



**Lao People's Democratic Republic  
Peace Independence Democracy Unity Prosperity**

*Unofficial Translation.*

**Order on Approval of  
Detailed Feasibility Studies on Mining Projects**

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## 1. OBJECTIVE OF THE ORDER ON APPROVAL

The objective of this Order on Approval is to provide a comprehensive or hands-on guidance to the Department of Mines (DOM) as a subsidiary institution of the Ministry of Energy and Mines (MEM). The MEM shall enact this Order on Approval.

This order on approval shall support the assessment of Detailed Feasibility Studies submitted by mining companies who are preparing mining operations. In this regard, this order will facilitate a comprehensive, transparent and well documented approval process. The order determines the scope, degree of detail as well as the timeframes valid for application and approval.

Besides the development of the Laotian mining sector and the related utilization of national resources, the sustainability of mining operations in terms of economic development of the Country, environmental and socio-economic sustainability shall be ensured to the benefit of the mine operator, the Lao People's Democratic Republic and the people involved. As an important issue, any Detailed Feasibility Study shall be reviewed with regard to its capacity to generate benefits and values for all partners involved.

A Detailed Feasibility Study being the matter of this Order on Approval corresponds widely with a "Definite" or "Bankable Feasibility Study" used on international level.

More detailed information on the preparation of a Detailed Feasibility Study has been compiled in the "Guidelines on Preparation and Evaluation of Feasibility Studies on Mining Projects" (MEM, 2012).

According to the Laotian mining legislation, the Law on Minerals issued in December 2011 is governing the approval procedure of mining projects.

According to the Law on Minerals (Article 42) it is the responsibility of the MEM to evaluate and approve Detailed Feasibility Studies as well as mining and mineral processing work programmes. In the case that such documents have been accepted, the MEM shall propose the consideration of the proposed mining project to the government via the Ministry of Planning and Investment.

Based on the Law on Minerals (Article 22), the approval of the Detailed Feasibility Study is the key prerequisite for the provision of a mining and processing licence required for the commissioning of mining activities. The Ministry of Energy and Mines (MEM) respectively its subsidiary, the Department of Mines (DOM) is in the responsibility of review and evaluation. Along with the Detailed Feasibility Study, the applicant has to submit a certificate on project funding, an environmental Certificate issued by Ministry of Natural Resources and Environment (MONRE), and other supporting documents, e.g. plans and certificates on the utilisation of land use, timber, water, and materials in the mine development area.

The applicant has to submit the Detailed Feasibility Study to the Ministry of Energy and Mines (MEM) respectively its subsidiary the Department of Mines (DOM). The DOM is then in charge of assessment and further communicating issues related to the approval of the mining project with the applicant.

The submitted Detailed Feasibility Study has to contain a signature of procurator. The submitted Detailed Feasibility Study must provide sufficient information on the mining project as well as on the sources of information used to enable the approving Department of Mines in the verification of comprehensiveness and plausibility of the information on which the Detailed Feasibility is based. To provide orientation to the applicant, the minimum required scope of a Detailed Feasibility Study is summarized in this Order on Approval.

The applicant shall submit one (1) digital copy and two (2) printed copies of the Detailed Feasibility Study including supportive documents such as maps, diagrams, flowcharts, tables, pictures, annexes, appendices, etc.

## **2. OBJECTIVE AND DEFINITION OF THE DETAILED FEASIBILITY STUDY**

A Detailed Feasibility Study (DFS) comprehensively describes all technical, economical, environmental and socio-economic aspects specific and relevant for the applied mining activities as well as the lifetime of the project. The Detailed Feasibility Study should contain a detailed description of all technical, economic and environmental aspects and has to include a list of major project parameters that served as the guiding principles during the preparation of the project. Information to be provided comprise the project objectives and a description of basic project history and strategy, the applicant and other parties involved, the geological, hydrogeological, geographic, climatic settings, the project location and infrastructure, basic project information (type of raw material, needs of processing and transport, plant capacity, etc.) as well as economic, social, environmental and other policies supporting the project.

The evaluation of a Feasibility Study is done by the relevant state authorities, but is also considered as a prerequisite for investment decisions within the applying mining company.

