
Dr. CORBY G. ANDERSON QP CEng FIChemE

Corby Anderson is a professionally registered engineer with 31 years of experience in process, chemical and metallurgical engineering, engineering services, research, consulting and industrial plant operations. His current global assignments include projects in Namibia, Slovakia, Kazakhstan, Chile, China, Mexico, Ukraine, Republic of Georgia, Russia, Peru, Philippines, New Guinea, and Australia. Experienced and trained in pyrometallurgy, he also has extensive industrial experience in hydrometallurgy, electrometallurgy, environmental metallurgy and mineral processing. He has developed and implemented novel hydrometallurgical technologies for pressure leaching, vat leaching, precious metal recovery, base metal recovery, process control, separations, purifications, refining and electrolysis. He has been responsible for lab work, pilot plant work, research, process development, engineering design, start-up, operations, management, corporate budgeting, contracting and environmental affairs for mineral processing and hydrometallurgical plants producing silver, PGM's, gold, antimony, nickel, cobalt, zinc, germanium, gallium and copper. He has authored or co-authored approximately 200 papers and presentations, and holds 7 international patents with 2 new provisional applications. He has served successfully as an expert witness on several international mining cases. Currently, he serves as a director of two publicly traded mining companies in the US and Canada and he owns a successful private consulting engineering business. He has been a Technical Editor for the Mineral and Metallurgical Processing Journal, International Journal of Mineral Processing, Physics and Chemistry of Minerals, Minerals Engineering Hydrometallurgy and Metallurgical Transactions B. He will also be the Editor of the Eighth Edition of Will Mineral Processing Technology, the most widely used mineral processing textbook in the world. As a faculty member of Montana Tech and Colorado School of Mines, he has directed or co-directed 6 Ph.D. candidates and 21 M. Sc. candidates. His teaching expertise is in x-ray diffraction, mineral processing, chemical metallurgy of nickel and cobalt, hydrometallurgy, nano-technology, fire assay, coal processing, chemical processing of materials, chemical metallurgy of copper gold silver and PGM's, transport phenomena and kinetics. He also teaches Mineral and Metallurgical Engineering fundamentals to candidates specifically seeking Professional Engineering registration as well as to Registered Mineral Examiner candidates with the Department of the Interior. He is active in many professional organizations including participation as an SME Director and Vice President, as an IPMI Director, as a Trustee for North West Mining Association and as a Fellow of the Institution of Chemical Engineers. He is a Founding Registered Member of SME and a Qualified Professional with MMSA. He also participates with the National Materials Advisory Board, The National Academy of Science, The National Research Council, The National Science Foundation and the National Academy of Engineering. In 1996 he was awarded the Extraction and Processing Technology Award from TMS. In 1999 and 2004, he was the Technical Chairman for the 23rd and 28th International Precious Metals Institute meetings. In 2001, he was a Co-organizer of a TMS International Symposium on Cyanide. In 2002 he was a Co-editor and Organizer for the Mineral Processing Plant Design, Practice & Control International Symposium. In 2002 he received a Distinguished Alumni Award from Montana Tech. In 2003 he was a Co-organizer of the Fifth International Ian Ritchie Symposium on Hydrometallurgy as well as for the Symposium on Global Development of Copper and Gold Deposits. In 2005 he is co-chairman for the Northwest Mining Association Annual Meeting and an invited plenary speaker at the 27th meeting of the Institute of Mining Engineers of Peru. In 2005 he received the Distinguished Researcher Award from Montana Tech. In 2006 he was the chairman for the Northwest Mining Association meeting held for the first time in Reno, Nevada. For that effort he received the NWMA Presidents Award. In 2007 he will serve as co-Chairman for a joint SME-TMS-IPMI Precious Metals Symposium. In 2008 he will once again serve as a co-organizer for the Sixth International Symposium on Hydrometallurgy. He is the Canadian Institute Chairman for the 2008 and 2009 Clean Coal Symposium and the 2009 Uranium Symposium. He was the TMS EPD Luncheon Speaker in 2009. He is also on the organizing committee for HydroCopper 2009 and HydroProcess 2010 in Chile and COPPER 2010 in Germany. He will give a plenary lecture and a short course at the HydroProcess 2010 meeting. In 2008, SME awarded him the Milton E. Wadsworth award for a distinguished contribution that advances our understanding and science of non-ferrous chemical metallurgy. Recently he was nominated to be a Fellow of the Institute of Materials, Minerals and Mining. Lastly, he was appointed by the U.S. Secretary of the Interior to serve on a BLM RAC.

