

CATHERINE A. DREESBACH, P.E.
Senior Mining Engineer

BACKGROUND

Catherine Dreesbach is a professional mining engineer with five years of industry experience in underground mining operations and eight years of regulatory experience in both coal and hard rock operations. Catherine's expertise includes underground mine planning and design, production scheduling, project implementation and supervision, rock mechanics, mine permitting and compliance, and reclamation oversight. She is an experienced user of complex computer software packages, such as Vulcan and ArcGIS. Catherine has familiarity with more than 70 (underground and surface) hard rock and coal operations gained through regular site visits, and has direct knowledge of various underground and surface mining methods and surface facility design. She also has direct experience in the implementation of federal and state environmental regulations for operations and reclamation.

With Micon, Ms. Dreesbach will provide mining engineering consulting services to North American and international clients.

PRIOR EXPERIENCE

**Mining Engineer, Environmental Management Bureau
Montana Department of Environmental Quality, Helena, Montana
July, 2008 – September, 2011**

Responsibilities included:

- Evaluating hard rock mine operating permit applications for sound engineering practices, including operational feasibility; proposed underground mine design with respect to location, groundwater effects, ground control and potential subsidence; and stability of impoundments, waste dumps, pit walls, and reclaimed slopes.
- Developing solutions to mining engineering problems within the confines of state and federal regulations and actively participating in the decision-making process.
- Calculating reclamation performance bonds for mining operations having a wide range of complexity, including discounted cash flow analysis for long-term water treatment.
- Working with an interdisciplinary team of professionals within the framework of the National Environmental Policy Act (NEPA) and the Montana Environmental Policy Act (MEPA); writing, editing, and reviewing engineering sections of environmental documents; effectively communicating with the public; providing engineering

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recommendations for controversial projects; and working cooperatively with other state and federal agencies, mining companies, and community stakeholders.

- Inspecting mine sites across the state on a regular basis to ensure compliance with state regulations, and collaborating with mine operators on both mine engineering and interdisciplinary issues.
- Using GPS survey equipment and computer software packages, including ArcGIS, Carlson Civil 3-D, Galena Slope Stability, Caterpillar Fleet Production Cost Analysis, EarthVision, ArcPad, Trimble Office, and Microsoft Office programs.
- Managing and supervising a limestone quarry reclamation project near Helena, Montana, including GPS surveying; calculating mass balance; scoping the project within tight budget constraints; supervising daily operations; working with the contractor to develop project improvements; and ensuring project completion within the scope, budget, and timeframe.

Mining Engineer, Industrial and Energy Minerals Bureau
Montana Department of Environmental Quality, Helena, Montana
February, 2003 – July, 2008

Responsibilities included:

- Evaluating coal mine operating permit applications for sound engineering practices, including operational feasibility; underground mine stability and longwall subsidence mitigation; stability of waste disposal areas, pit walls, sediment ponds, and reclaimed slopes; consistent, accurate mapping and engineering designs; and reasonable reclamation bond calculations.
- Using seismometers and analyzing seismic data to determine compliance with peak particle velocity and airblast limits for mine blasts, and to provide feedback to mine operators.
- Inspecting coal operations both on the ground and from the air to ensure compliance with the Surface Mining Control and Reclamation Act (SMCRA) and the Montana Strip and Underground Mine Reclamation Act (MSUMRA).
- Administering the coal blaster certification program by updating and providing blasting manuals; administering and grading written exams; and ensuring compliance with applicable blasting regulations.
- Providing engineering recommendations to aid in coal mine permitting and compliance decisions pertaining to mine planning; all aspects of operations; reclamation; and bonding requirements.

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- Proactively communicating with mine operators, staff peers, legal staff, supervisors, federal oversight regulators, and community stakeholders, often under difficult or adverse circumstances.

Underground Mine Planning Engineer, Rodeo Mine
Barrick Goldstrike Mines, Inc., Carlin, Nevada
July, 2000 – January, 2003

Responsibilities at this long-hole open stope gold mine included:

- Underground mine planning and design during both capital development and production phases, including designing primary and secondary development, underground facilities, and stopes using Vulcan software; scheduling production and sequencing long-hole stoping and backfilling in poor ground conditions; tracking production and waste tonnage; and providing detailed monthly and quarterly forecasts.
- Reconciling tonnage, grade, and ounces at month-end, quarter-end, and year-end using total station and CMS (Cavity Monitoring System) data, Vulcan software, and Excel spreadsheets.
- Designing and maintaining a Microsoft Access database for general foremen and other management personnel to access information on forecasting, production, backfilling, and conditions in production areas.
- Working extensively with Vulcan software for mine planning; forecasting; designing mine infrastructure; working with block models; and implementing time-saving strategies to improve efficiency.
- Designing a computer automation system to simplify the survey data reduction process for incorporation into the mine plan; this was carried out in cooperation with Maptek programmers using Vulcan software.
- Working as part of a team of engineers, geologists, mine foremen, and superintendents to inspect underground workings, troubleshoot, and improve interdisciplinary communication and cooperation.
- Supervising a three-person survey crew and assigning work to technical support personnel.
- Providing daily engineering services in response to operational needs in the mine.

