impacts of the proposed surface mining method that shall include, but not be limited to the following:

- a. Strategies on ground/slope stability monitoring, rock support and reinforcement; The development of the strategy on ground/slope stability monitoring, support, and reinforcement shall be based on a thorough understanding of the following points:
  - i. Geological structure;
  - ii. Rock mass strength;
  - iii. Groundwater regime;
  - iv. Behavior of the rock support or reinforcement system under load;
  - v. Rock stress levels and the changes in the rock stress during the life of the surface excavation; and
  - vi. Seismic events;
- b. Presentation of certain analytical models including mine plans in the evaluation of potential impacts, risk assessment and management;
- c. Surface and ground water management strategies and possible pit lake water condition scenarios controlled by differing geologic and climatic settings, e.g., acid mine drainage potentials and corresponding mitigations/neutralizations; and
- d. Progressive rehabilitation strategies and post-closure scenarios:
  - i. Benefit-cost scenarios, ground stability and enclosures, sustained community livelihood;
  - ii. Possible backfilling of the mined-out area during the final mine rehabilitation; and
  - iii. Revegetation of remnant benches and slopes.