



Statement of Qualifications

For Providing Mining, Geology, Civil, Geotechnical,
Process, Water, and Environmental Engineering Services

Prepared by:
Global Resource Engineering Ltd.
600 Grant St. Suite 975
Denver, CO 80203
www.global-resource-eng.com

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Global Resource Engineering (GRE) is a multifaceted engineering firm specializing in the mining industry. Our focus is to add value to your project and company by understanding your needs, employing innovative ideas, and applying sound engineering while maintaining an economically driven approach. Where other companies might have a “we are the experts” attitude, we will work closely with you and your team to provide a solution that fully meets your needs and expectations. Our team recognizes mining is a complex and multi-faceted business, where a solution to each challenge may have unexpected effects elsewhere in the project. At GRE, we work to consider the project as a “whole,” no matter what portion of the project our focus may be on. Our clients tell us that we provide personalized service, consistent high-quality work, and better communication than larger firms.

We are a dynamic and growing engineering firm whose hallmark of success, through all mining cycles, has been the ability to provide quality, cost effective, engineering and creative solutions for our clients.

We have a combination of senior level professionals, experienced project managers, and technical staff to execute projects efficiently. We work in a partnership with our clients to achieve their company goals and operational milestones. Because of this philosophy, we won an award as Denver’s fastest growing private business in 2012.

We provide comprehensive mining consulting services with international experience and technical excellence through a low corporate overhead approach. Our services include: geology mapping and modeling; hydrology; resource and reserve estimation; open pit and underground mine design, mine planning, and optimization; financial analysis and constraint modeling; metallurgical design and process flow sheet development; process audits; heap leach and tailings design; mine waste facility design; geochemical risk mitigation; geotechnical; ARD auditing, mitigation, and closure planning; field investigations; site water management; groundwater modeling and overall project water balance; project due diligence; and land management. With a combined experience in excess of 200 years we have the expertise to meet your needs.

A more detailed list of services, a select list of past and current projects, and team member bios are provided on the following pages.

GRE TEAM

Larry Breckenridge, P.E. - Principal Environmental Engineer

Mr. Breckenridge has 20 years of experience in mining environmental engineering including hydrogeology, geochemistry, water resource development, and environmental management. His work includes a diverse array of projects, including discovering a 7,000-gallon per minute (gpm) sustainable groundwater resource for a silver mine in the Bolivian desert, modeling contaminant transport at an inactive uranium mill in Texas, evaluating the hydrologic containment of an unlined tailings storage facility at a Guatemalan gold mine, and creating a geochemical model of a mining pit lake in Venezuela. He is also an expert in groundwater modeling using a variety of modern programs. Mr. Breckenridge has written numerous mine closure plans and is skilled in the economic assessment of environmental liabilities. He is fluent in English and Spanish and has experience in ten Latin American countries as well as experience with projects in Eastern Europe and Africa. Mr. Breckenridge fulfills the definition of a Qualified Person in accordance with Canadian NI 43-101 standards.

Kevin Gunesch, P.E. - Principal Mining Engineer

Mr. Gunesch is a Mining Engineer with 18 years of design and management experience in the mining industry. His experience spans many commodities including precious metals, base metals, coal, oil shale, industrial minerals, and aggregates both working directly for mining companies as well as an outside consultant. The majority of his experience is in economic assessments, mine design, optimization, resource and reserve calculations, short and long-range planning, reclamation designs, grade control, and construction quality control and assurance. He also has experience in hydrogeologic and geotechnical field programs and has managed construction of engineering designs for heap leach pads and tailings dams. In addition, he has worked as a front-line shift supervisor and has managed survey teams and laboratory quality control and assurance personnel. Mr. Gunesch also gained experience in construction and contract management during the construction of a Marlin Mine tailings dam where his responsibilities included contract negotiation, engineering oversight, contractor payment approval, contract closure, bid comparison, and environmental and safety policy enforcement. Mr. Gunesch is fluent in both written and verbal communication in English and Spanish, and has extensive field experience in North America, Latin America, and India. He is a registered professional engineer in Alabama and fulfills the definition of a Qualified Person in accordance with Canadian NI 43-101 standards.

Terre Lane - Principal Mining Engineer

Ms. Lane is a Mining Engineer with more than 30 years of experience. Her career has included full charge management of feasibility studies, mine and process engineering, and project development for surface and underground greenfield mines, and brownfield expansions. She has experience with a range of minerals, including base and precious metals, coal, potash, beryllium, uranium, talc, and sand and gravel; and she has managed projects throughout the world including the U.S., Canada, Mexico, India, Ireland, Russia, China, Chile, Bolivia, Peru, Costa Rica, Africa, and New Zealand. Ms. Lane's professional experience includes conceptual and detailed engineering, project optimization, project development, construction, start-up, and operations. She has directed engineering studies for numerous mine development projects and has managed engineering and feasibility study budgets as high as \$25M/year. She has been responsible for underground exploration programs in foreign countries. She is an expert at resource estimation and mine design and has completed several hundred projects using all modeling techniques; estimates included: statistical analysis, geo-statistical analysis, inverse distance estimation, Kriging, single stage and multiple Indicator Kriging, geometallurgical modeling, and estimation of error. Her broad range of experience allows her to optimize mining projects to maximum profits by improving the efficiency of both open pit and underground mines. Ms. Lane is a Mining and Metallurgical Society of America (MMSA) Qualified Professional in Ore Reserves and Mining and she is a SME Registered Member.

