Northwest Community College
School of Exploration and Mining

Introduction to Metal Leaching and Acid Rock Drainage

Course Information

Instructors:
Dr. Bill Price
Dr. Kevin Morin
Mike Aziz
Ron Robichaud
Glenda Ferris

Dates: September 12-16, 2005
Fee: $1,000.00
Location: Smithers, British Columbia, Canada

NWCC School of Exploration and Mining

Northwest Community College School of Exploration and Mining has been developed to respond to the training needs of this growing industry. The school has been developed in partnership with the Smithers Exploration Group.

Northwestern British Columbia provides an unparalleled natural classroom for resource-based learning activities. It is home to some of the world's remaining wild spaces, and it is a place where new and traditional residents interact with a rich diversity of ecosystems that sustain local economies from the interior to the coast. It is an area of challenge and opportunity, an area where there is much to be learned about natural systems and appropriate resource use.

Contact Information

Northwest Community College
PO Box 3606
Smithers, BC
V0J 2N0

Tel: 250.847.4461
Fax: 250.847.4568

akosalko@nwcc.bc.ca
www.nwcc.bc.ca

Course Description

The goal of this course is to provide a practical understanding of metal leaching and acid rock drainage (ML/ARD), the major environmental and reclamation challenges faced by the mining industry. ML/ARD is a multi-disciplinary subject, involving a large number of processes, each with demanding information requirements. It is also an applied science, with much of the current knowledge residing in company reports and with leading industry practitioners and regulators. The course will provide a basic understanding of the procedures used to assess and prevent potential ML/ARD impacts. Much of time will be spent touring mines in this area: Placer Dome's Equity Silver mine, Imperial's Huckleberry mine, Noranda's Bell mine and Silver Standard's Duthie mine. These mines are world leaders in ML/ARD mitigation and the tours will allow participants to observe state of the art ML/ARD practices. Participants will gain experience in how ML/ARD test work is conducted and mitigation plans are developed, and the challenges that are encountered. In addition to the mine tours, ML/ARD practices and the underlying theory will be illustrated using case studies drawn from the instructors experience with mines in Canada and throughout the world.

Target Audience

The course is recommended to professional/technical personnel working in the mining industry, regulators, consultants, community members reviewing mines and students in environmental protection and reclamation.

Instructors

Dr. Bill Price, one of Canada's foremost experts on ML/ARD, is the course organizer. Bill has spent the last fifteen years reviewing mines and is author of the British Columbia and Ontario ML/ARD Guidelines and Manual of Prediction Methods, documents used world-wide

Mike Aziz will lead the Equity Silver tour. Equity Silver has been an industry leader in ARD mitigation with its research on soil covers, underwater disposal and drainage collection. Mike has published widely on that work and on methods to minimize ML/ARD risks.

Ron Robichaud will lead the tour of the Huckleberry Mine and its facilities. Huckleberry is a state-of-the-art modern mine site where ARD prediction and prevention are an integral part of the mine plan. Ron is environmental coordinator at the site and has worked on a wide range of ARD issues.

Glenda Ferris will share her experiences as a community member active in ARD review since 1986, assisting industry, government, community and First Nations groups. Glenda is in high demand because of her knowledge and experience. Her contributions include work on the recent MMSD review.

Dr. Kevin Morin along with Brian Rosendale will lead the tour of the Bell Mine. Kevin has worked as a consultant for many major mines and mining companies and published widely on ML/ARD, including a compendium of case studies. The ML/ARD program at Bell includes some of the best prediction work in the Province.

Introduction to Metal Leaching and Acid Rock Drainage

Course Outline

Introduction

- A Brief History of ML/ARD
- Regulatory Requirements
- Public Involvement

Basic Processes and Contributing Factors

- Geological Conditions (key minerals and rock types)
- Geochemical Processes (oxidation, dissolution, reduction and microbial processes)
- Hydrological Processes (contaminant transport, leaching and loadings)
- Potential Environmental Impacts

Material Characterization and Assessment

- Key Parameters and Concepts
- How to Characterize Exposed Materials
- Sampling and Sample Preparation
- Sample Analysis
- Kinetic Test Procedures
- Data Analysis and the Interpretation and Use of Results
- Monitoring Drainage
- Techniques for Different Materials - waste rock, road cuts, tailings, soil materials

Measures to Prevent Impacts

- Review of Current Practices - general considerations, information and design requirements
- Underwater Disposal - constructed impoundments, flooded workings, bulkheads and deposition in natural water bodies
- Blending - past practices, neutralization mechanisms and constraints
- Measures to Reduce Drainage - selecting the best disposal location, ditches, soil covers and liners
- Measures to Reduce the Oxygen Supply
- Drainage Treatment - chemical and biological treatment options and concerns
- Mineral Processing
- How to Develop a Mitigation Plan - selecting the best mitigation strategy, risk assessment, contingency planning, monitoring and maintenance, and geotechnical and hydrological considerations

How to Conduct an Assessment

- What Questions Must Be Answered and What Data is Required to Answer Them?
- How to Conduct a Field Inspection

Equity Silver Mine

- History of ARD Management
- Drainage Collection, Lime Treatment and Sludge Disposal
- Soil Covers and Hydrogeology of the Rock Dumps
- Underwater Disposal of the Tailings
- Flooding of the Pits
- Drainage Discharge and Effluent Monitoring
- Consultation with the Community

Huckleberry Mine

- Mine History, Geology and Environment
- Material Characterization and the Separation of Different Waste Types
- Mitigation Options including the Present Strategy for Flooding ARD Generating Wastes
- Development of the Mine Plan
- Use of ARD and non-ARD Generating Wastes for Construction
- Tour of the Lab Facilities

Bell Mine

- Overview of Site and History of ARD Management
- Rock Types, Mineralogy and ABA and Kinetic Test Work Results
- Modeling and Predictions of Future Drainage Chemistry at Closure
- Post-Closure Weathering and Resulting Drainage Chemistry
- Drainage Collection at a Remote Site
- Drainage Assessment and Mitigation Plan for the Load-Out Facilities

Duthie Mine

- Mine History, ML/ARD Potential and Environmental Requirements
- Drainage Monitoring Results
- Proposed Mitigation Strategy and Maintenance Requirements

Case Studies

Including Eskay Creek, Kemess, Red Mountain, Snip and Sulphurets Mines.

Registration Information

Early registration is recommended as we operate on a first-come-first served basis. Registration and payment in full must be received prior to August 26th, 2005 to secure a seat on this course.

Cancellations

Any cancellations received 15 days or more before the start of the class will receive a refund (minus a $25 processing fee). We are sorry, but we cannot provide a refund or credit for cancellations received less than 15 days before a class.

Academic Credit

This course may by prior arrangement only, qualify for credit to a number of college / university degrees or diplomas, typically at a senior undergraduate or graduate level. For those seeking credit please contact us and we will direct you on how to proceed.

Accommodation

The course is based in Smithers, BC and mines in the surrounding area. Accommodation will be in Smithers and is the responsibility of the participant. You can find contact numbers and email addresses for a wide variety of accommodation options by logging on to: www.tourismsmithers.com or calling 250.847.5072 to reach the Tourist Information Centre. Transportation will be provided from Smithers during the course and is included in the course fee. Meals are not provided.

NORTHWEST COMMUNITY COLLEGE
Take a closer look.