

MINERALS COMMISSION



GUIDELINES FOR THE PREPARATION OF FEASIBILITY STUDY REPORT

NOTE: The Original copy must be obtained from MINCOM and duly stamped

FOREWORD FOR GUIDELINES

The Guidelines contained herein have been developed in accordance with the provisions in the Minerals and Mining Act, 2006 (Act 703) and international best practice.

The Guidelines are in respect of application for: mineral rights, licences to buy and deal in minerals, licences to provide prescribed services to holders of mineral rights, among others.

The purpose of the Guidelines is to ensure the management of Ghana's mineral resources effectively and efficiently so as to optimize the sector's contribution to the sustainable socio-economic development of the country.

More specifically, these guidelines are expected to:

- Document the standard procedures for acquisition of mineral rights and other licences; give clear guidance of what is expected of all stakeholders with respect to procedure and timing for granting as well as monitoring and evaluation of activities under mineral rights /licence; to
 - Facilitate the acquisition of mineral rights by prospective investors;
 - Assist regulators in the effective monitoring and evaluation of the activities of sector operators; and
- Contribute towards the integration of the mining sector into the rest of the economy.

Additional to these, the guidelines would assist the Commission to fulfill one of its core mandates of “securing a firm basis of comprehensive data collection on national resources and the technologies of exploration and exploitation for national decision making “ under the Minerals Commission Act, 1993 (Act 450).

The Minerals Commission would therefore like to appeal to all prospective investors as well as those who already have investments in the country's minerals and mining sector to collaborate with the regulatory agencies in the implementation of the guidelines.

We trust we can count on the cooperation of all stakeholders to ensure the management of Ghana's mineral resources in a manner that will create a platform by which the mining sector sustainably contributes to the development of not just the current generation but also lays the foundation for the development of future generations.

BEN ARYEE
CHIEF EXECUTIVE OFFICER
NOVEMBER 10, 2010

Application or Lease Registration Code Number: _____

Year submitted: _____

Minerals Commission – Monitoring and Evaluation Department

Form MISC: BFR - Bankable Feasibility Report

O F F I C I A L U S E		<p>Received at: _____</p> <p>On: _____</p> <p>Authorizing officer: _____</p> <p>Report is confirmed complete: _____</p> <p>On: _____</p> <p>Reviewing officer: _____</p>	
---	--	---	--

Type of application or lease for which the bankable feasibility is submitted:

- _____ Application for a Mining Lease
- _____ Application for a Restricted Mining Lease
- _____ Existing Mining Lease
- _____ Existing Restricted Mining Lease

1. LEASE APPLICANT / HOLDER DETAILS

1. Name of Applicant / Lease Holder: _____

2. Registered Address:

3. Postal Address: _____

4. Location of lease area District: _____ Locality: _____

5. Fax: _____

6. Phone: _____ Cell phone: _____

7. Email: _____ Website: _____

Name of mine: _____

BACKGROUND

Section 11 of the Mineral & Mining Act, 2006 (Act 703) states that:

1. An application for a mineral right shall be submitted to the Minerals Commission in the prescribed form and shall be accompanied with a statement providing,
 - (a) particulars of the financial and technical resources available to the applicant for the proposed mineral operations,
 - (b) an estimate of the amount of money proposed to be spent on the operations,
 - (c) particulars of the programme of proposed mineral operations, and
 - (d) particulars of the applicant's proposals with respect to the employment and training in the mining industry of Ghanaians.

These guidelines have been developed to assist Mineral Right holders in the preparation of Feasibility Study Reports on work carried out on their concessions. The submission of a satisfactory Feasibility Study Report is a requirement for the grant of a Mining Lease by the Government of Ghana.

The Commission evaluates the Feasibility Study Report to determine the Company's technical and financial capability to undertake the exploitation of the mineral resource it has identified and defined on the property. This helps the Commission to make the appropriate recommendation to the Sector Minister for the grant of Mining Lease.

STRUCTURE AND CONTENT OF FEASIBILITY STUDY REPORT

1. Title and Author(s) of the Report /Date
2. Executive Summary
3. Project Summary
4. Technical Elements
5. Financial Elements
6. Environmental Elements
7. Economic Elements
8. Socio-Economic Elements
9. Appendices

AUTHORS OF THE REPORT

- Name of Consultants that authored the Report
- Qualification of the Principal Authors
- Experience in Proposed Type of Mining Operation/Development and Area of Geographic Interest
- Track Records of the Principal Authors
- Address and Location

