

# Arizona State Land Department

## Documentation Guidelines and Requirements for Mineral Operations on State Trust Lands



### *Mineral Development Report Guideline*

- Section 1:** Geologic Assessment
- Section 2:** Economic Feasibility
- Section 3:** Environmental Assessment
- Section 4:** Mine Operating Plan
- Section 5:** Reclamation Plan

Revised: October 11, 2011

## ***Mineral Development Report Guidelines***

Mineral applicants must complete a Mineral Development Report (MDR) for mining operations proposed on State Trust Lands (STL) managed by the Arizona State Land Department (ASLD). This document presents guidelines for preparing Mineral Development Reports, which provide ASLD with information necessary for evaluating mineral lease applications and managing mineral leases. ASLD bases approval of a mineral lease on the technical content and analytical data presented in the MDR. ASLD expects a professionally prepared, technical document.

*The applicant is responsible for the completeness, accuracy, and clarity of the Mineral Development Report. ASLD recommends that the applicant attend a pre-technical conference prior to initiating the MDR to review the technical merits of the proposed mining operation.*

The MDR format satisfies requirements of ASLD's application process and summarizes project information necessary to secure other permits in support of the proposed mining operation.

### **CONTENT**

The attached outline summarizes the baseline content required by ASLD for the MDR. ASLD encourages including other sections to provide additional support and clarification for the MDR. The applicant may not eliminate topics or sections from the MDR that do not apply to the specific mining operation; the applicant must include a brief statement explaining why a section or topic does not apply.

*Please contact ASLD's Minerals Section to clarify MDR requirements.*

The level of technical, economic and operational detail required by the MDR depends on the deposit type, scope, and size of the proposed mining operation. The applicant must base each section of the report on verifiable, complete, and defensible data. The MDR must summarize mineral resource estimates, estimation methods, and economic calculations, thus providing ASLD with a clear understanding of the basis for mineral values, mineral reserves, and overall conclusions. The applicant must provide sufficient technical detail to demonstrate the presence of a valuable mineral deposit or resource before ASLD can approve a mineral lease application.

*ASLD will approve the application and schedule a public auction based on the technical data presented by the applicant in the MDR.*

The MDR must identify sensitive environmental issues and impacts in the Environmental Assessment (EA) section. The Environmental Assessment must discuss proposed mitigation measures of identified environmental issues. The Mine Operating Plan and Reclamation Plan must also address environmental issues and present mitigation measures where appropriate.

### **CONFIDENTIALITY**

The applicant may submit confidential information required for this report under separate cover, and prominently labeled "CONFIDENTIAL". The applicant must summarize confidential data in the MDR and cross-reference details to the appropriate topic section separately from the public document, pursuant to A.R.S. §27-239(F), A.R.S. §27-252, and A.R.S. §27-274.

*The applicant must formally request in writing that ASLD keep confidential information separate from the public document, with justification.*

## **REPORT STRUCTURE**

The Mineral Development Report consists of five major sections: 1) *Geologic Assessment*, 2) *Economic Viability*, 3) *Environmental Assessment*, 4) *Mine Operating Plan*, and 5) *Reclamation Plan*. ASLD requires that the applicant develop each section as an independent report because situations may arise during the application process requiring the submittal of an individual section report before completion of the Mineral Development Report. ASLD requires that the applicant combine all report sections into a single report.

## **PRESENTATION REQUIREMENTS**

ASLD requests that you follow the specifications summarized under “**MDR Format**” included at the end of this document.

## **EVALUATION PROCEDURES**

ASLD considers development of the MDR as a cooperative effort between the applicant, their consultants, and ASLD. Prior to filing the application, ASLD recommends scheduling a pre-technical conference with the applicant to discuss the approval process and application requirements. ASLD recommends scheduling a conference after ASLD accepts the application to address technical issues and to discuss application procedures.