Professional Qualifications

Diplomas: **Ph. D. Mining Engineering - Metallurgy, University of Idaho (1987)**
M. Sc. Metallurgical Engineering, Montana Tech (1984)
B. Sc. Chemical Engineering, Montana State University (1979)

Recent Education: **Economic Evaluation & Investment Decision Methods, Colorado School of Mines 2010**
Beneficiation of Coal Waste, EUCI-University of Kentucky 2009
Advanced Coal Processing, UBC-EDUMINE, 2009
Theory and Practice of Sampling of Particulate Materials, McGill University 2008
Resource Calculations, Northwest Mining Association 2008
Financial Statement Analysis, Colorado School of Mines 2007
Valuation of Mineral Projects, Imperial College London 2007
Global Trade Certificate Program, Montana World Trade Center 2007
An Introduction to Modeling Project Finance, EDUMINE 2007

Professional Registrations: **Chartered Chemical Engineer, Institution of Chemical Engineers**
Fellow, Institution of Chemical Engineers
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Founding Registered Member, SME
Qualified Professional Member, MMSA
The Order of the Engineer

Experience

Colorado School of Mines (August 2009 to Present)

Harrison Western Professor of Metallurgical and Materials Engineering

- Currently undertaking research projects in mineral processing, extractive metallurgy, energy, rare metals, environmental metallurgy and recycling.
- Currently teaching Hydrometallurgy, Chemical Processing of Materials, Transport Phenomena - Chemical Kinetics, Coal Processing and Metallurgy of Gold, Silver, PGM's, Copper, Cobalt and Nickel Production.

The Center for Advanced Mineral & Metallurgical Processing, Butte, MT, USA, (1997 – August 2009)

Director and Principal Process Engineer – Research Professor of Metallurgical and Materials Engineering

- Undertaking contracted projects for global industrial client projects such as;
 - Recycling of Precious and Base Metals
 - Fuel Cell Development and Technologies
 - Polymeric Material Development and Applications
 - Hydrogen Production Technologies
 - Coal Beneficiation and Characterization
 - Ion Exchange Resin Development and Application
 - Hydrometallurgical Treatment of Industrial Concentrates for As, Sb, Sn, Hg, and Au
 - Treatment of Copper Enargite Ores and Concentrates
 - Beneficiation and Hydrometallurgical Processing of Phosphate and Ores
 - Industrial Antimony Plant Design and Operation
 - Industrial Bio-Hydrometallurgical Gold Plant Due Diligence Review
 - Automated SEM and XRD Mineralogical Analysis
 - Wastewater Abatement, Treatment and Recycling
 - Airborne Emissions Abatement and Treatment
 - Industrial Metallurgical Accounting
 - Solid Waste Treatment and Recycling
 - Industrial Sampling and Sampling Systems
 - Financial Reviews of Precious and Base Metals Production Plants
 - Due Diligence Reviews of Precious, Base and Chemical Production Plants
 - Preliminary Economic Assessment, Pre Feasibility and Feasibility 43 101 Studies
 - Comminution, Flotation Testing and Flowsheet Development
 - Design and Start up of an Industrial Antimony and Gold Production Plant
 - Development and Piloting of a Gallium and Germanium Recovery Plant
 - Thermodynamic and Kinetic Model for Control of Industrial Autoclaves
 - Mineral Processing Testing, Flowsheet Development and Technical Studies
 - Expert Witness for Chemical, Metals and Mining Litigation
 - Recovery of Precious and Base Metals from Tailings
 - Due Diligence Review of a Gold Milling Operation
 - Due Diligence of Bayer Process Hydrometallurgical Alumina Process Plant.
 - Instruction in and Analysis of Precious Metals
 - Recovery of PGM's from Primary and Secondary Sources
 - Non-cyanide Alkaline Sulfide Gold and Silver Leaching and Recovery
 - Rare Earths and Metals Metallurgy and Processing
 - Molybdenum Flotation and Hydrometallurgical Processing
 - Titanium Recovery, Refining and Fabrication
 - Survey of Industrial Smelting Contracts and Economics
 - Due Diligence Technical Review of an Industrial Silver Processing Facility
 - Nickel Cobalt Laterite Ore Pyrometallurgical Processing Study