According to the Laotian mining legislation, a Detailed Feasibility Study is almost equivalent to a Bankable Feasibility Study (BFS) as used on international level.

A "Detailed Feasibility Study" also called "Final Feasibility Study" is considered as the decisive study in terms of approving or disproving the economic and practical viability of a proposed mining project. The Detailed Feasibility Study is the key document (litmus test) required to secure funding and provides the technical and financial basis for construction planning and cost control. Accordingly, they are completed with a financial accuracy of  $\pm 10\%$  provided that a significant portion of the formal engineering is completed. In the context of this Order of Approval, a Detailed Feasibility Study is considered as equivalent to a Definite Feasibility Study.

According to the Law on Minerals of the Lao People's Democratic Republic (Article 40), a Detailed Feasibility Study is required at a project stage where sufficient information has been gathered during prior exploration and the operator has the intention to start exploitation of a deposit. The Detailed Feasibility Study shall provide a calculation of economic effectiveness as well as an assessment on the impact on the environment and the society.

In the course of an application for mining operations, information provided in a Detailed Feasibility Study are considered as mandatory and will be further considered in the inspection and monitoring procedures (verification of compliance with regard to the timeframe and plans) applied during the entire lifetime of a mine.

A Detailed Feasibility Study required to obtain a license to conduct mining operations includes, amongst others, plans and information about the exploitation processes (technical exploitation systems, exploitation volumes etc.) as well as the analysis of socio-economic effectiveness of the planned mineral exploitation. The Detailed Feasibility Study shall be established in a reasonable time frame ensuring that the provided technical and economical information is valid and effective at the time of application. In the case that an investor cannot complete a Detailed Feasibility Study due to circumstances such as commodity price impact, a timely extension of maximum two years is possible based on Government approval (Law on Minerals, Article 40).

Inspection and monitoring of mining operations will be accomplished by agencies and local administrative authorities (provincial/capital city level Departments of Energy and Mines) under consideration of the results of the Detailed Feasibility Study created to during the application (Law on Minerals, Article 84).

An update of a Detailed Feasibility Study is required for any crucial project extensions, rehabilitation or major changes to the existing production with crucial influence on the cash-flow and revenue situation.

### **3. DESCRIPTION OF REQUIRED COMPONENTS AND SCOPE OF A DETAILED FEASIBILITY STUDY**

According to Law on Minerals, Article 22, the Detailed Feasibility Study is a compilation of studies related to a mining project and comprises a certified financial support (a document certifying funding the project), a Certification on Environment issued by MONRE and documents certifying to use land, timber, water and materials within the mine development area. These documents are the required basis for negotiations towards an agreement on mining and minerals processing.

The Ministry of Energy and Mines (MEM) respectively the Department of Mines (DOM), is responsible for the evaluation of a submitted Detailed Feasibility Study. A submitted Detailed Feasibility Study will be evaluated with regard to the following components:

- Project Location, Geology and Status of Licensing

- Pre-Investment Studies
- Market Analysis and Marketing Concept
- Resource/Reserve Evaluation and Raw Materials/Plant Supplies
- Mining method, operating plans, production plans
- Processing Technology
- Environmental and socio-economic impacts and mitigation needs
- Waste disposal plan
- Mine closure concept
- Infrastructure needs
- Organization and Overhead Costs
- Human Resources
- Implementation Planning and Budgeting
- Financial Analysis and Investment Appraisal
- Risk Evaluation

### **3.1 Project Location, Geology and Status of Licensing**

The introduction to a Detailed Feasibility Study shall provide a brief summary of the project background. In case mining has already been accomplished at the project site during former times, the exploration and mining history shall be recapped including summarising the results of these earlier activities. A brief statement shall be given explaining why the current conditions are considered to enable viable mining operations, e.g. technical improvements, changes in the legal situation, increased demand for certain raw materials, favourable market prices, etc. Furthermore, information shall be provided on earlier mining applications including the status of approval or its failures due to any kind of problems, neighbouring mining activities, etc.

Sufficient information about the geological and structural settings within the proposed mining area must be available. The status of exploration including the exploration history and the related knowledge about the deposit has to be explained in a reproducible and comprehensive manner.