Pre-technical conference topics may include: 1) ASLD's application process, 2) typical lease stipulations and terms, 3) contacts for Applicant, Consultants and ASLD, 4) timelines 5) environmental, land-use, and operational issues, 6) responsibilities, 7) scope-of-work, and 8) permitting.

The technical conference will focus on ASLD's review of the draft MDR. This conference provides an opportunity to clarify issues associated with the MDR, reimbursable expenses, the site inspection, the appraisal, lease terms (royalty rate, annual rent, bond, reclamation), and the public auction. The applicant may request additional technical conferences at any stage of the application process.

## **REPORT APPROVAL**

ASLD will notify the applicant in writing when the ASLD approves the final Mineral Development Report. ASLD may delay approval of the MDR or may deny an application if the applicant fails to provide verifiable technical data or adequately address key environment issues.

## **REPORT UPDATES**

The applicant may update or amend the MDR to address unanticipated conditions or in response to review comments requested by ASLD. In addition, ASLD may request updates or amendments.

*ASLD must approve any operational changes prior to implementation. The lessee must amend the approved MDR to reflect operational changes. ASLD must approve all updates or amendments to the MDR.*

OTHER REQUIRED REPORTS: ASLD requires the following reports during the term of the lease:

- *Monthly Production Reports*
- *Annual Operations Status Report* (ASLD summary form)
- *Reclamation and Closure Report* (summary of completed reclamation)

**DEPARTMENT CONTACT**

Please contact the ASLD geologist assigned to your application at:

Arizona State Land Department  
Minerals Section  
1110 West Washington  
Phoenix Arizona, 85007

David Haag  
602-542-2682  
dhaag@azland.gov

# *Mineral Development Report*

## Introduction

- 1. Administrative Summary**
  - 1.1. Geologic Assessment
  - 1.2. Economic Viability
  - 1.3. Environmental Assessment
  - 1.4. Mine Operating Plan
  - 1.5. Reclamation Plan
- 2. General Location and Property Description**
- 3. Legal Description**
- 4. Access and Haul Roads**
- 5. Contact Information**

## Section 1: Geologic Assessment

Section I establishes baseline data supporting the mineral discovery and development of the proposed mining operation. The applicant must base the Geologic Assessment on existing, factual, and verifiable data. ASLD may require additional studies or testing if existing data is insufficient.

ASLD requires the discovery of a valuable mineral deposit or resource prior to the approval of a Mineral Lease. The Geologic Evaluation must demonstrate the existence of a valuable mineral deposit. For hard-rock (locatable) minerals, ASLD bases proof of discovery on the "Indicated" reserve classification as defined by the U.S.G.S. in Circular 831. ASLD included Mineral Reserve Classification definitions for locatable minerals under **Definitions** at the end of this document. For common variety minerals, the applicant must demonstrate the existence of a resource with sufficient quantity and quality to support projected demand for the life of the mining operation.

### **1. Geologic Assessment**

The following outline presents typical topics for a geologic report. However, geologic and mineral resource details required to describe the proposed mining operation must follow accepted industry standards to describe the commodity or deposit under application.

- 1.1. Geologic Summary
- 1.2. Regional Geology
- 1.3. Exploration and Mining History
- 1.4. Project Exploration and History
  - 1.4.1. Exploration methods and procedures
  - 1.4.2. Analyses and Results
- 1.5. Detailed Site Geology

Describe the features and characteristics used to define the type of mineral deposit associated with your application. For example, hard-rock (locatable) deposits like porphyry copper deposits must discuss mineralogy, grade, alteration, zoning, and structure. Common variety mineral (sand and gravel) deposits must describe the quantity and quality of the resource, the sedimentary/fluvial system, gradation, size distribution, plasticity, absorption, and abrasion. Placer gold deposits require elements of both hard-rock and common variety deposits.

