GUIDELINE IN THE PREPARATION OF A FINAL MINE REHABILITATION AND/OR DECOMMISSIONING PLAN (FMR/DP) AND IN THE ESTABLISHMENT OF A FINAL MINE REHABILITATION AND DECOMMISSIONING FUND (FMRDF) PURSUANT TO DENR ADMINISTRATIVE ORDER (DAO) NO. 96-40[1]

1. PURPOSE OF THE GUIDELINE

This Guideline is intended to assist mining companies/operators, environmental managers and personnel and other interested parties within the Philippine minerals industry in preparing a Final Mine Rehabilitation and/or Decommissioning Plan (FMR/DP, also commonly referred to as a mine closure plan) during the feasibility stage of a new mining project or during the operational life of an existing mine.

The Guideline is an advisory document and is not a substitute for regulations. This Guideline provides suggestions on the range of issues that should be considered in determining the operation's responsibilities for the management of the land before, during and after operations.

The Guideline is not designed to provide a prescriptive formula for the development of a FMR/DP that will apply in every situation or a detailed instruction on how to develop an FMR/DP. Rather, the Guideline emphasizes the main requirements under existing mining law, rules and regulations and defines the expectations of the government for the development of mine closure plans. Mining companies/operators and FMR/DP preparers should carefully identify and consider environmental and social matters that are relevant to their operation, which may not have been mentioned/identified in this Guideline.

The Guideline will be updated from time to time based on feedback from users, development of standards and practice and improvements within the industry.

2. PLANNING FOR MINE CLOSURE

Planning for mine closure/integrated mine closure planning requires the integration of environmental and social considerations as early as the project planning phase (during the preparation of the Feasibility Study and of the Environmental Impact Statement) and in the preparation and implementation of environmental and social programs (such as Environmental Protection and Enhancement Program, EPEP; Environmental Management System, EMS; Social Development and Management Program, SDMP; Safety and Health Program, SHP, etc) during the operating life of the mine and of the Final Mine Rehabilitation and/or Decommissioning Plan (FMR/DP) during the mine closure process, before the final relinquishment of a "*new resource*" to the Government and to the community.

[1] as specifically amended by DENR Administrative Order No. 2005 – 07 entitled "*Amendments to Chapter XVIII of DENR Administrative Order No. 96 – 40, as amended, providing for the Establishment of a Final Mine Rehabilitation and Decommissioning Fund*" dated April 14, 2005. Published in the Manila Times and Manila Standard on April 18, 2005.

2.1 Regulatory Requirements and Considerations

2.1.1 DENR Administrative Order No. 96-40, as amended, the Revised Implementing Rules and Regulations of Republic Act No. 7942, otherwise known as the Philippine Mining Act of 1995.

- Chapter I (Introductory Provisions), Section 3 (Governing Principles);
- Chapter XIV (Development of Mining Communities, Sciences and Mining Technology), Sections 134-136 (Development of Community and Mining Technology and Geosciences, Credited Activities or Expenditures, and Development of Host as Neighboring Communities, respectively);
- Chapter XV (Safety and Health);
- Chapter XVI (Environmental Protection), specifically:
  - Section 169 (Environmental Protection and Enhancement Program);
  - Section 171 (Annual Environmental Protection and Enhancement Program); and
- Chapter XVIII (Contingent Liability and Rehabilitation Fund):
  - Section 187 (Final Mine Rehabilitation/Decommissioning Plan) which states that:

"The Final Mine Rehabilitation and/or Decommissioning Plan (FMR/DP or Mine Closure Plan) shall be integrated in the EPEP submitted by Contractors/Permit Holders to the MRF Committee through the Regional Office and to the CLRF Steering Committee through the Bureau. Using risk-based methodologies/ approaches, the FMR/DP shall consider all mine closure scenarios and shall contain cost estimates for the implementation of the FMR/DP, taking in consideration expected inflation, technological advances, the unique circumstances faced by the mining operation, among others: Provided, That such estimates shall be based on the cost of having the decommissioning and/or rehabilitation works done by third party contractors: Provided, further, That the estimates, on a per year basis, shall cover the full extent of work necessary to achieve the objectives of mine closure such as, but shall not be limited to, decommissioning, rehabilitation, maintenance and monitoring and employee and other social costs, including residual care, if necessary, over a ten year period. The FMR/DP shall be subject to pre-evaluation by the MRF Committee and to final approval by the CLRF Steering Committee."

2.1.2 Executive Order No. 270, as amended, The National Policy Agenda on Revitalizing Mining in the Philippines.

"Section 2 (Guiding Principles):

f) Protection of the environment shall be of paramount consideration in every stage of mining operation; mitigation and progressive rehabilitation measures shall be integral components of mining operations. ***Decommissioning and/or final mine rehabilitation shall be supported by the most appropriate environmental financial surety".***

2.1.3 Environmental Compliance Certificate (ECC) pursuant to the Philippine Environmental Impact Statement System.

2.1.4 Relevant Provisions of Department Memorandum Order No. 99-32, Policy Standards and Guidelines for Mine Waste and Mill Tailings Management.

2.1.5 Requirements Under Other Laws, Rules and Regulations Relevant to the Mining Operation.

2.2 Mine Closure Policy

The development of an internal Mine Closure Policy is necessary to provide a framework for mine closure planning. The Policy needs to clearly state the mining company's/ operator's intentions in relation to closure planning and provide a framework for action and setting of objectives. It can be a stand alone policy or part of the company's broader Environmental Policy.

2.3 Stakeholder Involvement

The primary objective of stakeholder involvement is to ensure that the interests and concerns of stakeholders are considered during the development of the FMR/DP.

Early identification of stakeholders and other interested parties is important. As a matter of practice, stakeholders that will be directly affected by the mining operation and by the eventual closure of the mine should be involved throughout the process.

It is advisable that a multi-stakeholder closure committee or group, that meets formally and informally to discuss the issues as appropriate be established in order for stakeholders to be kept abreast of plans for the mine. The involvement of government agencies and community representatives throughout the process enables the views of the broader group of stakeholders to be considered in the final decision of the mining company/operator with regard to final land-use and strategy/ies to be used in the rehabilitation of mining disturbed lands. Ideally, such committee or group should draw membership from other stakeholder committees (e.g., Community Technical Working Group, Multi-partite Monitoring Team, and Mine Rehabilitation Fund Committee) which are involved in the monitoring or resolution of issues throughout the life of the mine.

The number of stakeholders involved, however, should be kept relatively small to remain focused and effective, and may include representation from the following groups as appropriate:

- ***Community*** – host and neighboring communities that may be affected by mine closure, representative/s of indigenous peoples groups, if present;
- ***Government Agencies*** – MGB, DENR – Environmental Management Bureau, different levels of local government and other government agencies involved in planning, welfare, education and employment representatives, as necessary; and
- ***Non-government organizations*** – local environmental/conservation group, tourism industry (if current or future development potential exists) or other industries, as necessary.