The Detailed Feasibility Study must be reviewed with regard to a comprehensive documentation of the geographic settings including topography and climatic conditions (temperature, precipitation, etc.).

The geological settings in general including a description of the structural geological and hydro-geological settings must be comprehensively described. The geological description of the area included to availability of other natural resources of value such as groundwater, other minerals and energy resources, etc. Any recorded seismicity, volcanic activities, etc. must be documented.

The natural environment including surface waters, soils, vegetation, fauna, current and future land use as well as the existence of protected areas, locations with historic value, unique physical features, etc. must also be described.

The Detailed Feasibility Study must provide an overview on the status of urbanization, existing Infrastructure which may be affected by the mining project, amongst others the logistic situation including roads, railways, electricity grid, pipeline infrastructure, etc. Furthermore, the Detailed Feasibility Study must provide reliable information on, ownership of the land, the ethnic situation, the local /regional settlements, the population affected by the proposed mining activities and convincing reasoning for the final site selection.

The status of licensing and permitting must be documented as lists of applied and granted licences and permits (incl. size, dates, costs, etc.). The Detailed Feasibility Study has to address any problem related to the licensing and granting of permits and concession.

### **3.2 Pre-Investment Studies**

The Detailed Feasibility Study provides an overview on all formerly accomplished pre-investment studies which have led to the development of the mining project being the matter of the Detailed Feasibility Study. Pre-investment studies may comprise Opportunity Studies, Scoping Studies, Market Studies as well as studies elaborated to directly develop the project proposed in the Detailed Feasibility Study. National institutions and companies shall be integrated as much as possible.

Solely pre-investments which directly relate to the project qualify as front-end-project costs.

### **3.3 Market Analysis and Marketing Concept**

The Market Analysis covers the analysis of the target market including the demand and the value of the products gathered in the proposed mining project. Besides the demand for the produced product, a comparison with the key market competitors and the relevant customer characteristics and behaviour should be carried out.

Furthermore, human and financial resources to be utilized in the project have to be assessed as well as the related supply market on which the project depends during operation.

The Marketing Concept to be presented must have a viable marketing strategy including the application of marketing instruments based on an action plan and time schedule. The allocation of the mining products must be clearly stated with regard to the product volumes, the project time frame, etc. Alternative marketing concepts shall also be explained with an analysis and explanation of the identification and selection of the most viable marketing strategy.

The marketing study provides the basis for the long-term revenue prediction, the "cash-in" and "cash-out" positions of any Cash-Flow-Calculation.

Exchange rates and their related impact on project cost have to be clearly addressed with detailed reference to any short- and long-term risk.

The Detailed Feasibility Study shall analyze the possibilities for market extension to other countries as export sales have to be taken into consideration in determining the plant capacity.

### **3.4 Resource/Reserve Evaluation and Raw Materials/Plant Supplies**

The Detailed Feasibility Study shall address and analyse all raw material related key aspects at a reasonable level in terms of requirements, availability, costs and risks, which may be significant for the feasibility of a project. Figures to be provided on resources and reserves shall be related to different mining concepts having different recovery rates, etc.

The Detailed Feasibility Study must provide detailed information about the exploitable deposits such as location, size, depth, quality and composition of the deposit, a statement on proven reserves, the viability of opencast or underground mining, ore grades and its ratio to waste materials, statistical distribution of the ore grade and other physical and chemical properties. The reserves must be reliably defined with regard to its absolute quality, volume and range of mineral/element content (e.g. mineral composition, quality of content, grade of recoverable content, volume attributed to different quality classes, assigned type of mining/extraction technology (open cast/underground mining), cut-off values to be applied, in situ leaching, and quantities classified according to international standards (e.g. JORC). In case of ongoing mining operations, the remaining resources/reserves and the annual depletion rate of resources/reserves must be definite.

### **3.5 Mine design, mine operational and production plans**

A mine design is defined as the layout and operation of underground or surface mine and consists of topographic profile, geological interpretation, layout of the mine and scheduling. The applicant has to present and explain the most appropriate technical solution as to approve profitability and to support the decision making process with regard to investments to be taken. The mining method proposed for implementation has to address different mining scenarios with different mineable/recoverable resources/reserves with related grades and volumes.