- 1.6. Deposit Description
  - 1.6.1. Depth/Top of Deposit, Dimensions, Orientation, Geometry, Distribution
  - 1.6.2. Controls/Limitations
- 1.7. Reserve Estimates of Mineral Resource
  - 1.7.1. Grade/Quality
  - 1.7.2. Cut-off grade
  - 1.7.3. Total and Recoverable Reserves (common variety mineral leases must include the minimum annual guaranteed production, and the maximum projected production in the analysis).
  - 1.7.4. Production Rates (estimated minimum/maximum monthly/annual rates).

## **Section 2: Economic Feasibility**

### **2. Economic Feasibility**

Value assessments require an economic feasibility study. ASLD considers mineral resource value and value to the Trust. The quality, quantity, and the characteristics of the mineral deposit as discussed in the Geologic Assessment help determine mineral resource value. Value to the Trust is the revenue that the Trust realizes from the proposed mining operation. Revenue consists of royalty paid and rental income. Royalty terms for locatable minerals differ from common variety minerals. For locatable minerals, royalties are based either on fixed rate or sliding-scale rates as determined by appraisal. For common variety minerals, public auction sets the royalty rate. ASLD will provide estimated royalty and rent amounts at the pre-technical conference.

- 2.1. Economic Summary
- 2.2. Products (primary, secondary)
- 2.3. Market Analyses and Discussion
  - 2.3.1. Industry overview
  - 2.3.2. Value (range of market prices, point of sale)
  - 2.3.3. Supply/Demand
  - 2.3.4. Market Distance/Reach
  - 2.3.5. Competition
  - 2.3.6. Limitations and Risk
- 2.4. Costs
  - 2.4.1. Pre-mine Development
  - 2.4.2. Capital Expenditures
  - 2.4.3. Production/Operating Costs (component cost, overhead, per unit)
  - 2.4.4. Estimated Permitting
  - 2.4.5. Transportation
  - 2.4.6. Estimated Reclamation and Closure
- 2.5. Operational Economic Parameters
  - 2.5.1. Mine Life
  - 2.5.2. Investment/Discount Rate
  - 2.5.3. DCF – ROI, NPV
  - 2.5.4. Break Even Price
- 2.6. State Trust Revenue
  - 2.6.1. Royalties/Rents
  - 2.6.2. Cash Flows
  - 2.6.3. State NPV
  - 2.6.4. Other Economic Considerations

## **Section 3: Environmental Assessment**

### **3. Environmental Assessment**

Environmental Assessments (EA) evaluate and describe existing environmental conditions, plus discuss potential environmental impacts of the proposed mining operation. The EA must address drainage, erosion, safety, land use conflicts, current site conditions, regulations, permitting, and other issues considered consequential to the proposed operation. The Mine Operations Plan and the Reclamation Plan must address environmental issues and impacts identified in the EA. The EA must discuss impacts and potential mitigation. The Mine Operating Plan and Reclamation Plan must discuss mitigation measures.

3.1. Environmental Statement of Findings

3.2. Purpose and Scope of Assessment

3.3. Land Ownership (adjoining lands within 1 mile)

3.4. Current/Proposed Land Uses

3.4.1. Leasing History

3.4.2. Surrounding Land Uses (1-mile radius)

3.4.3. Land Use Compatibility Issues

3.5. Geographic/Physical Setting

3.5.1. Vicinity Characteristics

3.5.2. Site Conditions (natural, disturbed, surficial characteristics)

3.5.3. Climate

3.6. Soils

3.6.1. Soil Type

3.6.2. Characteristics

3.6.3. Erosion Concerns

3.6.4. Describe method to preserve topsoil for re-use during reclamation

3.7. Drainage and Erosion: ASLD recommends the following technical elements to assess impacts of mining operations within floodplains (requires technical support)

3.7.1. Hydrology: Determine design storm event(s) for analysis of impacts of in-stream mining. Obtain or develop hydrographs for single-event floods ranging from small to large frequencies. Evaluate long-term flood sequences of multiple events and flow duration data to assess worst case scenario(s) in terms of upstream and downstream impacts. ASLD engineers and engineers of the Maricopa County Flood Control District will define flood event(s).