2.4 Roles and Responsibilities of the Mining Company/Operator

The mining company/operator needs to obtain all the information necessary to effectively plan and design for operation, decommissioning, rehabilitation and post-closure and to ensure that the intent of mining and environmental laws, rules and regulations are met. The mining company/operator should:

- Have knowledge of all relevant factors concerning the impacts of the mining operation to the environment and the communities;
- Involve multi-disciplinary input;
- Involve stakeholders to identify option selection and design objectives;
- Have the ability to monitor performance and take corrective action if necessary; and

- Document the methods, procedures and criteria clearly and concisely to provide a transparent view of the process to the stakeholders and concerned public.

The mining company/operator should also:

- ***Establish, early in the life of the project, the project's final land use*** – knowing that it will be adjusted with time. Involvement of stakeholders and regulatory agencies in defining the final land use will increase probability of the final land use chosen being correct and acceptable;
- ***Establish success indicators for closure***. Ideally, an agreement with stakeholders on what will be considered success in closure should be reached;
- ***Initiate a review of the FMR/DP***. A date not exceeding two years from approval and every two years thereafter. This review may be moved up if changes in mining activities or in the rehabilitation measures chosen justify modifying the plan either at the company's request or if the MGB deems it to be necessary;
- ***Establish a mechanism for independent technical review***. Independent technical review and audit should be part of the entire mine development, operation and closure process. Key focus areas in mine closure include, among others:
    - Adequacy of plans for closure;
    - Adequacy of success indicators;
    - Appraising if conditions for satisfactory closure have been met; and
    - Identifying residual commitments and planning how to deal with them;
- ***Be prepared for residual care***. Residual care may be needed in some cases. As such, the mining company/operator should be prepared to educate stakeholders about such possibility;
- ***Avoid creating a culture of dependency***, where most community services and economic activities are dependent on the mine;
- ***Build local capacity*** so that communities are better able to plan and manage themselves;
- ***Help to facilitate the participation of other development players***, NGOs and community-based organizations in the area ; and
- ***Develop mine-generated benefits and compensation packages***, with the long term view of saving and investing for the post-closure period.

2.5 Risk Assessment and Management

Risk is defined as "*the chance of something happening that will have an impact upon objectives. It is a measure in terms of consequences and likelihoods*".

Risk = Consequence by Likelihood

or simply, it is also:

"**The probability of something you do not want to happen, *happening***" (55).

Risk management, on the other hand, is defined as "*the systematic application of management policies, procedures, and practices to the tasks of identifying, analyzing, assessing, treating and monitoring risk*" (55).

The successful implementation of risk management leads to (55):

- More informed, systematic and thorough decision making;
- More effective strategic planning;

- Increased knowledge and understanding of exposure to risk;
- Risk treatment and contingency planning;
- Prevention rather than reaction;
- Better utilization of resources;
- Greater transparency in decision making;
- Better preparedness for external review;
- Minimizing potential for disruption; and
- Continuous improvement.

Common or specific approaches to risk management include (55):

- Fault tree analysis;
- Event tree analysis;
- Failure Mode and Effects Analysis;
- Hazard and Operability Study; and
- What If? Structured What If Techniques (SWIFT).

A generic risk management process (Australian Standard for Risk Management, AS/NZS 4360-1999) has the following steps (1):

- Establish context ;
- Identify the risks ;
- Analyse the risks ;
- Evaluate the risks to establish priorities for action ;
- Treat risks ;
- Monitor and review ; and
- Communicate and consult.

The first step in identifying risks is to identify the potential hazards at the mine. These features or qualities of the mine which have the potential to impact on people or the environment. A consequence is the impact of the hazard after an exposure has occurred. The consequence multiplied by the likelihood (i.e. probability of the exposure event occurring) is the common measure of risk (1)

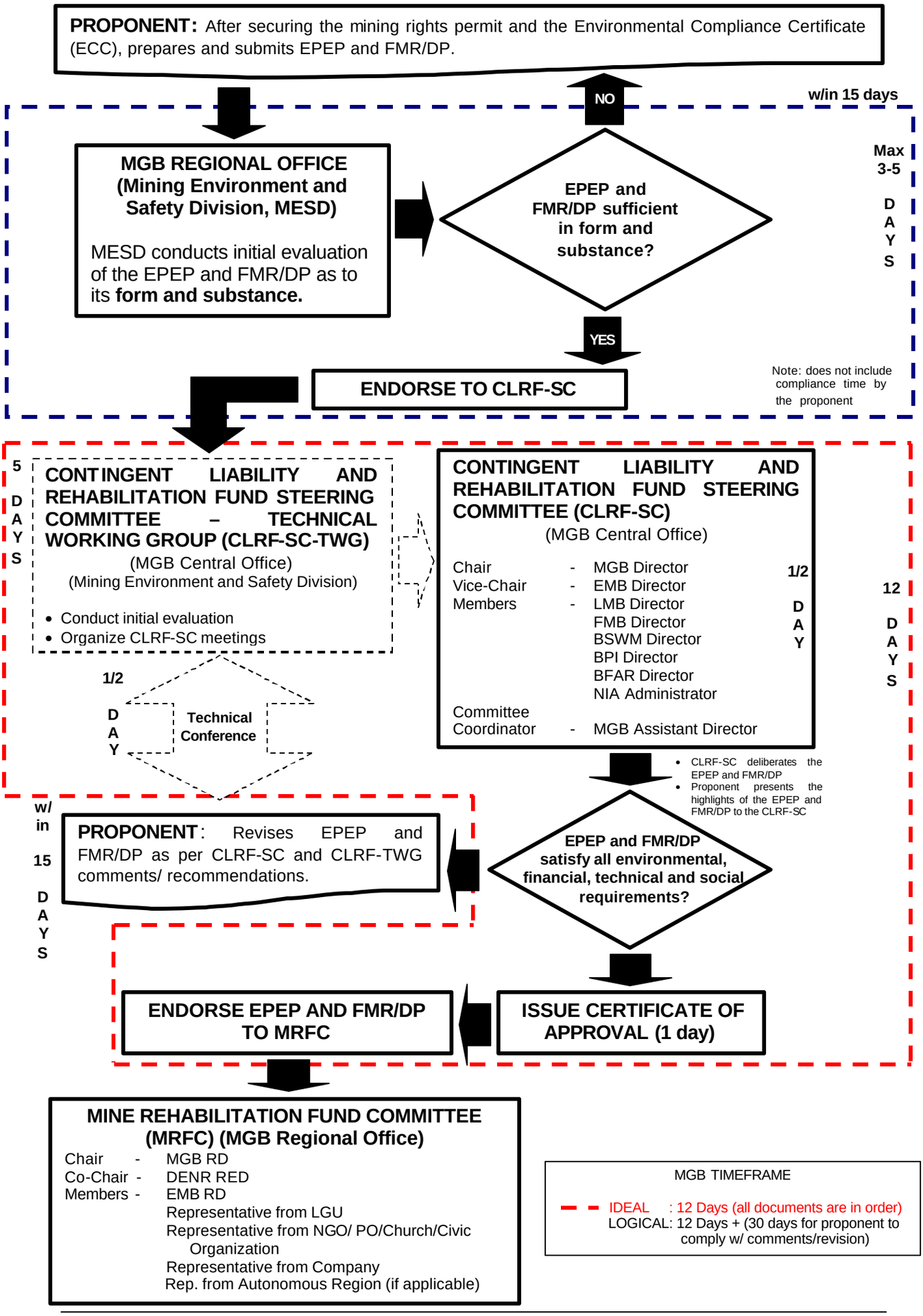
The features of a mine that might present potential hazards include, among others (1):

- Shafts, open pits, boreholes and adits;
- Hazardous minerals or chemicals;
- Unstable slopes (e.g., landslides, soil erosion);
- Land subsidence;
- Inappropriate revegetation methods (e.g., introduction of weeds)
- Failure of vegetation (e.g., through drought or fire); and
- Contaminated soil and groundwater.