A Detailed Feasibility Study has to explain the mining method and related technologies including a list of equipment to be applied under the technical, economic, environmental and other conditions. The construction of the mine prior to the commissioning of mining activities is to be explained in terms of applied measures, location and time period. Furthermore, proposed mining activities must be supported by definite operating and production planning. Annual mining and production plans are to be provided illustrating the mass respectively volume of raw material to be extracted. Such plans and the related mining progress must be supported by technical illustrations of the related mine design.



With regard to open pit mining, a detailed description of the mining method and related mining equipment has to be provided. Furthermore, the design of the open pit including bench heights, ramp systems and a reproducible calculation of overall operating cost (including a cost breakdown) must be illustrated including the spatial development of the mine under consideration of the proposed annual production/recovery rates. With regard to mine stability, geotechnical issues such as appropriate slope angles must be sufficiently addressed in the mine design.

Besides, any other relevant interference between mining and up- or downstream activities must be described in detail. The decision of the proposed mining method including any valuable alternatives must be explained in detail including its technical potential for increasing the value of extracted mining products.

Adequate information has to be provided for the application of underground mining, amongst others the mine design, the mineable/recoverable reserves (including grade and volume figures), ventilation measures, any project risks (e.g. related to subsidence, etc.), operating cost, etc.

A mine development plan has to explain the planned access to the resource/ore, the ventilation of the mine as well as the management and handling of the raw material as well as the related waste.

The applicant/mine operator is obliged to present a safety and health protection system to ensure health of labour and to identify risks and prevent, control, eliminate, or minimize the impacts and risks that are dangerous to mining labour in the mine area.

### **3.6 Processing Technology**

The Processing Technology to be applied as a reaction on different ore types, grades and volumes must be described in detail (design, capacity, process description, flow sheets, mineral recovery, consumption of materials etc.), as it is a key factor for the production and plant capacities. Besides this, an explanation on the selection and implementation of a certain processing technology must be provided. Regarding different operation strategies, the capacity range (including technically feasible full load operation) for the proposed processing technology must be explained under consideration of down-times, maintenance, holidays and other influences. These shall also consider resource and production constrains due to shortage in equipment or any other resource which may reduce the normal processing capacity.

A detailed layout of the processing plant must be provided which shall approve appropriateness as well as sufficient flexibility with regard to the planned production rates.

The basic engineering must be illustrated in detail including technical configurations of construction facilities, equipment and production processes, and of material flows and linkages between different stages of production. The basic engineering (appropriate scale is between 1:1,000 and 1:2,000) includes the functional layout according to site conditions and the position of principal key structures and buildings, major equipment,

roads, railways and other transport facilities, various utility and service facilities, as well as areas for future expansion. Furthermore, the flow of materials used and processed must be illustrated in Material Flow Diagrams providing information on quantities entering and leaving the processing facilities.

Based on the annual production rates, input requirements of the processing units such as special requirements on materials, equipment and labour must be defined. These shall be summarized in material flow diagrams, a cost assessment and estimates on the initial and full production including the consideration of different production scenarios. This should include staff and labour figures including the demand for training.

The processing equipment must be elaborated in detail including the required spare parts and tools. Limitations and other constraints related to the proposed processing technology should be summarized. The need for maintenance facilities, techno-economic implications such as lead times for procurement, transportation and installation of the equipment should be covered as well.

### **3.7 Environmental and Socio-Economic Impacts and Mitigation Needs**

A mining project will always interfere with the existing environmental and socio-economic situation. It is in the interest of all involved stakeholders to keep the negative impact as low as possible.

#### **Environmental Impacts**

The natural environment has to be described with regard to climatic conditions (Topography, climate, land use, flora and fauna, surface and ground water potential for flooding hazards, formation of noise and dust, drainage, etc.).

The potential impacts during the construction, operational and post-closure phases have also to be described.