GRE TEAM

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Rick Moritz - Principal Mining and Process Engineer

Mr. Moritz is a Mining Engineer with over 30 years of experience in mining and mineral processing as an employee and manager for several mining companies, an engineering company, and as a consulting engineer. He is a Mining and Metallurgical Society of America (MMSA) Qualified Professional in Mining and Metallurgy/Processing. His mining and metallurgical consulting experience includes clients such as Newmont Gold, Royal Gold, Anglo Gold, Bateman Engineering, and AMEC. He has worked in senior management, surface and underground mine operations, and mineral processing, in capacities such as VP Operations, Operations Manager, Process and Plant Manager, Mine Superintendent, Process Superintendent, and various engineering roles. His work includes assignments in the US, Uzbekistan, Nicaragua, and Australia. Mr. Moritz has been involved in the construction of numerous mines and plants, including process commissioning, start-up, and training of new staff.

Todd Harvey, Ph.D. - Director of Process Engineering

Dr. Harvey is a Process Engineer with over 25 years of experience in mining, renewable energy, and technology. He has solid leadership skills with C level experience (top management) combined with an excellent technical background and a proven track record of innovation and problem solving across multiple disciplines. Dr. Harvey is a Qualified Person under the Society of Mining Engineers (SME) Registered Member accreditation. Dr. Harvey's background includes: conventional gold recovery processes and refractory gold pretreatment via pressure oxidation, stirred tank BIOX, heap biooxidation, and roasting circuit design. Conventional base metal process design including polymetallic flotation, conventional oxide heap leaching, heap bioleaching and stirred tank bioleaching. Dr. Harvey has performed consulting for several companies in the field of process design and optimization, due diligence, and financial modeling. He possesses significant international experience, having lived in West Africa and South Africa and conducted a variety of projects in multiple countries. Dr. Harvey has extensive experience designing, performing, and analyzing metallurgical test work including mineralogy, crushing, grinding, gravity separation, filtration/thickening, flotation, CIL, heap leaching (gold/copper/zinc), refractory ore treatment (bioleaching - heap/tank, autoclaves, roasting), SX/EW, and tailings treatment. He has authored over 20 peer-reviewed technical papers and numerous studies and has presented at a variety of international conferences. He holds patents related to bioheap leaching biofuels production.

Luis Quirindongo - Senior Geological Engineer

Mr. Quirindongo is a geological engineer with over 17 years of experience in the field of geotechnical engineering, including mine tailings and waste facilities. His experience is broad, versatile, and includes sub-surface investigations, geotechnical analyses and design, preparation of grading plans, material management and handling, construction quality control / quality assurance, and performance as a Project Manager on major mining projects. As a Project Manager, Mr. Quirindongo applies his past experience as a resident engineer to improve communication between contractors and the client or other team members. His design experience includes feasibility-level design, conceptual design, and final design of waste facilities. His current projects have been located throughout Mexico, including the states of Chihuahua, Durango, Mexico, Sonora, and Zacatecas, among others. Mr. Quirindongo is fluent in both written and verbal communication in English and Spanish and has extensive field experience in North America and Latin America

Hamid Samari, Ph.D., M.Sc., - Senior Geologist

Dr. Samari is a Geologist with over 20 years of experience in the mining, petroleum, and civil industries. He graduated from Azad University, Sciences and Research Division, Tehran-Iran in 2000 with a Ph.D.

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in Tectonics. He has expertise in structural geology, mining geology, economic geology, seismic hazard assessment and engineering geology. Dr. Samari's professional experience includes: site visits, investigation of structural geology and geological data analysis, lithologic and structural mapping, satellite image studies and LIDAR image processing. He has been an advisor of mining exploration projects and a supervisor of exploration drilling of iron, copper, gold, silver and cobalt mines. Dr. Samari has developed geological maps of lithology and alteration for mining and exploration and has created fault maps and active fault maps for seismic hazard analysis of dams, hydroelectric power plants, water conveyance tunnels, roads, bridges, rail roads, pipelines, power lines, slopes, tailing storage dams, and other facilities. Techniques employed include use of base topographical maps, aerial photos, satellite images, and other techniques. He has conducted structural analysis of joints, faults, collapse gravity structures, salt plugs, and other structural elements using modern techniques and software. He collected and analyzed earthquake data for various projects using probabilistic and deterministic methods. Dr. Samari has prepared many geology, structural geology, and seismic hazard evaluation reports for a variety of projects. As a project manager Dr. Samari has overseen geological, geotechnical, and seismic hazard studies of several dams and hydroelectric power plant (HPP) projects in Iran. Dr. Samari has 19 years' experience as a university lecturer in the fields of photo geology, field geology, tectonics, tectonics and mineralization, preparation of geological maps, volcanism and mineralization, ophiolites, sedimentary ore deposits, and research methods at the prestigious IAU-Mahallat College.