Hazards may cause environmental, social or economic impacts (i.e., consequences) such as (1):

- Deterioration of surface and groundwater through contamination by metals, processing chemicals, hydrocarbons, or acid mine drainage (AMD) which may have direct ecological or economic impacts or may indirectly cause further impacts;
- Loss of biological diversity due to chemical contamination of soil or failure of rehabilitation;

Figure No. 1 – Procedural Flow for the Review, Evaluation and Approval of an Environmental Protection and Enhancement Program (EPEP) and a Final Mine Rehabilitation and/or Decommissioning Plan (FMR/DP).



- Deterioration of land quality due to steep slopes, degraded drainage, erosion and chemical contamination, all of which may reduce beneficial use of the land;
- Property damage from rockfalls and landslides; and
- Human or wildlife death or injury from falls into mine workings or boreholes.

Once a list of hazards is documented, the events that could result in the hazard causing an adverse effect (consequence) are identified. The probability of these events is estimated. The consequences of the events may be expressed in qualitative (e.g., low, medium and high) or quantitative measures (e.g., deaths per million or dollars worth of damage). Similarly, the probability may be expressed qualitatively (e.g., rare, unlikely, occasional, likely, almost certain) or quantitatively (e.g., once in 100 years). A risk matrix is commonly used to combine qualitative consequence and likelihood estimates into a risk classification (e.g., low, moderate and high risk). Quantitative estimates are multiplied to give a numerical estimate of risk (e.g. in occurrences per million per year, or annual average repair costs (in $) (1).

3. DEVELOPMENT OF A FINAL MINE REHABILITATION AND/OR DECOMMISSIONING PLAN (FMR/DP)

3.1 Mine Closure Scenarios

3.1.1 Planned Closure

Planned closure occurs when the mining and/or processing operations cease due to economic or operational requirements or when the ore reserve is exhausted. In this scenario, the FMR/DP, which has been developed and updated over the life of the mine, should now be systematically implemented.

3.1.2 Temporary Closure (Care and Maintenance)

Temporary Closure (Care and Maintenance) occurs when operations temporarily ceases due to economic or operational constraints. Temporary closure is normally planned and should entail the immediate preparation and implementation of a Care and Maintenance Program (CMP), taking into account the potential for future operations of the site. The CMP should contain key mine components that needs continuous monitoring including maintenance of on-going environmental and social programs. A temporary closure should always trigger a review of the FMR/DP, which will be required to be implemented if circumstances remain averse to the re-opening of the operation.

3.1.3 Sudden or Unplanned Closure

Sudden or Unplanned Closure occurs when mining and/or processing suddenly cease due to financial constraints (or similar economic imperatives) or if the operation is instructed to close due to non-conformance/s with regulatory requirements.

This scenario would involve the immediate preparation and implementation of a decommissioning plan, based on pre-existing FMR/DP, aimed at keeping the site "in a safe and environmentally acceptable condition and taking into account the site's non-operational status.

3.2 Components of a FMR/DP

3.2.1 Decommissioning Plan

Decommissioning is the transitional stage period between cessation of operations and actual closure that begins near, or at, the cessation of production and ends with the removal of all unwanted infrastructures (39). The ***Decommissioning Plan (DP)*** should, among others:

- List areas and equipment that require decommissioning;
- Describe the decommissioning strategy, timing, and the techniques chosen to remove and dispose of equipment and infrastructure; and
- Describe any special procedures or precautions to be used to ensure safety during decommissioning, e.g., removal and treatment of contaminated materials, procedures for making safe and sealing openings to underground workings.

3.2.2 Final Mine Rehabilitation Plan

The ***Final Mine Rehabilitation Plan (FMRP)*** identifies the activities and research required to address on-going physical rehabilitation and include strategies to address long-term stability and sustainability and timeframes for the assessment of rehabilitation activities.

The FMRP is considered as the most expensive aspect of a mine closure plan but with careful planning, technology selection and design, rehabilitation costs can be significantly reduced, particularly if rehabilitation is performed concurrently with mining operations. Progressive rehabilitation should commence as soon as the disturbed area is no longer needed for mining in order to reduce the area of disturbed land and lead to more rapid return to productive use or return of native vegetation. The implementation of the EPEP/AEPEP, therefore, is critical to achieving cost effective mine closure.

The FMRP should, among others:

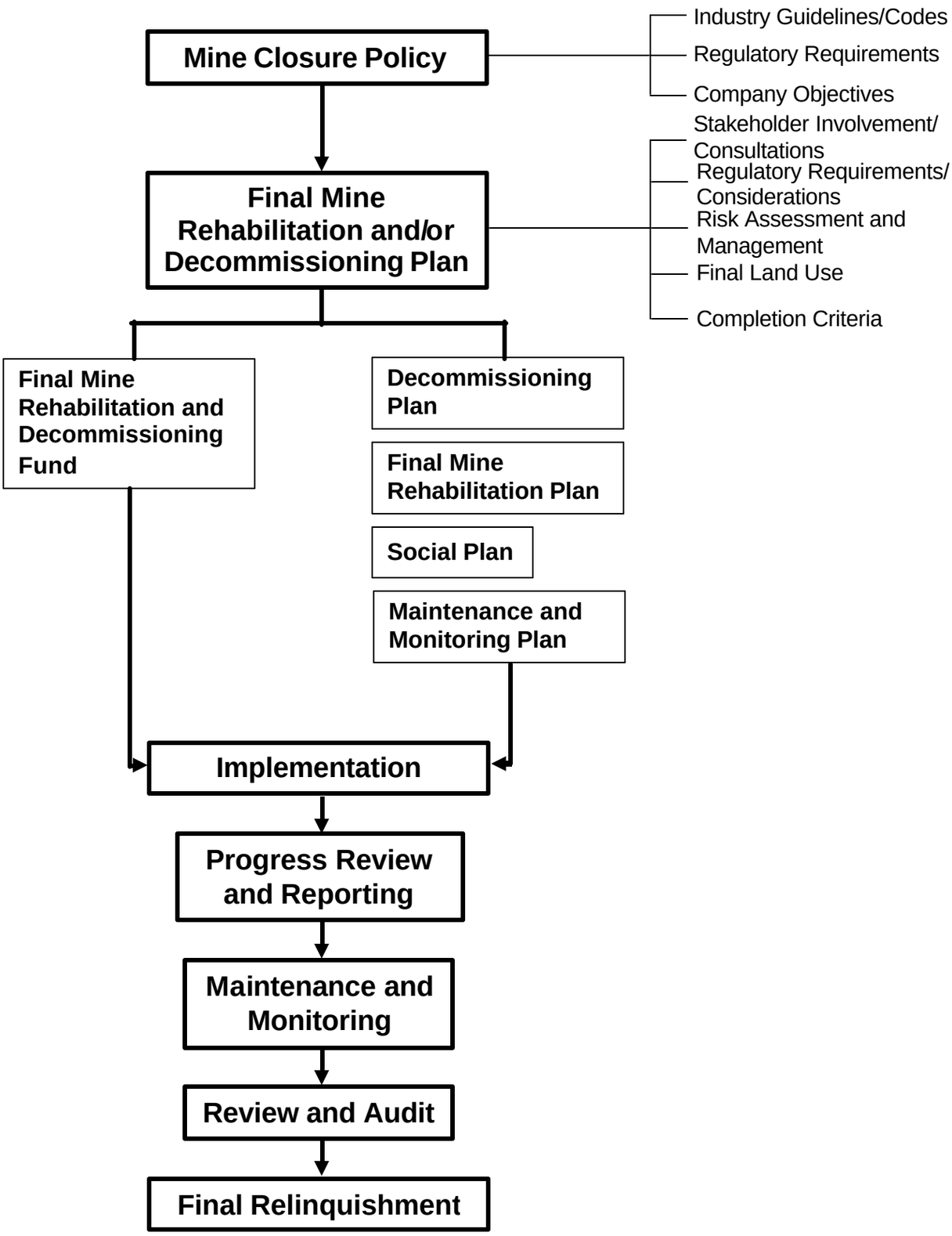
- Include maps detailing planned topography, hydrology and biological information at closure;
- Include maps detailing the topography, hydrology and biological data for works completed each year. A geographic information system is ideal for recording historical information;
- Describe the rehabilitation strategy, timing and techniques chosen to meet the rehabilitation success and closure criteria;
- Describe the objectives and methodology of any research or rehabilitation trials to be conducted;
- Detail the material, operational, and financial resources required, including any changes needed to integrate the plan into day to day operations; and
- Establish a monitoring program to evaluate success against the rehabilitation acceptance criteria e.g., stability, resistance to erosion, species density and diversity, and water quality.