The applicant has to explain that the proposed mining activities will be accomplished under implementation regarding environmental sustainability. Referring to the proposed mining and processing technology and the utilization of other natural resources (e.g. water), the Detailed Feasibility Study must clearly state that negative environmental and social impacts are avoided respectively minimized according to best international practice and knowledge. Mitigation and protection measures to be implemented for environmental protection have to be described in detail including an explanation on the selection of the proposed measure as well as a description of the protection target.

The applicant has to provide an environmental management plan, a resettlement plan as well as a plan for mine closure and post-closure and rehabilitation of the mined out area, and is obliged to approve liability to pay compensations for damages incurred from the impact of mining operations. Besides this, it must be stated in which extend compensation payments for environmental damages are planned and in which extend project related contributions to the Environmental Protection Fund are scheduled. The

Detailed Feasibility Study must clarify the state of the planned practices and processes related to the treatment of mining waste and of tailings in order to ensure health and safety of workers and the nearby public, animals and the environment in general.

An Environmental Impact Assessment (EIA) is a comprehensive analysis of the mining related impacts on the environment and should include a comprehensive, interdisciplinary investigation of environmental consequences, the development of an understanding of the scope and magnitude of incremental environmental impacts, the consideration of existing regulatory requirements, the identification of mitigation measures against adverse environmental impacts, the identification of critical environmental problems and the related needs for further investigations. Finally, a qualitative and quantitative assessment of environmental impacts as well as the overall environmental merit of the project site should be assessed. Within the EIA, alternative project locations shall be considered. The main phases of an EIA comprise a preliminary environmental impact assessment, the identification and evaluation of environmental impacts and finally the preparation of the environmental impact statement.

Environmental Impact Assessment covers environmental screening, initial environmental examination and the final Environmental Impact Assessment. Applications for Mining projects with a potential to affect the environment are obliged to be supported by an Environmental Assessment Report. In this regard, the scope and magnitude of incremental environmental impacts, conformity with regulatory requirements, appropriate mitigation measures as well as identification of any critical environmental problems shall be explained.

### **Socio-Economic Impacts**

The applicant shall analyse all mining related impacts on the socio-economic situation. With regard to the envisaged sustainable development the Detailed Feasibility Study shall explain in which extend the development of the community is supported, e.g. via an improvement of local infrastructure, the development of skills and the creation of jobs for the local/rural population, and finally towards an improvement of overall living conditions. All these aspects should be understood as measures to minimize the negative impact on the rural society.

The applicant has to provide a resettlement management plan for people impacted by the proposed mining operations and is obliged to compensate for the removal of land and agricultural products, to manage resettlement and to provide an appropriate place for the livelihood of people affected by the business operation.

Socio-economic aspects and mining related impacts to be addressed shall consider the socio-economic and cultural environment, such as social and economic policies and regulations, infrastructural services, transport and communications system, etc.

### **3.8 Mine Waste and Tailings Disposal Plans**

The natural resources, raw materials and energy shall be economically used in a manner that minimizes the overall pollution and waste caused by mining activities. The sustainable treatment of waste is defined in the environmental protection plan.

The Detailed Feasibility Study must include properties of mine waste and tailings, mine waste and tailings disposal plans mine and waste water processing and recycling, environment protections measure and environmental monitoring for the entire lifetime of the mine. These mine waste and tailings disposal plans must outline the future location of tailings, waste heaps and back filling for open pit and underground mining.

Heaps for mine waste must be outlined with regard to location, size, capacity, deposition technology, stability, remediation technology, future use, etc. Information to be provided for tailings dams includes location, size, capacity, construction, remediation technology, geotechnical design, future use, etc. Furthermore, the waste disposal plan has to address the handling and management of other types of solid waste, sewage and construction demolition material.

### **3.9 Mine Closure and Post-Closure Plans**

Mine closure plan is an integral part of the Detailed Feasibility Study and should be done at the beginning of a mine operation phase and reviewed during the mine life time. In order to avoid or minimize negative environmental and social impacts, the proposed mine operator has to prepare a rehabilitation plan as well as a mine closure plan for the mined out area.