3.7.2. Hydraulics: Identify main channel U.S. Army Corps of Engineers (USACOE) Jurisdictional Delineation (JD) and floodway and floodplain fringe based upon FEMA FIRM panel maps or previous floodplain delineation studies. If previous floodplain studies are unavailable or outdated, delineate floodway and floodplain using fixed-boundary hydraulic models.

3.7.3. Alternative Excavation Plans: Develop alternative excavation plans including the red-line depth of allowable excavation without any short or long term impacts. The MDR must consider both structural and non-structural solutions to the proposed alternative plans. ASLD will evaluate the feasibility of proposed plans including construction, operation and maintenance, and mitigation.

3.7.4. Sediment Engineering: Determine sediment supply to the mined reach and compare to the planned volume of extraction. Use movable-boundary sediment continuity modeling to evaluate impacts to the channel, both vertical and horizontal, for the single and multiple flood events identified in the hydrologic analysis.

3.7.5. Vertical Stability: Evaluate propagation of head-cuts from upstream end of pit for the flood events identified in the hydrologic analysis. Assess both short-term and long-term time frames using appropriate procedures.

- 3.7.6. Lateral Stability: Evaluate lateral migration hazards based on hydraulic, sediment transport, and geomorphologic assessment.
- 3.7.7. Hazards to Structures: Based on findings of the vertical and lateral stability analyses, assess hazards to structures located in the floodway and/or floodplain.
- 3.7.8. Drainage Mitigation Measures: Design structures to mitigate and/or prevent lateral erosion and scour due to in-stream mining.
- 3.8. Surface/Ground Water
  - 3.8.1. Surface Water (springs, ponds, etc.)
  - 3.8.2. Ground Water Hydrology (well data, depth of well and top of water, flow direction, basin, active manage area, etc.)
  - 3.8.3. Ground/Surface Water Contamination/Run-off (current quality)
  - 3.8.4. Operational impacts on surface and subsurface water
  - 3.8.5. Operational water requirements (usage, sources, permit requirements)
- 3.9. Biology (short/long term impact, existing habit and habitat loss)
  - 3.9.1. Native/Protected Plants
  - 3.9.2. Introduction and Control of Noxious Plants
  - 3.9.3. Wildlife
  - 3.9.4. Threatened and Endangered Species
- 3.10. Cultural Resources (Archaeology)
- 3.11. Hazardous Materials (use, types, quantities, treat, storage)
  - 3.11.1. Waste
  - 3.11.2. Chemicals
  - 3.11.3. Explosives
- 3.12. Solid Waste
- 3.13. Septic
- 3.14. Air Quality (current standards)
- 3.15. Noise (sources, levels, duration, standards)
- 3.16. Visual Impacts
- 3.17. Open Space, Parks, Recreation Areas, Wildlife Refuges
- 3.18. Environmental Liens
- 3.19. Regulations and Permits: Identify permits required, indicate status, implementation date, and special permitting issues. The MDR must include copies of correspondence related to permits in an appendix, including permit requirements.
  - 3.19.1. Corps of Engineers Section 404/401 Permit
  - 3.19.2. County Flood Control Permit/Floodplain Use Permit
  - 3.19.3. Special Use Permits (local jurisdictions)
  - 3.19.4. National Pollutant Discharge Elimination System Permit (NPDES)
  - 3.19.5. Air Quality Permit
  - 3.19.6. Aquifer Protection Permit
  - 3.19.7. Notice of Intent To drill
  - 3.19.8. Septic Tank
  - 3.19.9. Hazardous Waste Permit
  - 3.19.10. Waste Water Reuse
  - 3.19.11. Storm Water discharge
- 3.20. Utilities: Discuss existing utility infrastructure including locations and capacity for each utility, or if nonexistent, how the lessee will address lack of utility infrastructure.
  - 3.21.1. Water
  - 3.21.2. Gas



