

# Chlumsky, Armbrust & Meyer L.L.C.

## Statement of Qualifications

## ***INTRODUCTION***

Chlumsky, Armbrust, & Meyer L.L.C. (CAM) is an international mineral resources, consulting, and engineering group based in Lakewood, Colorado, U.S.A. The company offers complete mining, processing, and environmental consulting services to the mining industry and financial institutions.

CAM professionals pride themselves on working closely with the client to achieve the most cost-effective approach to project development, meeting both economic and corporate objectives. Included in this approach is the basic understanding that each project is unique and must be developed accordingly.

Our organization includes well-established alliances with other consulting groups, test facilities, and specialists throughout the world, enabling us to provide efficient and timely onsite and in-country expertise for a variety of assignments.

## ***EXPERIENCE***

CAM provides broad-based expertise in the evaluation and development of precious and base metals, energy, diamonds, and industrial minerals. We retain professionals who are experienced in geology, mining engineering, process and facility design, civil engineering, hydrogeology, environmental engineering, mineral economics, corporate planning and financing, and management of mining-industry projects, with each member of our team averaging more than 20 years of international experience.

Typical projects performed by the CAM organization range from QA/QC planning for exploration programs, exploration audits, exploration program design, reserve audits, due diligence reviews of feasibility studies, preparation of feasibility studies, closure planning and reclamation, and technical support to the corporate finance and legal communities. CAM professionals have completed over 1,200 assignments in the past ten years for mining companies and financial institutions, and have performed due diligence activities as a team on mining projects with capital construction costs of over US\$ 5 billion.

**CLIENTS**

Clients served by CAM professionals include mining companies, financial institutions, investors, and government bodies and agencies (excluding regulating units). Our specialists have completed projects throughout the world, including Africa, the Asia-Pacific region, Canada, Europe, Latin America, the former Soviet Union, and the United States. The following is a list of representative clients.

**Mining  
Companies**

American Alkali	Meridian Gold Company
Atlas Corporation	Metallica Resources
Barrick Gold Corporation	Minefinders
Brancote Holdings	Moydow Mines International
Cia. Minera Mexico S.A. de C.V.	Newmont Mining Company
Cementos Lima S.A.	Northgate
Coeur d' Alene	Orvana Resources Corporation
Cia. Minera La Parrena S.A. de C.V.	Pegasus Gold Corporation
Cyprus Mining Company	Real del Monte
Doublestar Resources	Royal Oak Resources Ltd.
Falconbridge	Satellite Goldfields
Golden Queen	Servicios Industriales Penoles
Greenstone Resources	Sociedad Contractual Minera El Abra
Hecla Mining Company	Sunshine Mining & Refining Co.
High Desert Mineral Resources	Teberebie Goldfields Ltd.
Homestake Mining Company	U.S. Energy Corporation
Industria Minera Mexico	Viceroy Gold Corporation
Industrias Luismin S.A. de C.V	Vista Gold
Kinross Gold	

**Financial  
Institutions**

ABN-AMRO Bank	Generale Bank
Bankers Trust of Canada	Hypo- und Vereinsbank AG
Bank of Montreal	Industrial Bank of Japan
Bank of Tokyo - Mitsubishi	James Capel
Banque Paribas	Japan Bank for International Cooperation
Barclays Capital	Kreditanstalt für Wiederaufbau
Canadian Industrial Bank of Commerce	N.M. Rothschilds & Sons
Citibank	NMB Bank
Chase Securities	Overseas Private Investment Corp.
Credit Lyonnais	Price Waterhouse, IPG
Deutsche Bank	Resource Capital Fund
Dresdner Bank	Royal Bank of Canada
European Bank for Reconstruction & Development	Royal Bank of Scotland
Export Development Corporation	SBC Warburg
Export-Import Bank of the United States	Scotia Capital
FerroScandia Bank Ltd.	Société Generale
Finnish Export Credit Ltd.	Standard Bank Group
	TD Securities
	Union Bank of Switzerland

**Government  
Entities**

CODELCO (Chile)	Empresa Minera Especial Tintaya S.A. (Peru)
COMIBOL (Bolivia)	
Empresa del Hierro del Peru (Peru)	

## ***SERVICES***

Services provided by CAM professionals include the following:

- geological and resource evaluations;
- surface and underground mine engineering;
- manual and computer-generated ore-reserve estimates;
- testwork design and monitoring;
- process, facility, and infrastructure design and engineering;
- environmental engineering; environmental plans, audits, and EIS monitoring;
- mineral economics, financial analyses, feasibility studies, bankable documents, due diligence, commodity and market studies, fairness opinions, valuation of mineral properties.