Mark E. Smith, P.E., G.E., D.GE, S.E. (Associate)

Mark has been working in heap leaching since 1979 and focused on Heap Leach / SX-EW projects for gold, silver, copper, nickel, and uranium since 1979. He has worked extensively throughout the Americas, Africa, and Asia; his key clients include BHP Billiton, Rio Tinto, Vale, Xstrata, Anglo American, Barrick, Codelco, Grupo Mexico, Glencore, Minmetals, Newmont, Freeport, and many mid-tier companies. He has also worked extensively with the major EPCM firms: Fluor, Bechtel, Aker, Hatch, and SNC Lavalin. Mark is a registered civil, geotechnical, and structural engineer. He has published dozens of papers in the field and has taught engineering short courses through universities in 8 countries. He was the founding principal and manager of Vector Engineering, Inc., building it from inception to a team of 500 people working in offices in the USA, Australia, Argentina, Chile, Peru, the Philippines, and Colombia. Vector, now part of Ausenco, is a multi-disciplinary engineering and environmental consulting firm working for both local and multi-national clients.

Dave Hallman, P.E., P.G.

Mr. Hallman has more than 30 years of experience specializing in geotechnical engineering and construction on a variety of mining and civil engineering projects throughout the world. His technical expertise includes tailings and water dam design and construction, design and construction of heap leach and landfill facilities, static and dynamic stability of embankments and natural slopes, landslide evaluation, rock slope stability, open pit design, seismic risk characterization, liquefaction evaluations, dynamic deformation analyses, mine subsidence risk assessment and abatement, mine fire investigation and extinguishment, liner and seepage cutoff system design and evaluation.

Clay Newton, Ph.D., C.P.G. - Geologist (Associate)

Mr. Newton is a certified professional geologist who has been responsible for project management, geological staff management, mineral reserve and resource evaluations, and planning and supervision of mine development programs. He has provided SEC and NI 43-101 compliant reserve and resource studies for gold, silver, base metals, coal, rare earth, and industrial minerals deposits. He has considerable

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experience in geological mapping, structural and tectonic surveys, geological and geotechnical core logging. He has designed Quality Assurance and Quality Control (QA/QC) procedures for gold and rare earth element exploration programs. He is experienced in ore deposit exploration with an emphasis on structural/tectonic and geochemical techniques. Mr. Newton is a Mining and Metallurgical Society of America (MMSA) Qualified Professional in Geology, Mining and Ore Reserves.

Eileen Josselyn, P.E. - Senior Mechanical & Environmental Engineer

Ms. Josselyn has 31 years of engineering design, project management, project controls, and construction management experience on a broad range of projects spanning horizontal and vertical construction, environmental remediation, and mining. Ms. Josselyn has experience with resource and reserve estimation, mine design and cost estimating, mine planning and optimization, and mine economic assessments. She has extensive experience in surface water and groundwater monitoring network design, implementation, and evaluation; environmental permitting; the assessment and remediation of impacted groundwater and soils; and the preparation of SPCC, stormwater management, and other material management plans. She is skilled in project scheduling using MS Project® and Primavera®, project cost accounting, and reporting. Ms. Josselyn has extensive experience in construction contract management, including contract negotiations, bid evaluations, change order management, subcontractor management, field oversight, QA/QC, and environmental and safety compliance. She is a registered professional engineer in Colorado and Guam.

Susan Poos, P.E. - Senior Mining Engineer (Associate)

Ms. Poos has over 25 years of experience in the mining industry predominately in open-pit mine planning and operations. Her experience includes working with precious and base metals, coal and industrial minerals in the Americas, Africa, Australia, Europe and Russia. Most recently she was Chief Mine Planning Engineer for Gold Fields Ltd. where she was responsible for the mining engineering for all the open-pit projects in development outside of South Africa. In this role, she worked with projects from preliminary evaluations of project potential through scoping, prefeasibility and feasibility studies as well as being involved in due diligence reviews. Throughout the project development process, the focus was on strategic long-term planning for the Project and Corporation using tools such as Whittle and GEMS. Working on the owner's side provided a different perspective from the consultant perspective, which is the majority of her experience. Through her experience she has developed different ways of planning and evaluating projects based on management objectives whether these are maximize ounces or maximize margin. In some cases, these alternative approaches have shown ways to increase production over nameplate plant capacity by more than 30% based on changes to the blending strategies. Her experience includes optimization analysis, mine design, production scheduling, resource and reserve estimation, cost estimation, permitting and financial analyses. Ms. Poos also has experience in management as a Vice President responsible for managing a consulting office and operationally as a Chief Mine Engineer. Ms. Poos fulfills the definition of a Qualified Person in accordance with Canadian NI 43-101, JORC and SAMREC standards.