- 3.21.3. Electric
- 3.21.4. Sewer
- 3.21.Improvements
  - 3.21.1. Existing
  - 3.21.2. Planned
- 3.22.Transportation
  - 3.22.1 Infrastructure (current, planned)
  - 3.22.2 Local Traffic Conditions
  - 3.22.3 Operational Requirements (loads per day, size, distances, routing, timing, etc.)
  - 3.22.4 Transportation Issues (residential areas, dirt roads)
- 3.23.Planning and Zoning (current zoning, re-zoning, exemptions for mining/metallurgical use)
  - 3.23.1 Current Planning and Zoning (County/City General Plan)
  - 3.23.2 Conformance to Zoning Requirements or Master Plan
- 3.24.Socio-Economic Impacts
  - 3.23.3 County and Community Economic Impacts (employment, payroll, taxes, etc.)
  - 3.23.4 Benefits and Improvements (open space, channelization, flood control, retention, commercial, etc.)
  - 3.23.5 Emergency Response (procedures, notification, timing)

## **Section 4: Mine Operating Plan**

### **4. Mine Operating Plan (MOP)**

The Mine Operating Plan (MOP) provides detailed technical and operational information. Primary topics include mining operations, equipment, processing facilities, materials handling, security, and production schedules. The MOP must discuss environmental issues identified in the EA that mine operations measures may mitigate. The MOP integrates with the Reclamation Plan to reflect concurrent, on-going reclamation.

- 4.1. Operations Summary
- 4.2. Development/Production Schedules (projected mine life, operating days per year, production rates)
- 4.3 Site Development (clearing, infrastructure, topsoil removal and stockpiling, etc.)
- 4.4 Access and Haul Roads
- 4.5 Construction
- 4.6 Mining
  - 4.6.1 Mine Method (open pit, quarry, underground, sluicing, dry washing, etc.)
  - 4.6.2 Mine Design Parameters (i.e. waste ratios, dilution, recovery, heights, slopes, mining days per year, hours, haul road widths)
  - 4.6.3 Topsoil Removal and Stockpiling
  - 4.6.4 Slope/Bench Preparation
  - 4.6.5 Drilling and Blasting
  - 4.6.6 Loading, Hauling, and Conveying
  - 4.6.7 Stockpiles
  - 4.6.8 Loading/Hauling
  - 4.6.9 Mining Equipment and Facilities (type, size and capacity of all equipment)

- 4.6.10 Ancillary Equipment and Facilities (maintenance areas, mine office, etc.)
- 4.7 Processing/Recovery (include flow chart)
  - 4.7.1 Plant Operations and Design (concentrating, crushing, screening, sorting, etc.)
  - 4.7.2 Processing Equipment ( include specifications)
  - 4.7.3 Ancillary Processing Equipment and Facilities
  - 4.7.4 Product Mix
  - 4.7.5 Ore/Materials Handling (i.e. crushing, conveying, screening, sorting/classifying)
- 4.8 Production Monitoring and Verification
- 4.9 Product Handling, Stockpiling, Bagging, Storage
- 4.10 Product Transportation/Hauling
- 4.11 Labor Force
- 4.12 Contractors/Subcontractors (construction and mining)
- 4.13 Dust Control and Other Particulates
- 4.14 Noise Abatement
- 4.15 Blasting, Explosives Storage and Handling
- 4.16 Power Generation and Distribution
- 4.17 Water Supply, Storage and Use (recycling, filtering, sedimentation)
- 4.18 Fuel Storage
- 4.19 Sanitary and Solid Waste Handling and Disposal
- 4.20 Hazardous Waste Handling/Water Pollutants/Spills (surface, subsurface)
- 4.21 Site Security
- 4.22 Fire Protection
- 4.23 Cultural Resources
- 4.24 Protected Plant Species Handling
- 4.25 Wildlife/Endangered Species Protection
- 4.26 Visual Impact
- 4.27 Emergency Response (notification, monitoring and reporting)

ASLD requires that the lessee submit an “*Annual Operations Status Report*” in January of each year for the duration of the lease. The status report must include: tons mined, total commodity recovered, total acres disturbed, and total acres reclaimed. The lessee must include updated maps and aerial photos in the “*Annual Operations Status Report*”.