1.0. EXECUTIVE SUMMARY

- i. Geology and Reserves
- ii. Mining
- iii. Metallurgy
- iv. Process Plant
- v. Infrastructure
- vi. Project Implementation
- vii. Environment and Community
- viii. Operations
- ix. Operating Costs
- x. Capital Cost
- xi. Economic Assessment
- xii. Opportunities and Risks

2.0 PROJECT SUMMARY

2.1. Introduction

2.2. Background

- 2.2.1. Geography
- 2.2.2. Climate
- 2.2.3. Existing Infrastructure and Services
- 2.2.4. Project History
- 2.2.5. Legal and Fiscal Regime

2.3. Geology and Resources

- 2.3.1. Introduction
- 2.3.2. Geological Setting
 - 2.3.2.1. Regional Geology
 - 2.3.2.2. Local Geology
- 2.3.3. Deposit Type(s)
- 2.3.4. Mineralization
- 2.3.5. Geological Model
- 2.3.6. Drilling and Sampling
 - 2.3.6.1. Sample Analysis
- 2.3.7. Geological/Geophysical/Geochemical Interpretation
- 2.3.8. Mineral Resource Estimation

2.4. Mining

- 2.4.1. Introduction
- 2.4.2. Geotechnical Considerations
- 2.4.3. Water Supply and Management
- 2.4.4. Mine Plan and Design
- 2.4.5. Proposed Mining Operations
- 2.4.6. Mining Schedule and Stockpile Accounting
- 2.4.7. Future Work

2.5 Mineral Processing

- 2.5.1. Introduction
- 2.5.2. Process Plant Description
- 2.5.3. Engineering Design Philosophy
- 2.5.4. Treatment Plant Overview
- 2.5.5. Flowsheet
- 2.5.6. Control Systems

2.6. Infrastructure

- 2.6.1. Site Development
- 2.6.2. Plant Area Buildings
- 2.6.3. Power Supply
 - 2.6.3.1. Power Supply Requirements
 - 2.6.3.2. Power Supply Options
- 2.6.4. Operational Water Supply
- 2.6.5. Raw Water Supply
- 2.6.6. Potable Water
- 2.6.7. Sewerage
- 2.6.8. Tailings Storage Facility (TSF)
 - 2.6.8.1. Introduction
 - 2.6.8.2. TSF Type and Location
- 2.6.9. Communications
- 2.6.10. Accommodation
- 2.6.11. Security
- 2.6.12. Roads

2.7. Project Implementation

- 2.7.1. Introduction
- 2.7.2. Project Management Plan
- 2.7.3. Work Breakdown Structure
- 2.7.4. Project Schedule

2.8. Environment

- 2.8.1. Introduction
- 2.8.2. Summary of the Baseline Information
- 2.8.3. Stakeholder Consultations
- 2.8.4. Impact Identification
- 2.8.5. Cost of Mitigation Measures with Alternatives
- 2.8.6. Corporate Social Responsibility Programme

2.9. Operations

- 2.9.1. Introduction
- 2.9.2. Organisation Structure and Manning
- 2.9.3. Workforce Make-Up
- 2.9.4. Recruitment and Training of Ghanaians (Sections 11 and 105 of Act 703)

2.10. Operating Costs

2.10.1. Introduction

2.10.2. Total Operating Costs

2.10.2.1. Mining Costs

2.10.2.2. Processing and Maintenance Costs

2.10.2.3. Labour

2.10.2.4. Utilities

2.10.2.5. Consumables

2.10.2.6. Maintenance

2.10.2.7. Laboratory

2.10.2.8. Environmental, Social and Community Costs

2.10.2.9. General and Administration Costs

2.11. Capital Costs

2.11.1. Introduction

2.11.2. Estimate Basis

2.11.3. Contingency

2.11.4. Exchange Rates

2.11.5. Clarifications

2.11.6. Exclusions

2.11.7. Statistical Analysis

2.11.8. Sustaining Capital

2.12. Project Appraisal

2.12.1. Technical

2.12.2. Financial

2.12.3. Economic

2.13. Risks Assessment and Management

2.13.1. Community and Social Agitations

2.13.2. Illegal Mining Operation

2.13.3. Speculative Activities

2.13.4. Health and Safety Issues

2.13.5. Political Issues

3.0. GEOLOGY

The objective of the Geological Evaluation of the deposit is to define the ore resource as adequately as possible since the ore resource is the major asset of the company.