Robert Hemming - Mineral Landman (Associate)

Mr. Hemming has over 30 years of experience as a mining executive related to mineral land evaluation, development, acquisition, maintenance, and compliance. His experience covers mineral properties including precious metals, base metals, and uranium in North and Latin America. He has negotiated acquisitions of surface, mineral, and water rights and drafted several joint venture agreements. He has conducted the acquisition of public domain lands through mining claim location and concession denouncement to obtain federal and state leases and prospecting / exploration permits. Finally, he

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has coordinated the necessary permits, contracted environmental consultants and survey crews, and submitted plans of operations to insure compliance with federal and state natural resource laws and regulations.

Gregory W. Knell, C.P.G., C.H.M.M - Environmental Scientist (Associate)

Mr. Knell is a certified professional geologist in six states and a certified hazardous materials manager with over 30 years of experience in hydrogeology, environmental assessment, waste management, and regulatory compliance. He has completed baseline environmental studies at mining properties as well as evaluation/assessment of environmental impact from mining operations. Mr. Knell has extensive field experience in the western U.S. and two Latin American Countries. He is well versed in surface water and groundwater monitoring network design, implementation, and evaluation; environmental permitting; the assessment and remediation of impacted groundwater and soils; waste characterization and identification of disposal options; and the preparation of SPCC and other critical material management plans.

James R. Hitt, P.E. - Senior Mining Engineer (Associate)

Mr. Hitt is a registered Professional Engineer with over 40 years in the mining industry providing him with a thorough understanding of resource estimation, mine design, detailed planning, permitting, closure, and financial analysis. He has extensive industry experience working in positions including the Director of Engineering, Engineering Manager, and Senior Mine Engineer for over 20 years before becoming a consultant. During his time in industry, he was responsible for construction management, engineering oversight, operations management, and new project acquisitions for multiple surface operations throughout the US. His core skills include project evaluation, due diligence reviews, mine design and planning, capital cost estimates, operating cost estimates, budget preparations, operations and engineering management, mine permitting, and closure. Mr. Hitt has worked both domestically and internationally with experience in India, Indonesia, Mexico, Columbia, Mongolia and Canada primarily in the coal, potash, and oil sands businesses.

David Ludwick, P.E. - Project Manager & Civil Engineer

Mr. Ludwick is a registered professional engineer in Colorado with 10 years experience in the mining industry. Mr. Ludwick is fluent in Spanish and specializes in Latin American projects with experience in Mexico, Honduras, Columbia, Peru, and Brazil. He graduated from California State University - Chico, with a B.S. in Civil Engineering and completed his M.S. in Civil/Environmental Engineering from the Colorado School of Mines in 2011 with a focus on mine waste management. His engineering expertise includes the layout and design of heap leach piles, solution collection systems and ponds, waste dumps, surface water management facilities, and mine reclamation and closure plans. Mr. Ludwick also has diverse field experience utilizing hydraulic packers and pump testing, water well construction, surface and groundwater sampling, surface water flow measurement, diamond drilling program management, geochemical characterization, and geotechnical sampling.

Amy Major, E.I.T. - Civil & Environmental Engineer

Ms. Major graduated from the Colorado School of Mines in 2010 with a BS in Civil Engineering and Environmental Engineering, and a minor in Humanitarian Engineering. Her professional experience includes drafting, surface water management design, ARD modeling and analysis, and the design of Heap Leach Facilities (HLF), ponds, embankments, and water diversions. Many of the projects Ms. Major has worked on have been or are now being constructed. She is proficient at many computer programs, including AutoCAD/Carlson, HydroCAD, and PHREEQCi.

GRE TEAM

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Kelsey Stark, E.I.T. - Mining Engineer

Mr. Stark studied Mining Engineering at Colorado School of Mines where he learned a set of skills including surface and underground mine design, economic evaluation, and data analysis. He has competency in a variety of software suites including Geovia GEMS, AutoCAD, Maptek Vulcan, Leapfrog3D, MicroModel, SAGE 2001, and Carlson. His professional experience includes mineral resource estimation and analysis, mineral reserve calculations, mine planning and optimization, mine economic evaluation, underground surveying, and mechanical testing of soil. Operations experience includes underground surveying, cavity monitoring system surveying, and stope dilution/deletion analysis at the Stillwater Mine in Montana.

Sophie Swanson - Mechanical Engineer

Ms. Swanson is a mechanical engineer with greater than five years of professional experience in the mining industry. She received her B.S. in Engineering with minors in mathematics and Spanish from Trinity University and is fluent in Spanish. Ms. Swanson's primary experience is in completing hydrology and hydraulic studies to support surface water management planning for mining projects spanning preliminary planning through detailed design. Accompanying her hydrology and hydraulic studies, she has significant professional experience in field work, construction oversight, drafting, mining feature design, geochemical analyses, and independent professional design review.