## **Section 5: Reclamation Plan**

### **5. Reclamation Plan**

The Reclamation Plan addresses technical and operational details regarding the preferred reclamation alternative outlined in the EA section of the MDR. The lessee must reclaim disturbed areas to a condition that allows the highest and best post-mine use. The Reclamation Plan integrates with the Mine Operating Plan to summarize reclamation activities. The scope of the Reclamation Plan depends on the type and size of the mining operation. ASLD recognizes that reclamation requirements, technology, and methods may change over time; ASLD will consider these changes at the termination of mining. ASLD requires that the lessee post a reclamation bond and maintain indemnity insurance for the term of the lease to comply with lease conditions and reclamation requirements.

5.1 Reclamation Alternatives must consider the best, most reasonable post-mining uses. The applicant must propose an alternative that meets ASLD reclamation requirements.

5.1.1 Alternative A: Preferred Alternative

5.1.2 Alternative B

5.1.3 Alternative C

5.2 Reclamation Approach / Methods (special technology required or applied)

5.2.1 Proposed Areas of Disturbance (mining, trenches, pits, processing sites, storage sites, stockpiles)

5.2.2 Equipment and Structure Removal

5.2.3 Waste Dumps, Stockpiles, Tailings

5.2.4 Settling/Filtration Ponds

5.2.5 Roads, Power lines, Water lines, Fences

5.2.6 Post Mining Site Preparation (i.e. topsoil replacement, grading, re-contouring)

5.2.7 Re-vegetation/Seeding

5.2.8 Slope Stabilization

5.2.9 Erosion and Drainage Control

5.3 Reclamation Scheduling and Timing

5.4 Personnel (short and long-term)

5.5 Post-Mine Care (long-term commitments, maintenance, monitoring)

5.6 Reclamation Projected Costs (short and long-term)

5.7 Developing the *Reclamation and Closure Report*

The Reclamation and Closure Report is a separate report due 30 days after completing final reclamation activities. The Reclamation and Closure Report documents all past reclamation activities and summarizes final reclamation efforts. The lessee coordinates final reclamation requirements and procedures with ASLD, including long-term commitments, maintenance, and monitoring. The report represents a time-line of reclamation efforts. ASLD requires post-mining aerial photos and final reclamation aerial photos. Reclamation activities involving long-term monitoring will require quarterly status reports.

5.8 Reclamation Summary

## **Suggested Appendices and Illustrations**

### **Appendices**

Geologic test results, sample analysis, sample description, location, testing methods, drill logs, reserve calculation worksheets, cash flow, other economic data, economic calculations.  
Phase I Environmental Study  
ASLD Environmental Questionnaire and responses  
Copies of Permits or Correspondence relating to permitting  
Correspondence  
References  
Agencies, Consultants, and Individuals Contacted

### **Maps, Figures, Illustrations**

General Location Map  
Detail Location Map (showing relationships of)  
    Lease/Operations Boundaries  
    Ownership (Surface & Mineral, at least 1 mile surrounding operation)  
    Access routes and haul roads  
    Existing Right of Ways, Roads, Highways  
    Utilities  
    Municipal Boundaries  
    Parks, Preserves, API Boundaries  
    Floodplain, Floodway, and COE Jurisdictional Boundaries  
    Areas of disturbance (reference details in MOP)  
    Drainage (Surface & Groundwater Flow maps)  
Geologic Maps (surface geology, mineralization, alteration, zoning, structure, deposit boundaries)  
Cross-sections  
Sample locations, testing sites, boring locations  
Aerial Photo (Recent and historic aerial photos depicting lease boundaries)  
Oblique aerial photos  
Site Photos  
Contour map (2 foot interval)  
Additional Illustrations (representing current conditions and describing the deposit)