3.2.3 Social Plan

The ***Social Plan (SP)*** shall consider the impact of mine closure, both for the workforce and impacted communities. Similar to the implementation of the EPEP/AEPEP, the implementation of the SDMP is critical to achieving cost effective mine closure.

During consultations with relevant stakeholder groups, including regulatory agencies, the mining company/operator should discuss the socio-economic aspects of mine closure. Among the social mitigation measures to be considered include:

Figure No. 2 – Mine Closure Planning Process



- ***Retrenchment Package*** as provided by law; and
- ***Labor Support Policies and Programmes***. A broad range of placement services designed to improve capacity of workers or "add value" to the human capital to help workers make the transition to alternative jobs or in becoming self-employed:
  - ***Job Search***. Provision of information to mine workers on labor markets and job-openings;
  - ***Skills Training and Education Programme***. Provision of job-related courses/trainings or courses focused toward a future career which may vary from office skills to artisan multi-skills training, computer technology, mechanical trades and similar vocations;
  - ***Enterprise Awareness***. To sensitize and/or motivate those who consider self-employment but have not yet seen such as a viable alternative; and
  - ***Counseling***. To help workers cope both socially and financially after the loss of their job and should be focused on money matters and property management.

Another issue that should be considered is the ***transfer of social assets and services***. The mine usually own and operate a range of social assets, including housing and institutions of culture, sports and medical services. Housing includes residential houses, water supply, and electricity and telecommunication network, among others. A major issue beyond the transfer of social assets and services is the funds to ensure their sustainability.

3.2.4 Maintenance and Monitoring Plan

The ***Maintenance and Monitoring Plan (MMP)*** should be developed and designed to demonstrate that the agreed completion criteria have been met and should include plans for remedial action/s where monitoring demonstrates that the completion criteria are unlikely to be met. The MMP should identify key aspects of the closure process that should be monitored.

The need for maintenance and monitoring recognizes the fact that not all closure strategies will be initially successful. All mine closure situations are unique and although experience and good planning can minimize the risks of failure, some remedial measures will usually be necessary (58).

3.3 Major Elements of a FMR/DP

3.3.1 Objectives

The general objective of mine closure pursuant to Section 71 (Rehabilitation) of Republic Act No. 7942, otherwise known as the Philippine Mining Act of 1995 is that:

> *"Contractors and permittees shall technically and biologically rehabilitate the excavated, mined-out, tailings covered and disturbed areas to the condition of environmental safety…"*

Further, DAO 96-40, as amended, states the following:

> "*Section 167. Environmental Protection Objectives.*
>
> *The environmental protection objectives include the following:*
>
> *a. Maintenance of sustainable environmental conditions at every stage of the mining operation; During every stage of the mining operation, as*

well as after the termination stage thereof, all open pit work areas, underground workplaces, mine waste and tailings impoundment systems, quarry sites and other mining-disturbed landforms, including those disturbed during exploration, shall be progressively rehabilitated to a condition prescribed in the Environmental Compliance Certificate and/or Environmental Protection and Enhancement Program;

b. *Establishment of a functional post-disturbance land use capability;*

Minesite decommissioning and rehabilitation shall aim to establish a land use capability that is functional and proximate to the land use prior to the disturbance of the mine area, unless other more beneficial land uses are predetermined and agreed in partnership with local communities and Local Government Units;

c. *Preservation of downstream freshwater quality;*

The quality of surface and ground water emanating from the exploration or contract/lease areas shall be maintained at acceptable levels, as determined from the actual and/or potential downstream water uses.

d. *Preservation of sea water quality and natural habitats for marine life;*

For the Government, the specific goals of mine closure are:

- To prevent or eliminate long-term environmental impacts by returning mining-disturbed land to a physically[2] and chemically stable[3]; visually acceptable[4]; productive or self-sustaining condition[5], taking in consideration the beneficial uses of the land and the surrounding areas and as agreed with stakeholders; and

[2] ***Physically Stable –*** shall mean that the mine component (e.g., underground shafts, open pits , tailings ponds, waste rock piles etc.) does not pose a hazard to public health and safety as a result of failure or physical deterioration; and that it continues to perform the function for which it was designed for its design life. It should not erode or move from its intended location under the extreme events (such as high precipitation events, earthquakes) or perpetual disruptive forces (e.g., wind and water erosion, leaching of rocks,) to which it will be subjected after closure (48, 12).

[3] ***Chemically Stable*** - shall mean that a mine component, should be chemically stable and not releasing chemicals (contaminants) into the environment. Using proven techniques, the production of contaminants should be controlled at source using a system of containment, collection and treatment systems in order to meet regulatory standards. However, the use of effluent-treatment facilities should not be considered as rehabilitation but a temporary measure to meet regulatory requirements, or while awaiting the development of technically and economically viable rehabilitation methods or while waiting for the rehabilitation measure put in place to reach its maximum efficiency and until the water output can be treated by passive treatment or discharged directly in the environment (48, 12).

[4] ***Visually Acceptable*** - should take into account that the trace of a mining site cannot be completely removed. All buildings and surface infrastructures must be dismantled unless they are required/needed for other purposes. Accordingly, consultation with the local governments and communities can help define what is visually acceptable (48, 12).