The Detailed Feasibility Study has to address all technical and economic aspects related to mine remediation including the entire mining site, all plant facilities, waste heaps, tailings ponds, etc. On international level, the Final Mine Closure Plan is part of the application of a mining licensing procedure. Within the Detailed Feasibility Study, the applicant has to provide a mine closure concept which addresses all technical and economic aspects of the remediation work including plant facilities, waste heaps, tailings ponds, etc. In addition, the future utilization of buildings after finalization of mining and processing activities has to be addressed.

The mine operator is obliged to prepare a decommissioning and post closure plan which includes mainly decommissioning works, completion of rehabilitation, covering of mine waste and tailings facilities, post-closure monitoring etc.

### **3.10 Infrastructure Needs**

Based on an analysis of existing infrastructure and its potential to be utilized in the proposed mining project, the Detailed Feasibility Study must detail the infrastructural needs of the project and related cost estimates for all major civil works. These are, amongst others the site preparation (road construction, earth-moving works, river devi-

ation, dam construction, etc.) and the erection of buildings and other facilities related to mining and processing.

Plans for construction or installation must be provided including cost estimates on the implementation of construction. Furthermore, the need for ancillary constructions as well as for the management of water, electricity, gas and sewage management must be explained.

### **3.11 Organization and Overhead Costs**

The Detailed Feasibility Study shall include an overview on the organizational structure of the planned project from the operational point of view, which is also necessary for project planning.

The organizational structure of the project shall cover the share of responsibilities of the various functional units of the company. The project organisation, often as a pyramidal structure, the top-, middle- and supervisory management and its responsibilities must be explained. This structure shall include the organization and management of the plant including mine plant, beneficiation (coal washing plant, ore treatment, crushing, etc.) as well as processing plants (e.g. flotation).

The key functions of the overall organization must be explained with regard to general organizational functions and related management, overall finance, financial control and accounting, the personnel administration, marketing, (sales and distribution), supplies (transport, storage of goods), the production including the main plant and related plants, quality assurance and production maintenance and repair.

The Detailed Feasibility Study must further explain planned procedures on accounting and financial control by the management and how project financial situation has to be regularly reported to the national financial authorities. In this regard, the Detailed Feasibility Study shall outline planned cost centres such as plant management, social services (housing, health services, cafeterias, transport and company food stores), off-site transportation (transport activities not directly related to production processes), the acquisition and stocking of raw materials, spare parts and other supplies, the repair and maintenance (machinery and equipment, buildings, vehicles). Other relevant cost centres comprise the power supply and distribution for production and general use, the supply of water, laboratories, process control and effluent disposals.

The Detailed Feasibility Study shall also explain the organization structure of the project in terms of marketing (sales and distribution of mining products and others) as well as the organization of supplies, such as the supply system (selection of suppliers, requesting of bits, materials and services, shipping of the goods, ordering and dispatch, Invoice control and payments of suppliers storage and inventory control).

The organisation structure should further outline the organization of storage, production, quality assurance, maintenance and human resources (recruitment and training).

The Detailed Feasibility Study must provide information on the overhead cost related to the proposed project such as factory overheads such as transformation, fabrication or extraction of raw materials (wages and salaries, factory supplies, and maintenance). The administrative overhead related to wages and salaries, office supplies, utilities, communications, engineering, Rents, Insurances and taxes should be outlined.

Marketing overheads cost shall further include direct selling and distribution costs. Indirect marketing costs that cannot be easily linked directly with a product are usually treated as marketing overhead costs (often included under "administrative overheads").

Furthermore, financial cost (such as interest on term loans, overall inflation rate of overhead cost) as well as depreciation cost (annual depreciation) must be covered.

### **3.12 Human Resources**

The human resource requirements should be defined in categories and functions and include detailed manning schedule, total cost calculations including salaries for management, staff and labour.

The socio-economic and cultural environment should be explained providing information on average labour conditions (legislation and labour terms), standards and health care, occupational safety, and health care and social security.

The Detailed Feasibility Study should assess the general availability of human resources required and describe the background situation with regard to employment, progress of economic development and industrialization in the region. A recruitment plan should be part of the Detailed Feasibility Study and should analyse the ability of the project to attract the human resources including an evaluation of the recruitment policy and methods. Here, the combination of recruitment and training as well as the recruitment of foreign expertise should be addressed.