Luis Adriano - Tecnico Ingeneria Minera

Mr. Adriano studied the metallurgical processing of polymetallic ores and later specialized in drilling. His drilling experience encompasses various aspects of hard rock mining methods including open pit and underground. Mr. Adriano has an extensive background in exploration and production drilling and has utilized various methods and drilling techniques under the most challenging physical conditions. His experience includes the use of percussion blast hole, diamond core, and tricone drilling methods. During his work in exploration, Mr. Adriano has successfully used various types of specialty drill methods for the recovery of hard rock, surficial clay and oriented core samples. In addition to drill rig operation, Mr. Adriano is experienced with the operation of various pieces of heavy machinery. Most recently, Mr. Adriano has used his diverse background to successfully conduct packer testing using air and hydraulic packer systems and has overseen a variety of data collection duties in field. He is an expert in surface flow measurement and field testing of geochemical experiments. He also has experience in piezometer installation.

RECENT KEY PROJECTS

Summary

Over the last 5 years, GRE has been involved in projects ranging from a feasibility study where GRE performed geology, resource, reserve, project optimization, metallurgical review and geometallurgy, site hydrology, tailings, waste rock facility design, closure, and ESIA submittal for a 22,500 tonne per day polymetallic project in South America, to ARD kinetic testing, mitigation modeling and pilot testing for a 20,000 tonne per day operating porphyry copper mine in eastern Europe.

GRE personnel have experience working in a wide variety of countries including: USA, Canada, Mexico, Venezuela, Peru, Bolivia, Brazil, Chile, Guyana, Argentina, Costa Rica, Columbia, Honduras, Puerto Rico, Ireland, Greece, Armenia, Turkey, Tajikistan, Kazakhstan, Papua New Guinea, Australia, New Zealand, Ghana, Mali, Burkina Faso, Namibia, South Africa, Zimbabwe, Botswana, Tanzania, India, Russia, and China.

Bear Creek Mining Corporation, Corani Project, Peru:

GRE has been involved with the +300 million ounce silver, lead, zinc bulk tonnage open pit project since 2011. The project is located at an elevation of 5,000 meters in challenging terrain. GRE's initial



responsibilities included geotechnical, hydrogeologic, and environmental drilling and site investigation programs for the project Feasibility Study (FS) and Environmental Social Impact Assessment (ESIA) permitting (in Spanish) in 2012. In 2014-2015, GRE completed a project optimization study of mine, process, tailings, and hydrologic aspects of the project, followed by a FS update that included the resource estimate, mine plan, and geometallurgical model, with input on process design. The geometallurgical model utilized state of the art non-parametric statistical methods to create a multivariate adaptive regression model that greatly improved the spatial understanding of metallurgical response, allowing GRE to optimize the mine plan, significantly enhancing project economics. In 2017, GRE provided Qualified Persons oversight

of the Phase 1 Front End Engineering Design Study involving geology, resource, reserve, hydrology, geochemistry, mining, marketing, and project economic models.

Lydian International, Amulsar Project Feasibility Study, Armenia:



GRE supported the 3.5 million ounce Amulsar gold project through the performance of a series of FSs. The Amulsar Gold Project is currently under construction. GRE's contribution to the FSs included: design and stability evaluation of the barren rock storage facility, pit dewatering predictions, acid rock drainage (ARD) management, and closure planning related to water quality management issues. The barren rock storage facility design required waste blending and waste encapsulation to mitigate ARD risk. This exercise involved the careful management of acid generating and non-acid generating waste streams from the pit to allow for the creation of encapsulation cells without the need for double-handling of the waste. Due to the encapsulation design

RECENT KEY PROJECTS... Continued ...

and other elements of GRE's ARD management plan, the site is able to consume all ARD-impacted leachate during operations, or is able to treat ARD-impacted water using affordable passive treatment alternatives. Using GRE's approach to barren rock management and ARD management, Lydian was able to realize ~\$65M in projected savings in comparison to prior ARD management plans and barren rock storage facility designs.

Luna Gold, Aurizona Mine Pre-Feasibility Study, Brazil:

For the Pre-Feasibility Study (PFS), GRE performed the following: waste rock storage facility design, pit dewatering predictions, surface water management plan, geochemical characterization, pit slope



stability, and acid rock drainage (ARD) management plan. Key challenges to the project included the remote location, the management of saprolitic soils, the management of extreme seasonal precipitation, and the close proximity of the Atlantic Ocean to the pit (which ultimately will be significantly below sea level). The GRE team performed multiple rounds of hydrogeologic, geotechnical, and geochemical field characterization. The team created an integrated slope-stability model and hydrogeologic model for the pit that allowed for an optimized pit slope angle (thus saving waste rock production). In addition, GRE saved significant capital by optimizing the existing water management infrastructure from the prior

mine operation. The end result of the effort was a PFS with a positive economic outcome that permitted rapid financing.