[5] ***Productive or self-sustaining condition*** – rehabilitation of the mining disturbed land to productive/developed use such as for agroforestry, agriculture or industrial facilities which may require passive or active care. Self-sustaining use shall mean that the end use can be sustained by natural processes and will not require actions by man (48, 12).

- To ensure that alternative skills and sustainable livelihood opportunities are provided/established and left behind to mine employees and their dependents and to the host and neighboring community/ies.

In the case of the mining company/operator, specific goals relevant to the operations that may have been indirectly identified in other regulatory instruments/issuances (e.g. protected areas and biodiversity, local government planning) should be also considered.

3.3.2 Final Land Use

There is a variety of possible final land uses for mine sites. The choice of the final land use should be guided by (12):

- Naturally occurring hazards in the area;
- The level of environmental and social impacts caused by the operation;
- The expected post-closure operational use of the land; and
- The productivity of the land surrounding the site.

To facilitate the identification/planning for the final land use, it is advisable that the mine be divided into the following components (17);

- Underground mine workings;
- Open pit mine workings;
- Waste and overburden piles;
- Water management and treatment facilities
- Tailings impoundment;
- Buildings and equipment;
- Land fills and other waste deposits;
- Infrastructure development;
- Linear Structures; and
- Others

3.3.3 Completion Criteria

Completion criteria are a set of rehabilitation indicators which, upon being met, will demonstrate successful rehabilitation of a site. The completion criteria are specific to the mine being rehabilitated or closed, and must reflect the unique set of environmental, social and economic circumstances of the site. They should be developed and agreed with stakeholders to ensure that there is broad agreement on both the final land use objectives and the basis for measuring the achievement of that objective. Completion criteria should be quantitative and capable of objective verification. They should also be flexible enough to adapt to changing circumstances without compromising the agreed objective (58).

As the agreed final land use may take years or even decades to achieve, a set of specific performance indicators should be developed to measure progress in meeting the completion criteria. Correctly chosen, the rehabilitation indicators will show whether the ecological processes, which will lead to successful rehabilitation, are trending in the right direction. This will enable early intervention where trends are not positive (58).

4. FINANCIAL PROVISIONING

4.1 Estimating the Costs of Rehabilitation

In order to estimate rehabilitation costs, the following steps should be followed:

- List the different mine components that will be or have been disturbed;
- Calculate the maximum area and/or volume of the identified mine component during the life of the mine;
- Identify the measures to be undertaken to rehabilitate the mine component to the agreed final land use;
- Estimate the direct rehabilitation costs which may include the cost of structure removal and earthmoving, recontouring, revegetation and other rehabilitation costs including associated labor and equipment costs;
- Estimate the indirect rehabilitation costs which may include mobilization and demobilization, contingencies, engineering re-design, profit and overhead, contract management fee, etc.;
- Calculate the estimated maximum cost for rehabilitation to the agreed final land use of all mine components.

4.2 Establishment of the Final Mine Rehabilitation and Decommissioning Fund

Section 187-B of DAO No. 96-40, as amended, states that:

> *A Final Mine Rehabilitation and Decommissioning Fund (FMRDF) shall be established by each operating Contractor/Permit Holder to ensure that the full cost of the approved FMR/DP is accrued before the end of the operating life of the mine. The FMRDF shall be deposited in a Government depository bank and shall be used solely for the implementation of the approved FMR/DP.*
>
> *Annual cash provisions shall be made by Contractors/Permit Holders to a Final Mine Rehabilitation and Decommissioning Fund (FMRDF) based on the formula:*
>
> *Annual Provision = Cost of Implementing the Approved FMR/DP x Percentage Required Per Table 1*
>
> *Based on the expected mine life, the initial annual cash provision shall be made to the MRF Committee within sixty (60) days from the date of the FMR/DP's approval and every anniversary date thereafter: Provided, That, on application by the Contractor/Permit Holder, the MRF Committee may allow a later date for the payment of the first annual provision.*

Table No. 1 – Outline of a Final Mine Rehabilitation and/or Decommissioning Plan (FMR/DP).

Closure Plan	Aspects to be addressed
I. Company Information	• Name and Full Contact Details (address, telephone and facsimile numbers and email address/es) of the mining company/operator; • Name and Full Contact Details (address, telephone and facsimile numbers and email address/es) of person/s authorized to act/represent the mining company/operator in respect of the Plan. Name of the Mine/Project, if any; and • Legal Description of the Mine (mining tenement, Environmental Compliance Certificate (ECC), and other regulatory permits/licenses relevant to mine closure).
II. Executive Summary	• Summary of the main issues and conclusions.
III. Background Information	• Detailed history of the mining operation and implications for mine closure; • Objectives of mine closure and how these relate to the mine and its environmental and social setting; and • Results/Lessons learnt from progressive rehabilitation already completed.
IV. Stakeholder	• Summary of stakeholder involvement/consultation activities

	Involvement	and other community interaction conducted including stakeholder expectations in relation to the mine closure objectives and strategies as well as agreement/s reached, if any.
V.	Risk Assessment	• Identify sources of risk based on safety, environmental, social and cost; • Summary of mine closure and rehabilitation scenarios, uncertainties and assumptions.

VI.	Final Mine Rehabilitation and/or Decommissioning Plan or Mine Closure Plan	• Final land use of the site and for each identified mine component;
		• Mine closure criteria and performance standards for all identified mine components;
		• Details of Decommissioning Plan.
		  • List of areas and equipment that requires decommissioning;
		  • Description of the decommissioning strategy, timing, and the techniques chosen for each mine component including mitigation measures to minimize potential adverse environmental impact/s; and
		  • Description of any special procedures or precautions to be used to ensure safety during decommissioning, e.g., removal and treatment of contaminated materials, procedures for making safe and sealing openings to underground workings.
		• Details of Final Mine Rehabilitation Plan
		  • Maps detailing planned topography, hydrology and biological information at closure;
		  • Maps detailing the topography, hydrology and biological data for works completed each year;
		  • Description of the rehabilitation strategy, timing and techniques chosen to meet the rehabilitation success and closure criteria;
		  • Description of the objectives and methodology of any research or rehabilitation trials to be conducted;
		  • Details of the material, operational, and financial resources required; and
		  • Details of the monitoring program to evaluate success against the rehabilitation completion criteria e.g., stability, resistance to erosion, species density and diversity, and water quality.
		• Details of Social Plan
		  • Retrenchment Package;
		  • Labor Support Policies and Programmes; and
		  • Transfer of Social Assets and Services.
		• Details of Maintenance and Monitoring Plan
		  • Maintenance and monitoring program and procedures to ensure that closure objectives are being achieved and to evaluate success against the agreed completion criteria; and
		  • Any long term management and maintenance expected including arrangements on their management and people/s responsible for managing residual commitment.

VII.	Schedule of Operations and Costs	• Detailed programme of work, including activity schedules/timelines, rehabilitation and decommissioning procedures and protocols, labor release programme, health and safety measures, emergency response and preparedness plan, milestones, and detailed budgets/costs to implement expected activities.
VIII.	Plan Showing Proposals	• Plans at appropriate scales and in appropriate detail to allow proposals to be clearly visualized, including final arrangements

	for the site.
IX. Technical Appendices	• Details of any specialist investigations, techniques, methods or innovative research undertaken or proposed.