Besides this, the need for trainings should be assessed and appropriate training programmes should be designed. Training programs shall be developed accordingly.

### **3.13 Implementation Planning and Budgeting**

The Detailed Feasibility Study should provide a comprehensive plan about the implementation of the proposed mining project including proposed measures and related arrangements. This plan has to be supported by an implementation time schedule indicating investments to be taken. Regarding the entire life cycle of a mining project, planning and budgeting of project implementation is crucial for the overall viability of the mining project, as deviations from the original plans and budgets could easily jeopardize the entire project. The Detailed Feasibility Study has to determine all technical and financial implications for individual stages (exploration, planning/design, construction, production, closure and post closure) of the project implementation. Accordingly, a detailed time schedule of the planned project implementation phase must be provided including the nomination of the management team in charge of project implementation.

The implementation planning and budgeting shall provide the information about working tasks (on- and off-site) in a logical sequence necessary for project implementation, a time-phased implementation schedule including all work tasks, the preparation of an implementation budget and cash flow to ensure the availability of adequate funds throughout the implementation phase. The entire project implementation must be comprehensively documented in terms of the implementation plan and budget and related predictions/ forecasts.

The planning must explain the different stages of project implementation including a description of the project team (number of staff, qualification, supervision, function, etc.). Required subcontractors have to be outlined as well (Name of Company, technical and financial capacity, experience, etc.).

The implementation planning must contain comprehensive information on the contracting including a technical documentation of planned constructions and installations. Appropriate timeframes for procurement of services and goods such as tendering, negotiations and contract awarding have to be stated.

Project implementation must be supported by a comprehensive and realistic implementation budgeting which lists all cost of resources required for project implementation according to the implementation plan. The determination of cost for implementation must include contingencies related to price increases, etc.

### **3.14 Financial Analysis and Investment Appraisal**

The financial analysis addresses the basic criteria for investment decisions, a pricing of project inputs and outputs, the planning horizon and project life, risks and uncertainties, a cost analysis, basic principles for accounting, methods of investment appraisal (discounting and conventional methods), the financing of the project, financial efficiency, a financial analysis and a project evaluation covering certain uncertainties. Based on this financial analysis, the potential investor, promoter and/or financier have to decide whether to undertake an investment, and how to finance the proposed project.

Under the prevailing conditions of uncertainty, a Detailed Feasibility Study must identify the most attractive project alternative. Here, critical variables and possible strategies for managing or controlling risks must be identified. Furthermore, during investment, start-up and operational phases, the flow of financial resources must be determined and used in the most effective way. The financial analysis has to address the interest of the involved parties, public interests as well as the socio-economic development needs.

The financial analysis and investment appraisal must include an analysis of cost estimates including the total investment cost (CAPEX), the initial investment cost, replacement investment required during plant operation, investment to increase production at a later phase (deferred investment) and pre-production expenditures. Besides the capital investment, the operating cost (OPEX) has to be analysed and reliably predicted.

Fixed- and variable cost should be separately stated to enable sensitivity calculations. The total "production cost" embraces the investment cost and the operating cost.

As a method of investment appraisal, a cash-flow analysis (inflows and outflows of cash as expenditures and revenues) has to be executed in order to approve the overall profitability of total capital invested. The Detailed Feasibility Study must explain the basic assumptions underlying cash-flow discounting, the main discounting methods, the net present value, the internal rate of return as well as the discounted return on equity capital.

Furthermore, the financial analysis and investment appraisal should include an assessment of the conditions of uncertainty. To minimize uncertainty, a Detailed Feasibility Study shall include a sensitivity analysis as well as the critical variables within the structure of cash flows. A break-even analysis will identify the equilibrium point at which sales revenues equal the costs of products sold. Finally, an Economic evaluation shall assess the overall financial and commercial feasibility of the proposed project.

For the determination of the economic life span of a project, the duration of demands, the duration of required supply of raw materials, the rate of technical progress, industrial life cycles, duration of building and equipment and administrative constraints (urban planning horizon) have to be assessed.