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**Underground Mine Engineer, Tg Mine
Tg Soda Ash, Granger, Wyoming
November, 1998 – July, 1999**

Responsibilities at this underground room and pillar trona mine included:

- Underground rock mechanics engineering under conditions of a high rate of roof separation.
- Investigating and reporting rock falls by examining ground support condition and mechanism of failure; noting any indication of failure from roof separation monitoring; reporting injury/damage to personnel or equipment; and recommending corrective actions.
- Training mine personnel in safe ground control practices, including recognizing unsafe conditions; using proper scaling technique; and understanding ground control policies and procedures.
- Assessing ground support requirements for the mine, including collecting and analyzing roof separation data; designing and implementing roof support; and monitoring the adequacy of installed support.
- Effectively communicating with the mine planning engineer, mine geologist, safety coordinator, production superintendent, and general foreman, by working together to accomplish the following: evaluating and updating ground control policies and procedures; assessing areas of poor ground conditions and deciding on best practices; and ensuring the cooperation of all mine departments for the purpose of safe, efficient, and uninterrupted mine production.
- Improving drilling efficiency and optimizing procedures to minimize costs by evaluating the effectiveness of different types of roof bolts and resin grouts, and combinations of slow and fast setting resins; and working with roof bolting personnel to optimize resin bolt installation.
- Collaborating with NIOSH on experiments to evaluate the utility of instrumented rebar and cable bolts.

Supplementary Experience

- Intern position: Underground mine engineering, FMC Wyoming Corporation.
- Intern position: Engineering, Pony Mill and Tailings Impoundment Project, Montana Tech/Montana Department of Environmental Quality (Master's thesis project).
- Senior Assay Laboratory Technician and Chemical Engineer, FMC, Granger.

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- Assay Laboratory Technician, OCI Big Island Mine.
- Quality Assurance Manager, Berkeley Pit Innovative Technologies Project, Montana Tech.

EDUCATION

M.S., Mining Engineering, Montana Tech, Butte, Montana, 1998
M.S., Environmental Engineering, Montana Tech, Butte, Montana, 1998
B.S., Physics (German Minor), University of California, Davis, California, 1992

CERTIFICATIONS

Professional Engineer's License in Mining Engineering, State of Montana, December, 2004.

PROFESSIONAL MEMBERSHIPS

Society for Mining, Metallurgy, and Exploration (SME)

- Mining and Exploration (M&E) Division Executive Committee, since 2008.
- M&E Division Program Area Manager, Mine Operations Programming, SME Annual Meeting, February, 2010.
- Government and Public Affairs Committee, since 2010.
- Peer Review Editorial Board/Associate Editor, Mining Engineering Magazine, since 2005.
- M&E Division Underground Mining Unit Committee, 2002-2006.
- Secretary/Treasurer of Southwest Wyoming SME Section, 1999-2000.

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PUBLICATIONS

Conference on Incorporating Geospatial Technologies into SMCRA Business Processes: “Using Real Time Kinematic Survey Technology and Blue Marble Software to Streamline Coordinate Conversion”, 2008.

The Forge Newsletter: “How Vulcan Increased Mine Planning Efficiency at the Rodeo Mine”, 2001.

20th International Conference on Ground Control in Mining: “Evaluation of Instrumented Cable and Rebar Bolts as Ground Support at a Trona Mine”, 2001.

Proceedings: New Technology For Coal Mine Roof Support: “Evaluation of Instrumented Cable and Rebar Bolts as Ground Support at a Trona Mine”, 2000.

Tailings and Mine Waste '99: “Closure of a Cyanide Tailings Pond”, 1999.

Mine Planning and Equipment Selection 1998: “Pony Mill Site Closure: Healing a Black Eye of the Mining Industry”, 1998.

Master of Science Thesis: “Encapsulation Design for the Containment of Cyanide Processed Tailings at the Pony Mill Tailings Impoundment”, 1998.