## **Geological Evaluations**

CAM prides itself on its integrated-team approach that enables geologists, geostatisticians, and project engineers to work together effectively ensuring timely, cost-effective results for the client. Our professionals are experienced in dealing with precious and base metals, coal, uranium, diamonds, and industrial minerals.

We understand that every mineral deposit has unique geologic characteristics and features that must be considered. Geologic features control economic mineralization; therefore, a more reliable grade estimate will be calculated with careful geologic modeling than by using a more complex statistical method without geologic guidelines.

Resource estimation is based upon the development of a three-dimensional model of the deposit with either manual or computer methods. The completed resource model allows for rapid tabulation of mineral inventory and provides a basis for all subsequent mine design and planning. The objective is to provide the most reliable and accurate evaluation with the data available.

Audits of exploration databases sometimes occasionally discover that critical parts of the data-gathering processes have been omitted, such as sufficient down-hole surveying or duplicate sample assaying. CAM offers a pre-exploration program QA/QC service that reviews exploration program plans to ensure that all necessary information is available for a reliably calculated resource estimate.

Geological services provided by CAM professionals include:

- QA/QC planning for exploration programs;
- design and implementation of exploration programs;
- prospect and mine geology evaluations;
- resource audits and third-party verifications;
- statistical and geostatistical analyses;
- geologic modeling;
- resource estimation.

## **Mine Engineering**

### ***Open Pit Mining***

CAM professionals use modern computer technology to provide a total-system approach to open-pit mine planning and design. By incorporating extensive computer expertise with practical international experience, we are able to provide the client with an individually tailored product. CAM can also provide estimates for equipment and personnel requirements, infrastructure, and mine capital and operating costs.

Mine engineering planning includes pit-optimization techniques that define the phased and ultimate-pit limits. CAM professionals are skilled in using the most widely available mine planning software packages.

Open pit mining services provided by CAM professionals include the following:

- economic pit-limit design;
- manual and computer-generated, mineable-reserve estimations;
- mine planning and scheduling;
- cutoff-grade optimization;
- production reconciliations;
- capital- and operating-cost estimates;
- waste-dump design and placement.

## ***Underground Mining***

CAM professionals have considerable experience with selecting the most suitable underground mining methods compatible with specific ground conditions. Completed projects include the evaluation and design of the smallest to the largest underground mines, underground storage vaults, and underground openings for water flow, transportation, and mine access. CAM has been involved in the design, development, and construction phases of underground mines in a variety of terrains and in countries worldwide.

Underground mining services provided by CAM professionals include the following:

- underground mine design;
- ore-transportation assessment and alternatives;
- optimum production-rate studies;
- equipment selections and specifications;
- planning for all aspects of mine operation;
- underground environmental mine evaluations for water-control problems and safety requirements;
- capital- and operating-cost estimates;
- production reconciliation.

## **Process, Facility, and Infrastructure Engineering**

CAM professionals have completed a wide variety of assignments involving feasibility studies, basic engineering, process-alternative investigations, and metallurgical test programs. We have worked in over 30 countries and have supplied process expertise for the successful recovery of minerals, from abrasives to zinc. Our innovative designs are backed up with state-of-the-art mass and chemical balances. Design work, including flowsheets, general arrangements, P&IDs, single-line electrical drawings, and site plans, is produced on our in-office AutoCAD system. Project schedules and planning are set up and tracked by Primavera software.

CAM's process/facility engineering professionals are experienced in assessing metallurgical testwork and the validity of samples used, data-processing parameters, plant design, estimated capital and operating

costs, and implementation schedules. Our engineers are skilled in preparing the technical completion section of loan agreements and certifications of completion at the start of production, assisting with plant startup, and troubleshooting in established operations.

Process and infrastructure services provided by CAM professionals include the following:

- process plant audits and appraisals;
- project-completion certification;
- metallurgical-testwork planning, control, and client representation;
- feasibility studies;
- conceptual facility design and basic engineering;
- infrastructure engineering;
- plant-operation audits and startup.

## **Mineral Economics**

CAM mineral-economics specialists provide a full range of services and products to the mining industry. We have extensive databases for precious and base metals, energy minerals, and industrial minerals that provide the basis of our ability to conduct detailed economic evaluations.

Services in mineral economics provided by CAM professionals include the following:

- mineral-commodity analyses;
- marketing and scoping studies;
- economic evaluations and bankable documents;
- foreign-privatization reports;
- expert-witness testimony;
- cash flow and financial analyses;
- costing reviews;
- loan-completion requirements and certifications;
- project valuations;
- fairness opinions;
- due diligence reports;
- industry and strategic country studies.