### **Maps, Figures, Illustrations**

Plant/Facilities/Dumps/Stockpiles layout  
Mining plans (scheduled, phased)  
Process flow chart  
Pre-Mining and Post-Mining Contour Maps  
Aerial Photos  
Pre-Mining and Post-Mining profiles (cross-sections)  
Reclamation Concept renderings  
Maps showing facilities, roads, fences & other features designated for removal  
Additional Illustrations (representing mine operations and reclamation)

## **Definitions**

Reserve Classification: U.S. Geological Survey Circular 831

**Measured:** Quantity is computed from dimensions revealed in outcrops, trenches, workings, or drill holes; grade and/or quality are computed from the results of detailed sampling. The sites for inspection, sampling, and measurement are spaced so closely and the geologic character is so well defined that size, shape, and mineral content of the resource are well established.

**Indicated:** Quantity and grade and/or quality are computed from information similar to that used for measured resources, but the sites for inspection, sampling, and measurement are farther apart or are otherwise less adequately spaced. The degree of assurance, although lower than that for measured resources, is high enough to assume continuity between points of observation.

**Inferred:** Estimates are based on an assumed continuity, beyond measured and/or indicated resources, for which there is geologic evidence. Inferred resources may or not be supported by samples or measurements.

## **MDR Format**

<b>Copies:</b>	One (1) bound paper copy of every draft submitted One (1) digital copy (saved in Adobe® PDF format) of every draft submitted
<b>Binder:</b>	Loose leaf, 3 ring, 8½" x 11" binder
<b>Title/Cover Page:</b>	(Binder Cover Page and Report Title Page, see attached example) Report Title Lease/Application Number Lease/Application Type (Mineral Lease, Common Variety Minerals Lease) Location: Township, Range, Section, and County Name of Lessee/Applicant Address, Phone Prepared By Prepared For Date
<b>Binder Spine:</b>	Report Title Name of Lessee/Applicant Lease/Application Number County, State, Township, Range, Section
<b>Table of Contents:</b>	Follow the outline. If required, insert additional topics or sections
<b>Appendices:</b>	Dividers with labeled tabs
<b>Margins:</b>	Right 1 inch, left 1 inch
<b>Font:</b>	Arial or Times New Roman, 12 point
<b>Justification:</b>	Left or Full
<b>Page Header:</b>	Include report title and application/lease file number (start header after title page)
<b>Page Footer:</b>	Page number, right justified, format is " <i>Page x of x</i> ".

*(Example: Cover & Title Page Format)*

# MINERAL DEVELOPMENT REPORT

Application 04-999999

Section 32, T15S, R14E  
Pima County, Arizona.

XYZ Mining, Inc.  
9999 South Rocky Road  
Phoenix, Arizona 85999

Prepared by

ABC Consulting Services, Inc.  
P.O. Box 99999  
Phoenix, AZ 85999

For

Minerals Section  
Natural Resources Division  
Arizona State Land Department

September 9, 1999

*(Example: Spine Label Format)*

## MINERAL DEVELOPMENT REPORT

Application 04-999999  
Section 32, T15S, R14E  
Pima County, Arizona  
XYZ Mining, Inc.

*(example)*  
**TABLE OF CONTENTS**  
**Mineral Development Report**

**Introduction**

- A. Administrative Summary
  - i. Geologic
  - ii. Economic
  - iii. Environmental Findings
  - iv. Operational
  - v. Reclamation & Closure
- B. General Location and Property Description
- C. Legal Description
- D. Access/Haul Roads
- E. Operator/Applicant Contact Information

**Section 1: Geologic Assessment**

- 1.0 Geological Assessment
  - 1.1 Geological Summary
  - 1.2 Regional Geology
  - 1.3 Exploration and Mining History
  - 1.4 Current Project Exploration and Testing
  - 1.5 Detailed Property Geology
  - 1.6 Deposit Model
  - 1.7 Resource Estimate