Anfield Gold, Coringa Feasibility Study, Brazil:



GRE has been involved with the narrow vein gold Coringa project since 2009, including the initial resource, at the Preliminary Economic Analysis (PEA), and FS stages, with overall project responsibility for the PEA. The most recent work included developing a surface water management plan, groundwater management plan, waste rock dump design, environmental monitoring plan, and acid-rock drainage management plan for the development of the Coringa for the FS. Key challenges of the project included the management of extreme tropical rainfall, the management of saprolitic soils, and environmental management in a sensitive tropical rainforest ecosystem. GRE performed hydrogeologic, geotechnical, and environmental field work to collect the necessary data, and GRE has created predictive models for the following: water balance, dewatering, tailings storage facility seepage, geochemical water quality, and waste rock dump stability. These predictive models form the key sections of the FS and Environmental Impact Assessment. Prior work (2009-2015) included two resource estimations, two PEAs, a scoping acid rock drainage characterization, and the initial hydrogeologic characterization. The Coringa project is currently under construction.

RECENT KEY PROJECTS... Continued ...



Newcastle Gold, Castle Mountain PFS, California:

GRE has been retained by Newcastle Gold to perform the open pit mine optimization, mine design, and capital and operating cost estimates for the previously producing, 4.0 million ounce Castle Mountain gold project in Southern California. Key features of the project include land and water constraints that required innovative solutions. The study is expected to be finalized in the first half of 2018.



TriMetals Mining Inc., Gold Springs Project PEA, Nevada/Utah:

GRE provided structural geologic mapping support, metallurgical test work support, completed several mineral resource estimates, and PEA of the nearly million ounce Gold Springs heap leach gold/silver project. The work consisted of numerous pit sizes and production rates identifying various viable scenarios. The results were further analyzed to determine the most robust economic scenario to advance to the next level of study. GRE is continuing its involvement in the project as it advances to the PFS stage.

Confidential Client, Scoping Study, Pacific Northwest Gold Project:

GRE evaluated numerous mining and processing options for the moderately refractory multimillion ounce green fields gold project. Both open pit and underground mining were considered in combination with a series of processing options including: flotation and ultra-fine grinding with cyanidation, pressure oxidation of flotation concentrates and whole ore, and bio leaching of low grade ore and flotation concentrate. Preliminary mine plans and production schedules were developed, including capital and operating costs for each scenario. The study involved review of historic metallurgical testing and the development of metallurgical balances, design criteria, and cost estimations. The study also included preliminary analysis of the ARD potential, and permitting and closure requirements, along with water management.

ECI Exploration & Mining - PEA, Operations Support, & Tailings Construction Design, Mexico:



GRE completed a PEA for expanding a currently producing 150 tpd silver-gold-lead-zinc underground mine and mill operation to rates up to 1,500 tpd. The PEA considered multiple production rates and mining sequences, and cutoff grades, to determine the optimum economic expansion scenario. We also assisted in the review and refurbishment plans for the entire operation including the mine, mill, and tailings facility. The mining work involved detail mine planning, development sequencing, estimating manpower, equipment, and material requirements. The plant review included oversight of a comprehensive metallurgical program involving different ore types to maximize recovery of gold and silver. GRE also provided recommendations for expansion of the flotation plant, and a review of the partially constructed oxide circuit identifying the additional equipment required prior to commissioning. The tailings work included review and redesign of a partially designed and

RECENT KEY PROJECTS... Continued ...



constructed tailing storage facility. The design updates of the TSF included a liner system, seepage and stability evaluations, updates to the staging of the upstream raises, and compliance with groundwater monitoring. GRE also assisted on the preparation of tailings design documents used for permitting, including translation to Spanish. GRE's work was used to create a detailed 18-month operating budget for the existing mine using productivities, consumption rates, and current unit costs. GRE also played a key role in updating the cost accounting system to better track operating and capital costs for management and to support due diligence review of potential partners.

Alacer Gold, Coper, Turkey - Heap Leach Design & Construction Support

GRE completed the construction level design for the Phase 4 leach pad which will allow the stacking



of up to 68 million tonnes of ore on the ultimate pad. The design included a benched foundation and stability buttresses to maximize ore storage within the facility. Staged construction has been ongoing since 2015 and is scheduled to be completed in 2018. Alacer has now asked GRE to perform the Phase 5 work. GRE has actively supported the construction by reviewing daily construction reports, verifying manufacturer certificates for materials meet specification and answering operational questions. GRE also provided recommendations for stability monitoring for a Hydro-Jex heap injection program design to liberate entrained leach solution and extract additional gold

from the heap through a series of pressure injection wells. Alacer is contemplating a Phase 5 expansion for the leach pad, where GRE is assisting them in the preliminary evaluation and study plans.