Note: The FMR/DP is integrated in the EPEP during the review, evaluation and approval process, thus, Item Nos. I to III should be omitted for new mines to avoid repetition.

4.3 Disbursements from the FMRDF

Section 187-C of DAO No. 96-40, as amended, states that:

> *Withdrawal from the FMRDF shall be based on a work and financial plan approved by the MRF Committee: Provided, That amounts incurred by the Contractor/Permit Holder for progressive rehabilitation/annual environmental and enhancement programs pursuant to its EPEP/AEPEP cannot be reimbursed or credited to the FMRDF and shall continue to be governed by relevant provisions of DAO 96-40.*

5. REVIEW AND PROGRESS REPORTING

Section 187-D (Progress Reporting) of DAO No. 96-40, as amended, states that:

> *The Contractor/Permit Holder shall submit a progress report, if applicable, containing details of fully, partially, and on-going rehabilitation activities relative to the implementation of the FMR/DP.*
>
> *The report shall be submitted to the MRF Committee for review and evaluation within thirty (30) days from the end of the term of the preceding work and financial plan, if applicable. The results of the Committee's review and evaluation shall be integrated in the succeeding year's work and financial plan.*

Table No. 2 - Sample Worksheet for the Estimation of Rehabilitation Costs (modified from Department of Minerals and Energy, Queensland, Australia, 1995)

Description of Mine Component/Disturbance Type (Determine the cost to completely rehabilitate each type of disturbance)	Activity (Unit)	Number of Units to Complete Rehabilitation	Cost to Rehabilitate Each Unit of Activity	Cost to Complete Each Activity
Underground Mine Workings				
	Total Cost for this type of disturbance			
Waste Dumps e.g., reshape dump: *x*m3 at PhP*x*/m3; stabilize by ripping, place topsoil, seeding/planting and fertilizing at PhP*x*/m2	Shaping (m3)			
	Stabilizing (m2)			
	Total Cost for this type of disturbance			
Tailings Impoundment/Dam e.g., construction of *x* m permanent diversion channels at PhP*x*/m, cap tailings with *x*m3 of sand and rock at PhP*x*/m3	Diversions (m)			
	Reshaping (m3)			
	Total Cost for this type of disturbance			
Access Roads/Tracks (on and off lease) e.g., two passess of ripping at PhP*x*/km, reshaping *x*m3 to reinstate drainage pattern and to provide diversions at PhP*x*/m3	Ripping (km)			
	Shaping (m3)			
	Total Cost for this type of disturbance			
Workshop Areas e.g., PhP*x* to remove *x* tons of mining debris, rip *x* ha of compacted	Clear Debris			
	Ripping (ha)			
	Shaping			

area at PhP*x*/ha, reshape *x*m3 to look similar to surrounding land at PhP*x*/m3 and remediate site by removing or burying contaminated soil (oil, chemicals) *x*m3 at PhP*x*/m3	(m3)			
	Remediation (PhP)			
	Total Cost for this type of disturbance			
Others				
	Total Cost for this type of disturbance			
Maintenance and Monitoring	Monitor (PhP)			
	Maintain (PhP)			
	Total Cost for this type of disturbance			
Indirect Costs • Contingencies • Mobilization/De-mobilization • Profit and Overhead • Etc…	PhP			
TOTAL COST TO COMPLETELY REHABILITATE ALL TYPES OF MINE COMPONENT/ DISTURBANCE TYPE FOR THE MAXIMUM TERM OF THE FMR/DP	PhP			

While Section 187-E (Review of the FMR/DP), meanwhile, states that:

> *The FMR/DP shall be reviewed and/or revised at a date not exceeding two (2) years after its approval and every two (2) years thereafter. The FMR/DP may also be reviewed and/or revised whenever amendments are justified by changes in mining activities; the review and/or revision may be made on the Contractor's/Permit Holder's initiative or at the request of the Director/Regional Director.*
>
> *In conjunction with the review and/or revision of the FMR/DP, annual provisions to the FMRDF may be increased or decreased based on such factors as:*
>
> - *To credit progressive rehabilitation works undertaken by the Contractor/Permit Holder; and*
> - *To account for changes in the nature or cost of work to be done pursuant to the approved FMR/DP.*

Circumstances that may trigger a review and/or revision of the FMR/DP include (2):

- Successful exploration which expands the life of the mine;
- Significant changes in product price, which affects profitability;
- Change in the regulatory requirements or new permitting requirements;
- Installation of new technologies or management approaches which minimize pollution;
- Innovations in modeling and prediction which indicate potential environmental problems different than in the initial plan;
- Significant long-term movements in the factors included in the cost estimates, including inflation rates;
- Discovery of valuable historic/cultural/ecological resources at the mine site;
- A change in cooperation and compliance of the mining firm; and
- A change in the financial status of the firm (e.g., bankruptcy, changes in credit rating and lawsuits).

Table No. 3 - Sample Worksheet for Summary of Areas Disturbed and Projected Rehabilitation.

MINE COMPONENT/ DISTURBANCE TYPE	MINING	REHABILITATION																																						FINAL LAND USE
	Area Disturbed* (ha)	Area Recountoured** (ha)											Area Topsoiled*** (ha)											Area Established**** (ha)											Area Revegetated***** (ha)										
	Total	Year										Total	Year										Total	Year										Total	Year										Total	
		1	2	3	4	5	6	7	8	9	10		1	2	3	4	5	6	7	8	9	10		1	2	3	4	5	6	7	8	9	10		1	2	3	4	5	6	7	8	9	10		
Underground Mine Workings																																												
Open Pit Mine Workings																																												
Water Management and Treatment Facilities																																												
Tailings Impoundment																																												
Buildings and Equipment																																												
Landfills and Other Waste Disposal Sites																																												
Infrastructure Development																																												
Linear (pipelines, powerlines, etc.)																																												
Others																																												
TOTAL																																												

* Area Disturbed – area affected during any mining operations and includes all infrastructures, access routes/roads, waste dumps, tailings dams, stockpile areas, etc.

** Area Recountoured – area reshaped or recountoured to final grade ready for ripping and/or topsoil replacement.

*** Area Topsoiled – area currently undergoing rehabilitation and covered with sufficient topsoil.

**** Area Established – area where all rehabilitation processes have been carried out (recountoured, ripped, topsoiled, seeded, planted and fertilized).