## **Environmental Engineering**

CAM professionals have conducted environmental assessments and audits on a variety of metals, coal, and industrial mineral mining projects in the U.S. and abroad for both private industry and government. We provide skilled support to the mining industry in all phases of mine permitting and regulatory support. We are experienced in the evaluation and implementation of environmental management programs/systems in accordance with U.S. and international environmental standards.

Our specialists have prepared comprehensive mitigation plans, evaluated permitting feasibility, assessed and developed water-treatment systems, prepared and implemented operating and reclamation plans, conducted water-quality investigations, completed environmental baseline studies, managed environmental compliance programs, and participated in an assortment of other projects, all in support of permitting for a wide variety of clients.

Environmental services provided by CAM professionals include the following:

- Environmental Impact Assessments (EIAs);
- environmental/regulatory compliance audits;
- mine permitting at the local, state, federal, and international levels;
- operations regulatory compliance inspections;
- mine-waste management design/remediation;
- water management;
- wetlands mitigation/construction;
- air quality and noise assessment;
- risk assessment/management;
- acid-rock drainage assessment and abatement;
- mine closure planning;
- surface reclamation, erosion/sediment control and regulation;
- environmental management of construction sites;
- appraisal of community relations and community development programs;
- assessment of relocation and resettlement programs.



## **PROFESSIONAL TEAM**

CAM geologists, geostatisticians, environmental specialists, and engineers work closely and effectively as a team on specific projects for timely, cost-effective results. This approach allows for flexibility and rapid changes during a project to accommodate changing corporate, economic, and/or site-specific requirements. Through its senior staff, CAM also offers management and organizational consulting covering all facets of the mineral-resources industry, from restructuring of private and government-owned companies to cost and efficiency reviews for specific operations. In order to provide the best available expertise on every project, CAM may contract with additional senior specialists on an as-needed basis.

The following is a list of CAM professionals, detailing their education and experience.

### **George A. Armbrust** Principal

*Education:* B.S., Ph.D.

*Experience/Specialties:* 35 years. Managed over 80 geological evaluations/reserve audits throughout North America, South America, Africa, Russia, and Southeast Asia. Studies have included reserve audits for SEC filings, feasibility studies, technical appraisals, privatization plans, and general project reviews. Project manager/principal geologist on due diligence reviews for Antamina, Bulyanhulu, Batu Hijau, Los Pelambres, and Candelaria projects. Prepared or audited resource and reserve estimates worldwide, including Esquel in Argentina, Wassa in Ghana, Ellatzite in Bulgaria, and Kubaka in Siberia. Fluent in Spanish.

### **Gregory F. Chlumsky** Principal

*Education:* B.S.

*Experience/Specialties:* 30 years. Extensive experience in mineral processing, hydrometallurgy, primary zinc smelter operation, solvent extraction uranium mills, and heap leach gold operations. Well versed in modern smelting techniques and new and innovative flotation systems. Evaluated over 250 mine processing facilities in Africa, the United States, Mexico, and the former Soviet Union. Project manager and principal process engineer for due diligence on Kubaka Gold, C.R. Briggs Gold, Lomas Bayas, and San Cristobal. Project manager for feasibility studies of Golden Queen, Wassa, Rosia Montana, Esquel in Argentina, and Ellatzite in Bulgaria. Deputy Project manager on due diligence reviews for Antamina, Bulyanhulu, Batu Hijau, and Los Pelambres.

**Kenneth L. Meyer**  
Principal

*Education:* B.S., M.S.

*Experience/Specialties:* 33 years. Domestic and international experience in the design, construction, and operation of industrial production facilities and associated infrastructure. Experience in design, application, and operation of mechanical and electrical equipment; piping design; process control engineering; and civil/structural engineering. Principal engineering, construction and infrastructure reviewer for Batu Hijau, Antamina, Los Pelambres, San Cristobal, Bulyanhulu, and principal designer for feasibility studies on Golden Queen, Rosia Montana, Wassa Satellite Goldfields, and Esquel in Argentina. Extensive foreign experience in Europe, Middle East, Persian Gulf, Asia, and South America. Fluent in Italian.

**Richard Addison**  
Senior Process  
Engineer

*Education:* A.C.S.M., M.S.

*Experience/Specialties:* 34 years. Extensive experience in providing engineering and consulting services to more than 100 mining operations and projects throughout the world. Vast technical knowledge and thorough familiarity with capital and operating costs and with production and implementation scheduling. Fluent in Spanish.

**John P. Barry**  
Senior Geologist

*Education:* B.S., M.S., M.B.A.

*Education/Specialties:* 15 years. Extensive international experience, primarily in Sub-Saharan Africa, Western Australia and South-east Asia in the sourcing, managing and evaluation of gold and base-metal exploration projects ranging from conceptual plays to advanced targets around existing mines. Specific areas of expertise are in structural geology and financial modelling. Studies have included independent expert reports/valuations to support SEC filings, technical appraisals and strategic pathfinder documents.