### **3.15 Risk Evaluation**

The Detailed Feasibility Study must contain a comprehensive evaluation of project related technical and economical risks and uncertainties. Based on financial and technical analyses of the project, risks and uncertainties associated with various outcomes are to be presented based on historic data as well as predictions on the future mining and marketing situation. As a minimum, the Detailed Feasibility Study has to address risks related to currencies and exchange rates, market stability, price variation of the products, technical production risks, environmental and political risks. Within a Detailed Feasibility Study, risks should be evaluated using a SWOT analysis.

## **4. EVALUATION OF A DETAILED FEASIBILITY STUDY**

### **4.1 Receipt of Detailed Feasibility Study (DFS)**

The DOM in charge of assessment and approval of submitted Detailed Feasibility Study shall conduct a brief review within 10 working days with regard to completeness and formal correctness of the submitted Detailed Feasibility Study. As a result of this first review, the DOM will inform the applicant about the receipt of the documents in written form and whether the submitted documents fulfil the formal requirements of a Detailed Feasibility Study.



## 4.2 Evaluation of Detailed Feasibility Study

The Competent Authority as representative of the government will review and evaluate Detailed Feasibility Studies submitted by applying mining companies. Such review and evaluation will be accomplished, amongst others, under consideration of the following aspects:

- To act in compliance with environmental protection regulations according to best international practice.
- To verify the availability of resources/reserves and their sustainability with regard to the proposed mining activities (minimum predicted operative lifetime, annual recovery, etc.).
- To ensure the suitability of technical implementation concept covering best-practice, fulfilling workers safety standards and the acceptability of the assumptions, parameters and references used.
- To apply technologies with international standards to ensure efficiency, safety and environmental protection.
- To verify the overall profitability of the project and related benefits to the state during the mining operation including the payment of taxes, fees and other government shares required under existing laws and regulations, including positive financial benefits for the national and local economy.
- To support existing logistic systems and land development concepts.
- To support socio-economic development and improvement of the local employment.

## 4.3 Feedback to the Applicant – Further Clarification

Within 60 working days after receipt of the Detailed Feasibility Study, the Department of Mines (DOM) will initiate a technical meeting with the applicant. In this meeting, the DOM is obliged to state whether all requirements on the feasibility study are fulfilled and all aspects according to Chapter 3 have been sufficiently addressed and explained in detail as required for a Detailed Feasibility Study.

If the Detailed Feasibility Study does not fulfil all requirements with regard to its content and information to be provided, the DOM shall provide feedback to the applicant in terms of clarification on the need for revision. These issues are to be summarized in written form and submitted to the applicant within 5 working days after the technical meeting.

The revision of the Detailed Feasibility Study will be accomplished by the applicant within 30 working days. In case this is foreseen to be not feasible, the DOM will define an appropriate time frame for required revision.

After receipt of the revised Detailed Feasibility Study, the DOM will continue the evaluation.

In case the Detailed Feasibility Study fulfils all requirements, the DOM will prepare a summary report on the evaluation of the Detailed Feasibility Study and submit to the MEM for consideration and directives. After final decision made by MEM, the Ministry cabinet office will submit a formal transmittal slip of the final decision to Investment Promotion Department, Ministry of Planning and Investment for further reporting to the Government for an approval of the negotiation process on mining and mineral processing agreement with investor(s). If the Government agrees to allow having a negotiation process with investor(s), it will submit a formal corresponding letter to Ministry of Planning and Investment so as to invite all stakeholders and investor(s) to come for negotiation on mining and mineral processing agreement draft. Ministry of Planning and Investment will, then, report the negotiation results to the Government and requesting an approval for signing such agreement with investors. If the Government agrees, it will assign a formal representative for signing agreement with investor(s) accordingly.

After signing the agreement, the investor(s) will be requested to improve its Detailed Feasibility Study based on those conditions raised through the negotiation as well as conditions specified in the agreement, within 30 working days and submit the revised DFS to DOM for review and certification of correctiveness and compliances with the agreement prior to the issuance of DFS certificate to investor(s) in accordance with regulations set forth.

This order comes into effect since the date of signature

Vientiane Capital, Date: 15/07/2014



Dr. Simone Prichit  
Director General  
Department of Mines