Nickel Cobalt Laterite Ore Hydrometallurgical Processing Study
Study of Silver Department in Industrial Lead Blast Furnace Slag
Industrial Mercury Department and Abatement
Alternative Technologies for Processing of Low Grade PGM Ores
Feasibility Study for a Copper, Gold and Cobalt Orebody
Piloting of Nitrogen Species Catalyzed Pressure Leaching
Diagnostic Department of Gold in a Roasted Ore
Process Delineation for a Nickel/Cobalt Laterite Orebody
Hydrometallurgical Zinc Recovery From an Oxide Ore Deposit
Sulfuric Acid Plant Testing and Design
Bankable Feasibility of a Copper Electrorefining Facility
Industrial Gold Ore Pressure Leaching Pre-Feasibility Study
Pyrometallurgical Treatment of Copper Concentrates for Antimony Removal
Industrial Silver Electrorefining and Electrowinning
Evaluation of Sampling Methodology and Bias at an Industrial Lead Smelter
Metallurgical Scoping Evaluation of a Gold Ore
Industrial Gold Cyanidation Plant Consulting
Mineral Processing and Hydrometallurgical Tungsten Project
PGM Recovery and PGM Concentrate Evaluation
Coal Processing
Due Diligence of Industrial Precious Metals Recycling Plants.
Evaluation and Development of an Enargite Concentrate Processes
Technical Evaluation of a Tetrahedrite Concentrate
Hydrometallurgical Antimony Process Evaluation
Lead Reverberatory Furnace Diagnostic Analysis
Gold Recovery from Chalcopyrite

H. A. Simons Ltd., Mining Group, Vancouver, BC (1996 – 1997)

Senior Process Engineer

- Senior Process Engineer undertaking contract projects for clients covering topics including; Nickel/Cobalt Hydrometallurgy, Nickel /Copper Ore Mineral Processing, Copper/Cobalt Ore Processing, Copper Heap Leaching, Bankable Feasibility Studies, Hydrometallurgical Antimony Recovery, Arsenic & Bismuth Processing, Copper Solvent Extraction, Gold Ore Process Review, Ion Exchange Process Review, Molybdenum Impurity Removal and Titanium Dioxide Production

Sunshine Mining & Refining Co., Kellogg, ID, USA (1988 - 1995)

Chief Process Engineer

- Chief Process Engineer involved in all aspects of research, development, engineering design, start-up, operations, marketing, and environmental affairs at state-of-the-art chemical plants producing silver, gold, copper and antimony.
- Undertook several projects for outside clients covering topics including; Tetrahedrite with High Mercury Content, Stibnite Processing, Lead Refinery Wastes, Chloride Ion Selective Electrode Technology, Refractory Gold Concentrate, Copper Dross Flue Dust, PGM Processing, and Refractory Gold/Silver/Copper Concentrate Treatment.

Key Tronic Corporation, Spokane, WA, USA (1981 - 1982)

Chemical Engineer

- Chemical Engineer, directing the production of electronic components utilizing electrolytic and hydrometallurgical processes.
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Morton Thiokol Corporation, Brigham City, UT, USA (1979 – 1981)

Chemical and Manufacturing Engineer

- Manufacturing Engineer directing the production of propellants for automotive passive restraint systems. Also a Chemical Engineer, designing, testing and producing solid fuel rocket motor nozzles.

**Professional
Affiliations**

The International Precious Metals Institute - Director

The Society for Minerals, Metallurgy and Exploration – Director, Vice President and Strategic Committee, Executive Committee. Founding Registered Member # RM59300

The Order of the Engineer - Link 119

The Northwest Mining Association - Trustee

The Canadian Institute of Mining, Metallurgy and Petroleum

The Metallurgical and Materials Engineering Advisory Board of Montana Tech

The National Materials Advisory Board – Materials Technology for Process Industries

National Academy of Engineering – Consultation for Mineral Processing and Hydrometallurgy

National Science Foundation – Proposal Reviewer

The Mining and Metallurgical Society of America Member Qualified Professional Registration # 01079QP

The American Institute of Chemical Engineers – Senior Member and Nanoscale Science and Engineering Forum

Society for Biological Engineering

Prospector's and Developers Association of Canada

Institution of Chemical Engineers – Fellow and Registered Chartered Chemical Engineer # 99906638 and ECUK # 558000

FEANI – Registered as Eur Ing # 28934

The Minerals, Metals and Materials Society – Aqueous Processing, Copper Cobalt Nickel & Precious Metals Committees, EPD Council

The Institute of Materials, Minerals and Mining # 453925 – Nominated as a Fellow

Sigma Rho Mining Fraternity

Southwest Montana Technology Network

Colorado Mining Association

Montana Mining Association

Montana Academy of Sciences

The Society of Mineral Analysts

The International Titanium Association

Montana State University Alumni Association

Montana Tech Alumni Association

Kokondo Karate Black Belt Level Instructor

American Hockey Coaches Association

USA Hockey Masters Certification and Head Coach of Butte High School Hockey Team