***** Area Revegetated – area with vegetation that will lead to the designated final land use for at least one (1) year.

Table No. 4 - Sample Schedule for Mine Closure (modified from Ricks, 1997)

	Years Before and After Cessation of Mine Operations														
	Closure Planning					Decommissioning, Rehabilitation and Socio-economic					Maintenance and Monitoring			Relinquishment	
Activity	-5	-4	-3	-2	-1	+1	+2	+3	+4	+5	+6	+7	+8	+9	+10
MINE CLOSURE PLANNING • Review/update FRM/DP as necessary • Agree detailed plan															
UNDERGROUND FACILITIES • Removed fixed plant, etc. • Seal openings, etc…															
SURFACE FACILITIES • Remove fixed plant • Demolish buildings • Remove infrastructure • Treat/dispose of all materials and residues															
SOCIO-ECONOMIC • Re-employment counseling • Transfer of Social Assets and Services, etc…															
SITE REHABILITATION • Re-profile site • Cultivate/ameliorate planting areas • Seeding/planting • Monitor plant growth • Research tailings revegetation • Tailings revegetation trials • Plant tailings surface, etc…															
MAINTENANCE AND MONITORING • Monitor surface run-off • Monitor mine flooding • Monitor mine water discharge • Monitor run-off from tailings • Monitor plant growth, etc…															
FINAL RELINQUISHMENT • Preparation of FRR with EA • Issuance of Certificate of Final Relinquishment • Implement Site Management Plan for residual commitments															

The Progress Report should contain the following:

- Name and Full Contact Details (address, telephone and facsimile numbers and email address/es) of the mining company/operator;
- Name and Full Contact Details (address, telephone and facsimile numbers and email address/es) of person/s authorized to act/represent the mining company/operator in respect of the Plan;
- Nature and Extent of Mine Closure Activities carried out during the previous twelve (12) months including details of monitoring program conducted;
- Evaluation of whether or not the approved FMR/DP is adequate to properly rehabilitate the mine. If the report indicates that the Plan is not adequate to properly rehabilitate the site, the mining company/operator should submit a revised FMR/DP;
- Nature and Extent of Mine Closure Activities to be carried out during the next twelve (12) months incorporating the results of the review undertaken by the MRFC and/or the audit undertaken by the CLRF-SC.

6. MONITORING AND AUDIT

The Mine Rehabilitation Fund Committee (MRFC) through the Multi-partite Monitoring Team (MMT) and the Contingent Liability Rehabilitation Fund Steering Committee and the Mines and Geosciences Bureau (MGB) shall monitor and/or audit the implementation of the FMR/DP.

7. RELINQUISHMENT OF THE REHABILITATED AREA/S

Section 187-F (Final Relinquishment of Rehabilitated Areas) of DAO No. 96-40, as amended, states that:

> *The Contractor/Permit Holder shall prepare and submit a Final Rehabilitation Report with third party Environmental Audit (FRR with EA) for pre-evaluation by the MRF Committee and final approval by the CLRF Steering Committee, if, based on the assessment of the Contractor/Permit Holder, that the objectives of mine closure, as contained in the approved FMR/DP, have been achieved.*
>
> *The MRF Committee and/or CLRF Steering Committee may, after due review and evaluation of the FRR with EA, conduct field validation of the reported accomplishments, recommend revision/s to the submitted report, and/or require additional rehabilitation works to be undertaken: Provided, That if residual care is still needed, the Contractor/Permit Holder shall submit a Site Management Plan detailing how the identified residual rehabilitation commitments are to be managed: Provided, further, That the CLRF Steering Committee shall issue a Certificate of Final Relinquishment to the Contractor/Permit Holder signifying approval of the FRR with EA and freeing the Contractor/Permit Holder from any further obligations insofar as the rehabilitated area/s are concerned.*
>
> *Any remaining amount, based on the Contractor's/Permit Holder's total FMRDF annual provisions as well as MWTF payments, shall be released back to the Contractor/Permit Holder: Provided, That any shortfall in the amount needed to achieve the objectives of mine closure pursuant to the approved FMR/DP and to implement the Site Management Plan, shall be shouldered by the Contractor/Permit Holder.*

The Final Rehabilitation Report (FRR) should contain:

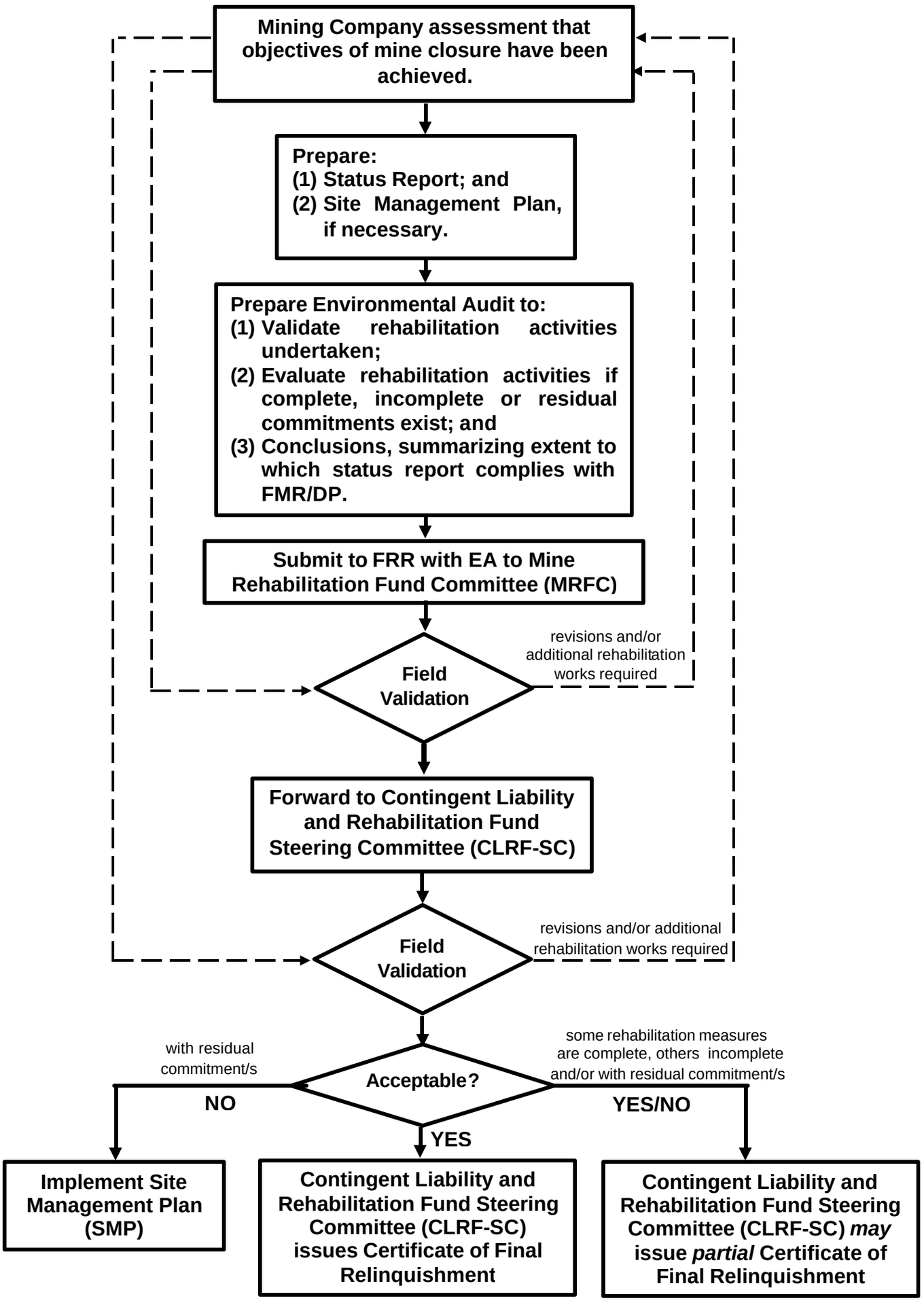
- Name and Full Contact Details (address, telephone and facsimile numbers and email address/es) of the mining company/operator;
- Name and Full Contact Details (address, telephone and facsimile numbers and email address/es) of person/s authorized to act/represent the mining company/operator in respect of the Plan;
- Status Report showing:
  - Detailed description and evaluation of accomplishments for each mine component and other rehabilitation activities undertaken based on the completion criteria and other commitments in the FMR/DP;
  - An analysis of monitoring data collected to demonstrate compliance with regulatory standards;
  - Identification of requirements for any on-going rehabilitation and/or maintenance and monitoring activities; and
  - Maps, photographs and diagrams showing rehabilitated areas, among others.