**Fred Barnard**  
Senior Geologist

*Education:* B.A., Ph. D.

*Experience/Specialties:* 35 years. Domestic and international experience in conducting reserve audits and geologic evaluations of mineral projects. Extensive experience in evaluating and planning mineral exploration projects. Has examined mines and exploration projects throughout North and South America, Australia, Africa, Europe and Asia. Fluent in Spanish.

**Fred R. Banta**

Senior Environmental  
Specialist

*Education:* B.S., M.S.

*Experience/Specialties:* 30 years. Experienced in mining related environmental/regulatory activities in a variety of positions for both private industry (mining and consulting companies) and with the U.S. Federal Office of Surface Mining. Specialized in soil chemistry, the permitting of proposed mine properties, compliance with environmental laws/regulations, safety standards, social impact mitigation, mined-land reclamation design/ planning, and the environmental impact analysis.

**Terry R. Brown**

Senior Environmental  
Specialist

*Education:* B.S., M.S., Ph.D.

*Experience/Specialties:* 24 years. Experienced in mining related environmental/regulatory activities in a variety of positions for both private industry (mining and consulting companies) and with the State of Colorado EH&S regulatory programs for mining operations. Specialized in soil chemistry, the permitting of proposed mine properties, compliance with environmental laws/regulations, safety standards, social impact mitigation, mined-land reclamation design/ planning, and the environmental impact analysis.

**Bruce Higson-Smith**

Financial Analyst

*Education:* B.S., M.B.A.

*Experience/Specialties:* 30 years. Experienced as a mining professional with strong expertise in sourcing of mining opportunities worldwide, evaluating their potential and negotiating structured finance transactions with mining companies. Commodities reviewed include gold, silver, diamonds, copper, zinc, germanium, gallium, and industrial minerals.

**Leonard R. Kilpatrick**

Senior Mining  
Engineer

*Education:* GDE, ACSM

*Experience/Specialties:* 40 years. Global consulting experience including banking (Bank of Montreal) for the mineral industry. Experience in most commodities, particularly gold, platinum, palladium, and also base metals, diamonds, uranium, coal, potash, and other industrial minerals. World-wide experience in North, Central, and South America, Europe, Central Asia, Africa, Australia, and the South Pacific.

**Jan W. Matousek**

Senior Process  
Engineer

*Education:* Ph. D., P.E.

*Experience/Specialties:* 30 years. Technical, operations, and supervisory experience in pyrometallurgy ranging from world-class primary smelter production to the design of pilot plants, developing



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flowsheets, preparation of process engineering and

economic studies, and due diligence reviews.

**Steve L. Milne**

Senior Mining Engineer

*Education:* B.S., P.E.

*Experience/Specialties:* 35 years of experience. Diversified experience in the management, design, evaluation, and operation of mining properties worldwide. Specializes in the design and evaluation of underground mines and facilities in conjunction with open-pit mining methods. Fluent in Spanish.

**Michael J. Read**

Senior Mining Engineer

*Education:* B.S.

*Experience/Specialties:* 18 years. Experienced in mine engineering, software development, and computer applications. Skilled in the development of mine plans, mine operational plans and feasibility studies for the gold, silver, beryllium, copper, coal, and uranium industries. Proficient in both open-pit and underground designs. Gold experience includes a recent 12-month operational mine design assignment at Brewery Creek in Canada and acting as mine engineer for the Rosia Montana pre-feasibility study.

**Robert L. Sandefur**

Senior Geostatistician

*Education:* B.S., M.S., P.E.

*Experience/Specialties:* 33 years. Computerized mine planning, orebody modeling, and geological data handling for underground and open-pit mines. Experienced in coal, copper, uranium, and precious metals with foreign assignments in Chile, Kyrgyzstan, Peru, and Mexico.

**James R. Swaisgood**

Senior Geotechnical Engineer

*Education:* B.S., P.E.

*Experience/Specialties:* 40 years. A wide-range of geological and civil engineering experience, particularly in projects involving water storage and tailings dams, underground openings, ground behavior, slope stability and seismic analyses. Extensive experience in design, construction and evaluation of tailings impoundments, dams and reservoirs.

**Donald B. Tschabrun**

Senior Mining Engineer

*Education:* B.S., M.S.

*Experience/Specialties:* 26 years. Broad experience in geological and mine engineering, ore deposit modeling, ore reserve estimation, mine planning and design, capital and operating cost estimation, and economic and financial evaluations. Very strong computer skills in many computer languages. Experienced in gold, silver, copper, lead, zinc, and industrial minerals with assignments on projects in North America, South America, Australia, Africa, and China.

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