Confidential Client, ARD Mitigation and Geotechnical Support:

GRE is assisting a 20,000 tonne per day operating copper mine with ARD characterization, and mitigation. In addition, GRE is conducting a geotechnical and hydrogeologic investigation of the existing tailings storage facility (TSF). GRE's work includes performing on-site geochemical kinetic cell tests on potentially acid generating (PAG) waste rock. The work is designed to characterize ARD kinetics under ambient climate conditions. Additional testing will determine the effectiveness of microbial controls designed to suppress the microbes that catalyze ARD-forming chemical reactions. The ARD mitigation effort also includes a large scale ARD waste rock trial encapsulation test with long term monitoring using lysimeters. The goal of this work is to develop a strategy to manage long ARD development in waste rock and pit walls and to reduce future water quality management costs. GRE designed and executed a geotechnical investigation of the exiting tailings storage facility. GRE oversaw the installation of geotechnical monitoring instruments and an extensive Cone Penetration Test (CPT) program to characterize the subsurface conditions. Along with the CPT investigation, samples were collect to depth and from surface material for laboratory analysis. Piezometers and Vibrating Wire Piezometers were also installed to better understand the phreatic conditions and pore pressures within the dam. All of the data collected was used to develop the database required to analyze and predict seepage behavior and geotechnical stability within the dam.

INNOVATIVE TECHNIQUES USED BY GRE

PROCESS TECHNOLOGY

GRE's process engineering group have experience with a wide variety of mineral recovery systems including: copper (oxide, secondary, primary), gold (free milling, refractory), polymetallics (lead zinc silver), rare earths, coal, and industrial minerals. GRE capabilities include general unit operations plus specialized expertise in: Bio-hydrometallurgy (biooxidation and bioremediation), pressure hydrometallurgy (refractory gold treatment and base metal leaching like the Cominco and Sherritt processes), flotation, heap leach (gold, copper, bioleach), gravity separation, SXEW, and gold recovery (CIP, CCD, CIL, and ADR). GRE has developed models related to mass balance, chemical deportment, biological performance, water balance, and geochemical relationships. GRE has produced, managed, directed extensive metallurgical test programs ranging from trouble shooting to feasibility study level. GRE's capabilities include: flow sheet development, equipment selection, capital and operating cost estimation, process optimization, plant audits, and specialized software.

As GRE has seen the mining landscape evolve with an ever increased focus on environmental impact and closure, GRE has taken it upon themselves to become experts in the fields of effluent treatment, tailing storage facility design and ARD prevention, mitigation and treatment.

MULTI SCENARIO ANALYSIS (MSA) MODELS

GRE has developed a propriety technique we call Multi-Scenario Analysis (MSA) models. MSA is a project optimization methodology that allows the application of typical project constraints; cutoff or cutover grade, mill power, grind size, work index, metallurgical performance,... without the need to completely re-engineer the entire project for each constraint/condition. This enables GRE to identify the combination of conditions that lead to the optimization of the overall project economics. Our models are fully-transparent, consisting of a spreadsheet-based project evaluation tool that permits the project team to rapidly determine how changes in numerous input parameters affect the economic outcome of the project. These models not only consider changes in mining related parameters that affect the ultimate pit, cutoff grade, and mining sequence but also evaluate impacts to the processing circuit operation such as milling rate and various process flow sheets. Each combination of variables produces a unique scenario that quantifies the impacts on capital and operating costs. We also evaluate lease, purchase, and contractor scenarios to provide our clients with a wide range of options to reduce upfront capital while quantifying their expected effects on operating costs and overall project economics. If you are asking yourself, "What happens if?", we can help.

GEOMETALLURGICAL & GEOCHEMICAL CORRELATION MODELING

GRE applies a unique approach to mapping the relationship between process plant performance and ore body characteristics. Our methodology allows for a better overall representation of the local variability of metallurgical response and how it relates to geology, geochemistry, and ultimately financial metrics. GRE employs geometallurgical and geochemical modeling using cluster analysis, recursive partitioning, and multiple adaptive regression to help develop metallurgical/orebody relationships. This type of non-parametric statistical modeling allows the flexibility to analyze multiple variables/parameters within the deposit to produce a best fit process model that is utilized to produce an optimum mine plan, production schedule and economic model. This goes beyond the typical univariate analysis that uses one parameter to estimate a predicted value. This type of statistical analysis and modeling

INNOVATIVE TECHNIQUES USED BY GRE

... Continued ...

involves database construction, data analysis, non-parametric statistical modeling, geostatistics, and is followed by block modeling. In a recent project, GRE used elevation (approximation of the redox, supergene boundary), correlation between metal grades (lead, zinc, and copper), along with the percentage of 4 separate minerals types to create a robust predictive recovery model of a complicated poly-metallic deposit. GRE substantially improved the understanding of the flotation response and removed much of the metallurgical uncertainty of the project.

