



### Professional summary

Dr Sobolewski dedicated his professional life to the protection of the environment. He founded Microbial Technologies in 1991 and pioneered the use of biologically-based treatment systems to detoxify polluted industrial waters. Over the past 25 years, he assessed environmental impacts from proposed industrial developments and designed wastewater treatment systems. Throughout these years, he delivered consistently relevant expert information to industry, government, First Nations and NGOs.

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Andre has broad experience with the treatment of mine drainage, from the development of conceptual designs at the Environmental Impact Assessment stage to the implementation of treatment systems in operating and closed mines. The following summarizes his project experience in the field.

### Impact Assessment

Dr Sobolewski has participated in several EIA's for proposed mines: Western Gold's Casino Project, Newgold Blackwater Project, Northcliff's Sisson Project, Cominco's Kutz Ze Kayah's Project, Teck's Pogo Project, Placer Dome's Las Cristinas Project, Millenium's Tulsequah Chief (BC) and Dublin Gulch (Yukon) Projects, Tahera's Jericho Project (including hearings), BHP Billiton's Ekati Project, Inmet's Mina de Cobre Project, Imperial Mineral's Red Chris Project, Teck Coal's Line Creek Expansion, Compliance Coal's Raven Project, Newgold's Blackwater Project, and Western Copper and Gold's Casino Project. Typically, he designed treatment systems for the anticipated discharges from these mines.

Andre was the Technical Lead in developing a selenium management strategy for Walter Energy's BC existing and planned coal mines. He reviewed Teck Coal's Elk River Valley-wide model for selenium and sulphate management, as well as potential environmental impacts at diamond mines in Canada's Northern Arctic. Dr Sobolewski developed procedures for deriving site-specific clean-up criteria (Environment Canada) and was lead author on the Guidance Manual for the Review of Environmental Assessments for Proposed Mine Projects in the Yukon (YESAB).

### Water Treatment System Design

Dr Sobolewski has designed, evaluated and developed several treatment systems – both active and passive – for a wide variety of contaminants. His primary focus has been to develop biologically-based treatment systems, such as wetlands and bioreactors.

### Treatment Wetlands

Andre pioneered the use of wetlands for treatment of contaminated mine drainage. He began his studies in 1989, investigating a treatment wetland at Bell Copper. He investigate, designed or constructed treatment wetlands at the Musselwhite Mine, Campbell Mine, Red Lake Mine, Keno Hill Mines (Bellkeno, Galkeno 900 and Silver King adits), Antamina Mine, Gibraltar Mine, Cluff Lake Mine, Rico Mine and Wismut Nordhalde. He has been selected as member of the Nico Mine Constructed Wetland Review Expert Panel.

## Limestone-based Passive Treatment Systems

Andre designed a number of limestone-based treatment systems, including the abandoned Mt. Washington Mine, Burlington Mine, Silver Butte Mine, Tom Valley Mine and Gossan Mine.

## Bioreactors

Dr Sobolewski investigated and constructed bioreactors for treatment of nitrate and zinc (Pend Oreille Mine), molybdenum (Highland Valley Copper), selenium (Smoky River Coal) and ARD (Tulsequah Chief Mine).

## In-Pit/In-Pond

Andre developed the geochemistry for the in-pond treatment system at the closed Island Copper Mine (Vancouver Island, BC), investigated the potential for in-pit treatment at Golden Sunlight (Montana) and Faro (Yukon), as well as in-pond treatment at Kinross' DeLamar Mine (Idaho) and Newmont's Yanacocha Mine (Peru).

## Heap Detoxification

Andre developed procedures for the biological detoxification of the spent heap at Brewery Creek (Yukon).

## Treatment Plants

Dr Sobolewski participated in the evaluation and design of treatment plants for selenium (Key Lake mill), ammonia and thiocyanate (Barrick's Nickel Plate Mine), calcite (Teck's Line Creek Mine), ARD (Minera Yanacocha) and acid leach barren solution Zaldivar Mine).

## Troubleshooting, Plant Optimization

Dr Sobolewski troubleshot the biological treatment plants at the Nickel Plate Mine (BC) and at Beal Mountain Mine (Montana). Additionally, he has been contracted to optimize the Nickel Plate Mine treatment plant after 20 years of operation to account for the changed feed flows and chemistry.

## Research

Dr Sobolewski has conducted research on a variety of subjects, including the evaluation of a biocide to control acid drainage (US Bureau of Mines), investigation of the mechanisms of contaminant removal in wetland sediments (Noranda Mines and Placer Dome), microbial degradation of thiosalts (Western Minerals) and the uptake of metals by wetland vegetation (UKHM, Yukon College). He developed a process for the biodegradation of wood extractives in woodwaste runoff and leachate (Forest Innovation Investment). He developed a microbial indicator for sulphide mineral oxidation and methods for isolating bacteria specific to sulphide minerals (Placer Dome, Ekati Diamonds). His most important work was the discovery of bacteria that dissolve gold, to be used as a replacement for cyanide (Placer Dome). Much of this research was conducted in the two commercial laboratories that he designed and operated over a period of twelve years.

## Publications and presentations

Dr Sobolewski authored 12 scientific publications, more than 35 conference presentations, and a website. He co-authored the *Technical Guide for the Environmental Management of Cyanide in Mining*, for the Mining Association of BC and the *Guidelines for the Prediction and Mitigation of Potential Direct Environmental Effects from Effluent and Waste Rock Management of Major Hard Rock Mining Projects* for YESAB, as well as the well-received review *Evaluation of Treatment Options to Reduce Water-Borne Selenium at Coal Mines in West-Central Alberta* for Alberta Environment. André taught four courses on the biological treatment of contaminated mine water.