3.1. Geology, Exploration Sampling Techniques and Mineralization

- Description of the Regional Geological Environment
- Description of the Local Geological Environment
- History of Exploration Work in the Area, the Nature of Work, Quality and Usefulness
- Additional Work Completed by the Current Company
- Procedures Employed in Data Collection for the Ore Reserve Estimation
- Sampling and Assaying Procedures Adopted
- Number of Holes Drilled, Drill Spacing and Orientation
- Compilation of Drill Hole Database
- Laboratory Reliability (QAQC- Duplicates, Blanks and Standards)
- Detailed Description of Ore and Host Rock
- Description of Structural Setting of Mineralization
- Ore Type and Style of Mineralization
- Geological Model

3.2 . Ore Reserve Estimation

- Methods Used for Calculating the Ore Reserves i.e. Grade/Tonnage Determination
- Explanation for the Rationale behind the Choice of Method
- Criteria for classifying Reserves into Proven, Probable and Possible or Measured, Indicated and Inferred
- Assumption in Establishing the Geological Cut-off-Grade
- Explanations for the Choice of Geological Cut-off-Grade
- Resource Modeling

4.0 . MINING

In the mining method selection, the main idea is to design a specific extractive system suitable for the particular orebody.

- Factors Underlying the Choice of a Particular Mining Method
- Evaluation of Alternative Mining Scenarios
- Consideration of Geotechnical Factors (Slope Stability, Stope Stability, Shaft Security Zones etc.)
- Assumptions for the Calculation of Mineable Reserves
- Dewatering, Surface-Run-Off Management
- Location of Waste Dumps and Waste Management
 - Waste Characterisation
- Ventilation Design (Underground)
- Occupational Health and Safety Provisions
- Discussion and Specification of Critical Design Parameters

- Preparation of Mine Design (Mine Layout)
- Preparation of Pre-Production Plan with Manpower, Equipment and Materials Requirements
- Mining Schedule and Stockpile Accounting
- Future Work
- Training Programme for Local Labour

5.0 . MINERAL PROCESSING

5.1.Plant design

- Preliminary Design Considerations of the Plant
- Basis for Mill Site Location
- Engineering Design Philosophy
- Control Systems

5.2 . Sampling

- Describe Methods Used in Sampling
- Typical Size Distribution of the Materials Used for Tests

5.3 . Chemical Characterization

- Outline the Procedure Used to Obtain Head sample
- Establish the Full Chemical Composition of a Representative Portion(s) of the Sample, at Least Semi-Quantitatively
- Conduct quantitative Chemical Analysis of the Sample. Giving the Concentration of the Main Elements
- Briefly Describe the Analytical Methods Used to establish the Grade of the Head Sample
- Chemical “Liberation” of the Value Mineral(s) from the Gangue Should be established for Non Alluvial Material
- Establish the Distribution of the Value Mineral in Separated Fractions (Ore) in the Case of Material of Alluvial Origin
- In the Case of Gold, Identify the “Impurities” in the Gold Bullion

5.4 . Mineralogical Appraisal

- Identify Constituent Minerals, Wherever Practicable
- Establish proportions of Main Minerals (Model Analysis) Occurring
- Establish the Apparent Degree of Liberation (Mineralogical) of the value Mineral(s) if Necessary

5.5 . Process Selection

- Establish Comminution Characteristics of the Mined Material
- Establish Washing Characteristics of Alluvial Material
- Establish the Amenability of Mined Material to Pre-concentration, Wherever Practicable
- Brief Description of various Test Works Performed in the Laboratory Indicating Methods, Results and Conclusions Reached

5.6 . Process Testing**5.6.1. Pilot Plant Tests****5.7 . Proposed Flowsheet**

- Technical Basis for the Flowsheet Selected
- Flowsheet drawn should Show Material Balance
- Full Description of the Flowsheet drawn in the text of the Report

5.8 . Process Water

- State the sources and Quantities of Water to be Utilized in the Treatment of the Ore
- Describe Water handling, Water Consumption, Water Recovery (Via Reclamation) and Sources of water Losses
- Stipulate the Quality of Water to be Discharged to the General Environment

5.9 . Tailings/Effluent Disposal

- Environmental Considerations
- Mode of Transportation and Storage

6.0 . INFRASTRUCTURE

- Energy Supply
- Access to the Mine
- Telecommunication Systems
- Material Handling Systems
- Workshops, Offices, Changehouse, Laboratories and Equipment
- Housing, Power, Water and Sewerage for Employees
- Transportation for Employees
- Medical Care, Recreational Facilities, Schools and Supply of Household Goods

7.0. PROJECT IMPLEMENTATION

- Project Management Plan
- Work Breakdown Structure
- Project Schedule
- Procurement Plan
- Organisational Structure and Manning
- Workforce Make-Up
- Recruitment and Training of Ghanaians (Sections 11 and 105 of Act 703)

8.0 ENVIRONMENTAL ISSUES

8.1. Introduction

8.2. Baseline Information

8.3. Stakeholder Consultations

8.4. Impact Identification

This means all environmental and social impact that will emanate from mining, processing, waste disposal, community and social issues (cost of relocation, resettlement etc.)