SERVICES

GEOLOGY

- Geological, Structural, Fault, and Seismotectonic Mapping
- Exploration Sampling Program Design (Quality Control/Quality Assurance)
- Exploratory Data Analysis
- 3D Geological and Structural Modeling
- Mining Geology Modeling
- Collapse Gravity Structures Modeling
- Slope Stability and Seismic Hazard Analysis

RESOURCE/RESERVE ESTIMATION

- Exploration, Resource, and Production Database Creation and Management
- Creation of 2D and 3D Geology, Structure, and Resource Models
- Statistical and Geostatistical Analyses
- Geometallurgical models and Non-parametric Statistics
- Resource Estimation and Classification
- Due Diligence Review
- Metal Accounting and Production Reconciliation
- Tools include: Vulcan, GEMS, Datamine, Techbase, Leapfrog, Sage, Micromodel, Carlson, Access, R, Python, etc.
- NI 43-101, JORC, SEC Compliant Reports

PROJECT VALUATION AND OPTIMIZATION

- Independent Project Review
- Project Due Diligence
- Independent Engineer
- Multi-Scenario (constraint analysis) Economic Modeling
- Project Optimization and Trade Off Studies
- Scoping Studies / Preliminary Economic Assessments, Pre-Feasibility Studies, Feasibility Studies
- Technical Reports (NI 43-101, Guide 7, JORC)
- Pre-Feasibility and Feasibility Study Management
- Independent Advisor and Consultation Service



SERVICES... Continued ...

MINING ENGINEERING

- Open Pit Mine Design, Planning and Engineering
- Underground Mine Design, Planning and Engineering
- Operations Auditing and Optimization
- Mine Production and Cost Optimization
- Long Range, Mid-Range, and Short-Term Planning
- Mining Economics and Finance
- Material Handling System Design
- Reclamation Bond Calculation
- Underground Rock Mechanics - Field Investigations and Modeling
- Pit Slope Stability - Field Investigations and Modeling
- Underground Mine Ventilation
- Corporate Management - interim executives and production staff
- Safety Audits
- Practical Safety Plan Development
- Environmental Audits

MINERAL PROCESSING

- Test Work Design and Supervision
- Project Design
- Intellectual Property Development/Management
- Operator Training
- Technology Applications
- Financial Modeling
- Heap Leach Pad and Tailings Facility Design
- Flowsheet Development and Design
- Operating and Capital Cost Estimation
- Plant Auditing, Optimization, and Trouble Shooting
- Equipment Selection

MINE WASTE MANAGEMENT

- Tailings Dam Design - Rockfill, Earthfill, Upstream, and Downstream Construction Methods
- Dry Stack Tailings Design
- Waste Rock Facility and PAG Encapsulation Design
- Geomembrane Liner System Design
- Technology Screening and Risk Assessment
- Tailings and Mine Waste Co-Disposal Design
- Slurry Pipeline System Design
- Seismic Hazard Evaluation
- Geotechnical Stability Analysis
- Geochemical Characterization and Modeling
- Unsaturated Flow (Mine Waste Leachate) Modeling
- Mine Waste Cover Design and Modeling
- Tailings Dam Operations Support

SERVICES ... Continued ...

- Dam Safety Inspections
- Monitoring Instrumentation Design and Installation

GENERAL CIVIL AND GEOTECHNICAL

- Site Grading and Drainage
- Geotechnical Instrumentation
- Foundations
- Access Roads
- Retaining Systems, Tie Back, and Soil Nail Wall Design
- Rockfill and Slope Stability Assessment and Mitigation
- Erosion Control and Best Management Practice (BMP) Plans
- Training For Safe and Environmentally Friendly Operations
- Seismic Monitoring Stations

HYDROLOGY, HYDRAULICS, AND WATER RESOURCES

- Piping and Pumping Systems
- Surface Water Management Plans
- Channels, Ditches, and Diversions
- Sediment Detention Structures
- Weirs and Flumes
- Stilling Basins and Energy Dissipation Structures
- Dambreak and Floodplain Studies
- Channel Restoration
- Stream Gauging Stations
- Meteorological Stations
- Site Climatology
- Site Hydrology and Hydrogeology Studies
- Pit Dewatering
- Groundwater Modeling for Mine Impacts
- Groundwater Supply Development
- Water Balance Studies
- Monitoring Well Design and Installation
- Vibrating Wire Piezometer Design and Installation



SERVICES ... Continued ...

CONSTRUCTION SUPPORT SERVICES

- Owner's Engineer
- Engineer of Record
- Construction Quality Assurance
- Construction Management
- Project Management
- Geotechnical and Materials Testing
- Post-Construction Monitoring
- Trouble Shooting and Remedial Action
- Instrumentation Monitoring

ENVIRONMENTAL MANAGEMENT & SOCIAL RESPONSIBILITY SERVICES

- Acid Rock Drainage (ARD) Prevention and Mitigation
- Reclamation and Closure Planning
- Environmental Studies - (Impact Studies, Baseline Studies, and Geochemical Studies)
- Environmental Management Planning
- Environmental Permitting
- Geofluvial Reclamation Design
- Sustainable Surface Water Management Plans