**Section 2: Economic Feasibility**

- 2.0 Economic Feasibility
  - 2.1 Economic Summary
  - 2.2 Commodity/Products
  - 2.3 Market Analysis Discussion
  - 2.4 Costs
  - 2.5 Operational/Economic Parameters
  - 2.6 State Trust Revenues

**Section 3: Environmental Assessment**

- 3.0 Environmental Assessment
  - 3.1 Environmental Statement of Findings
  - 3.2 Purpose and Scope of Assessment
  - 3.3 Land Ownership
  - 3.4 Current/Planned Land Uses
  - 3.5 Geography/Physical Setting
  - 3.6 Soils



- 3.7 Drainage and Erosion
- 3.8 Surface/Groundwater
- 3.9 Biology
- 3.10 Cultural Resources
- 3.11 Hazardous Wastes
- 3.12 Solid Wastes
- 3.13 Septic System
- 3.14 Air Quality
- 3.15 Noise
- 3.16 Visual Impact
- 3.17 Open Space, Parks, Recreation Areas, Wildlife Refuges
- 3.18 Environmental Liens
- 3.19 Regulations and Permits
- 3.20 Utilities
- 3.21 Improvements
- 3.22 Transportation
- 3.23 Planning and Zoning
- 3.24 Socioeconomic Impacts

#### **Section IV: Mine Operating Plan**

##### 4.0 Mine Operating Plan

- 4.1 Operations Summary
- 4.2 Development/Production Schedules
- 4.3 Site Development
- 4.4 Access and Haul Roads
- 4.5 Construction
- 4.6 Mining
- 4.7 Process/Recovery
- 4.8 Production Monitoring and Verification
- 4.9 Product Handling, Stockpiling, Bagging and Storage
- 4.10 Product Transportation/Hauling
- 4.11 Labor Force
- 4.12 Contractors/Subcontractors
- 4.13 Control of Dust and Other Particulates
- 4.14 Noise Abatement
- 4.15 Blasting, Explosives Storage and Handling
- 4.16 Power Generation and Distribution
- 4.17 Water Supply, Storage and Use
- 4.18 Fuel Storage
- 4.19 Sanitary and Solid Waste Handling and Disposal
- 4.20 Hazardous Waste Handling/Water Pollutants/Spills
- 4.21 Site Security
- 4.22 Fire Protection
- 4.23 Cultural Resources

- 4.24 Protected Species Handling
- 4.25 Wildlife/Endangered Species Protection
- 4.26 Visual Impact
- 4.27 Emergency Response

## **Section 5: Reclamation Plan**

### 5.0 Reclamation Plan

- 5.1 Reclamation Summary
- 5.2 Reclamation Approach
- 5.3 Reclamation Scheduling and Timing
- 5.4 Personnel
- 5.5 Post-reclamation Care
- 5.6 Reclamation Projected Cost
- 5.7 Approach to Developing the Reclamation and Closure Plan

## **Graphics and Appendices**

### FIGURES

- 1. Location Map
- 2. Vicinity Map
- 3. Geological Map
- 4. Geological Cross Sections
- 5. Incorporated Areas
- 6. Zoning Map
- 7. County Land Use Designations
- 8. Noise Receptors
- 9. Parks and Recreation Areas
- 10. Existing Conditions
- 11. Pit Plan
- 12. Pit Cross Sections
- 13. Mining/Processing Flowsheet
- 14. View of Processing Plant
- 15. Reclamation Alternative A
- 16. Reclamation Alternative B
- 17. Reclamation Alternative C

### APPENDICES

- A. Legal Description
- B. Resource Estimate
- C. General Climate Summaries and Soil Survey
- D. Biological Evaluation
- E. Cultural Resources Survey
- F. Visibility Analysis
- G. Permit Related Documents
- H. Reclamation Cost