8.5. Cost of Mitigation Measures with Alternatives

This should capture Provisional Environmental Monitoring Plan, Reclamation, Restoration or Rehabilitation Plan as Decommissioning and Post-Closure Plans including proposed reclamation Bond. Specifically, the following have to be addressed

- Engineering works to decommission and dismantle infrastructure, complete rehabilitation, grade kind forms for effective drainage, cap and cover tailings facilities, implement post closure monitoring networks etc.
- Administrative works relating to the transfer of assets, labour force, demobilization, relinquishment agreement and other government and NGO agreements
- Due diligent monitoring and reporting on the post decommissioning status of environmental and social aspects of the site.

8.6 Corporate Social Responsibility Programme

9.0. PROJECT COSTS

9.1. Cost Estimation

Cost estimation forms a very important part of a Feasibility Study since the potential viability of the project will depend on the relevance of the cost data. The basis for the cost estimation should be clearly documented.

9.2 . Operating Costs

Operating costs include costs expended during mining and milling of ore as well as transportation and marketing.

- Compile Standard Database for Use in Estimating All Areas of the Project
- Specify the Approach to be Used for Estimating all Areas of the Project
- Separate Estimates for Each Area Should be broken Down into Appropriate Elements
- Compare Costs to Other Operations Using Similar Mining and Processing Methods

9.2.1 Total Operating Costs

9.2.1.1. Mining Costs

9.2.1.2. Processing and Maintenance Costs

9.2.1.3. Labour

9.2.1.4. Utilities

9.2.1.5. Consumables

9.2.1.6. Maintenance

9.2.1.7. Laboratory

9.2.1.8. Environmental, Social and Community Costs

9.2.1.9. General and Administration Costs

9.3 . Capital Costs

- Compile Standard Data Bases for Use in Estimating Each Area of Project
- Separate Estimates for Each Area Should be Broken Down into Appropriate Elements
- Assess and Apply Contingency
- Assess and Apply Escalation
- Prepare Capital Disbursement Schedule for Financial Analysis Purposes:
 - Estimate Basis
 - Contingency
 - Exchange Rates
 - Clarifications
 - Exclusions
 - Sustaining Capital

10.0. ECONOMIC AND FINANCIAL ANALYSIS

The purpose of this section is to develop an economic model using data generated throughout the study to determine the project's economic viability and to examine the effect of numerous factors on the profitability of the project.

The objective of the Economic and Financial Analysis is to develop revenue projections for the financial and economic assessment of the project and to support these projections with sufficient market information and sales commitments to demonstrate to the investors and financial institutions that the projections were realistic.

- Sources of Market Information
- Analysis of Demand and Supply for Both the Short and Long Terms
- Specifications for the Shipped Mineral Product
- Compliance with Kimberley Process Certification Scheme (KPCS) in the Case of Diamonds
- Effect of By-Products on the Market Price
- Purchasers
- Specification of Sales/Marketing Strategy (Marketing Contracts)
- Conduct Product Price Analysis and Make Price Projections

Factors to Consider:

- Capital Costs
- Operating Costs
- Production data (Grade, Tonnage of Output; Project Life)
- Marketing and Revenue Data
- Amortization Criteria
- Taxes and Royalties
- Inflation
- Investment Grants and Subsidies
- Financing and Capital Structure
- Assumption of the Base Case Scenario
- Profitability Criteria Being Used in the base Case Scenario
- Definition of Cash Flow being Employed
- State Whether cash flow Analysis is Based on Equity or Combination of Debt and Equity
- Application of Appropriate Fiscal Regime
- Cost of capital or Hurdle Rate Being Used
- Define Variables to be Used for Sensitivity Analysis
- Calculation of Debt Coverage ratio for the project and for each Year During Debt Repayment
- Indicate Government's share

11.0. SOCIO-ECONOMIC ANALYSIS

- Assess the Socio-Economic effects of the Project
- Assess Whether Local Communities will be Moved and Resettled
- Compensation, give Compensation Figures
- Institutional Services being proposed for the Mine and the Local Community

12.0. RISKS ASSESSMENT AND MANAGEMENT

- Community and Social Agitations
- Illegal Mining Operation
- Speculative Activities
- Health and Safety Issues

13.0. CONCLUSIONS**14.0. APENDICES**

- Back Up Calculations
- Maps
- Figures
- Tables
- Drawings, etc.

I HEREBY CERTIFY THAT THE INFORMATION AS PROVIDED ABOVE IS TRUE

Name: _____ Signature: _____

Title: _____ Date: _____