Table No. 5 – Table No. 1 of DAO 2005 – 07.

Expected Mine Life *(in years)*	Operating Mine Life *(in years)*														
	Year 1	Year 2	Year 3	Year 4	Year 5	Year 6	Year 7	Year 8	Year 9	Year 10	Year 11	Year 12	Year 13	Year 14	Year 15
1 year	1.000														
2 years	1.000	-													
3 years	0.500	0.500	-												
4 years	0.556	0.333	0.111	-											
5 years	0.437	0.313	0.187	0.063	-										
6 years	-	0.437	0.313	0.187	0.063	-									
7 years	-	0.367	0.300	0.180	0.123	0.030	-								
8 years	-	0.367	0.300	0.173	0.102	0.030	0.028	-							
9 years	-	0.367	0.300	0.153	0.092	0.040	0.028	0.020	-						
10 years	-	-	0.265	0.225	0.177	0.163	0.095	0.055	0.020	-					
11 years	-	-	0.265	0.225	0.177	0.157	0.090	0.050	0.020	0.016	-				
12 years	-	-	0.265	0.225	0.177	0.147	0.088	0.050	0.020	0.016	0.012	-			
13 years	-	-	0.207	0.180	0.150	0.130	0.100	0.080	0.063	0.050	0.030	0.010	-		
14 years	-	-	-	0.207	0.180	0.150	0.130	0.100	0.080	0.063	0.050	0.030	0.010	-	
15years	-	-	-	0.207	0.180	0.150	0.130	0.100	0.080	0.063	0.050	0.020	0.010	0.010	-

- Residual Commitments:
  - Description of any residual rehabilitation commitments; and
  - Site Management Plan detailing how residual commitments will be managed together with third party cost to complete rehabilitation including funding source.
- Environmental Audit (EA)
  - Be made for the mining company/operator by a qualified Auditor;
  - The EA should validate that the rehabilitation activities undertaken are consistent with the approved FMR/DP;
  - The Auditor should evaluate all rehabilitation activities undertaken and should provide statement/s that:
    - Rehabilitation is ***complete*** and there are no on-going management, maintenance or monitoring issues; or
    - Rehabilitation is ***incomplete*** and there is/are on-going management, maintenance or monitoring issue/s. A third party estimate of cost to complete any residual rehabilitation management, maintenance or monitoring should be included; or
    - Residual Commitments exist and implementation of a Site Management Plan is necessary; and
  - Conclusion, summarizing the extent to which the FRR demonstrates compliance with the approved FMR/DP and other regulatory requirements, any residual commitments and the amount of FMRDF that should be returned to the mining company/operator or additional fund needed to complete the rehabilitation.
- The FRR with EA should be a stand alone report and should be signed and sealed by the mining company/operator, by person/s authorized to act/represent the mining company/operator and by the Auditor.

Figure No. 3 – Final Rehabilitation Report Process Flow.



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9. KEY TERMS

- ***Agreed criteria*** – a standard or level of performance which must be achieved to the satisfaction of regulatory agencies and other stakeholders (39).

- ***Completion Criteria –*** an agreed standard or level of performance which demonstrates successful closure of a site (39).

- ***Consultation*** – the process of interactive and responsive communication (39).

- ***Decommissioning*** – Decommissioning is the transitional stage period between cessation of operations and actual closure that begins near, or at, the cessation of production and ends with the removal of all unwanted infrastructures (39).

- ***Disturbed*** – area affected during any mining operations and includes all infrastructures, access routes/roads, waste dumps, tailings dams, stockpile areas, etc (15).

- ***Established*** – area where all rehabilitation processes have been carried out (recountoured, ripped, topsoiled, seeded, planted and fertilized).

- ***Final Land Use (also post-closure land use, after use, end use)*** – term used to describe the land use to which a site is returned after mining; should be beneficial but not necessarily economic; and may include mining as a possible future land use.

- ***Final Mine Rehabilitation and Decommissioning Fund (FMRDF) –*** the financial mechanism established by a mining company/operator to support the implementation of the FMR/DP.

- ***Final Mine Rehabilitation and/or Decommissioning Plan (FMR/DP)*** – an integral component of the Environmental Protection and Enhancement Program that specifically deals with mine closure.

- ***Infrastructure*** – total area of land disturbed for such things as haul roads, transmission lines dams and landfills. Different areas of infrastructure disturbance will probably vary in cost for rehabilitation (15).

- ***Mine Closure*** – a whole life of the mine process, which typically culminates in tenement relinquishment. It includes rehabilitation and decommissioning (39).

- ***Mine Closure Planning*** – a whole of life exercise that begins at the start of a mine life and continues through to post closure, it is an on-going process, not an end of mine event (39).

- ***Planning for Mine Closure/Integrated Mine Closure Planning –*** the integration of environmental and social considerations as early as the project planning phase (during the preparation of the Feasibility Study and of the Environmental Impact Statement) and in the preparation and implementation of environmental and social programs (such as Environmental Protection and Enhancement Program, EPEP; Environmental Management System, EMS; Social Development and Management Program, SDMP; Safety and Health Program, SHP, etc) during the operating life of the mine and of the Final Mine Rehabilitation and/or Decommissioning Plan (FMR/DP) during the mine closure process, before the final relinquishment of a "*new resource*" to the Government and to the community.

- ***Post Closure Management (also after care***) – the process that occurs after decommissioning and includes both active and routine management and monitoring strategies 39)

- ***Recountoured*** – area reshaped or recountoured to final grade ready for ripping and/or topsoil replacement.

- ***Rehabilitation*** – another word for closure used primarily in countries other than the United States. It refers to the return of disturbed land to a stable, productive and self-sustaining condition, after taking into account beneficial uses of the site and surrounding land (39); can commence shortly after land has been disturbed (progressive rehabilitation) and continuing until the end of the operational life of the mine (1).

- ***Rehabilitation Commitments*** – shall refer to residual issues that cannot be brought to closure prior to relinquishment and can be satisfactorily handled under a Site Management Plan (15).

- ***Relinquishment*** – the process wherein successfully rehabilitated land is returned to the Government and the community, freeing the mining company/operator of any liability to the site.

- ***Revegetated*** – area with vegetation that will lead to the designated final land use for at least one (1) year.

- ***Site Management Plan (SMP)*** - a plan approved by the Mine Rehabilitation Fund Committee (MRFC) that will be used to manage identified residual issues/ commitments.

- ***Stakeholder*** – a person, group or organization with the potential to be affected by the process of, or outcome of, mine closure (39).

- ***Successfully rehabilitated –*** area of rehabilitated land that meets the completion criteria set in the FMR/DP.

- ***Topsoiled*** – area currently undergoing rehabilitation and covered with sufficient topsoil.