

# Short Course

<b>NAME OF SHORT COURSE:</b>	<b>Pit Lakes and Mine Closure: Design and Management</b>
<b>DATE:</b>	Saturday, September 17, 2011
<b>TIME:</b>	8:30 am – 5:00 pm
<b>LOCATION:</b>	<b>Fairmont Chateau Lake Louise - Beehive/Lakeshore Room</b>
<b>REGISTRATION FEE:</b>	\$500 (CDN)
<b># OF PARTICIPANTS:</b>	40
<b>FACILITATED BY:</b>	<i>Dr. Clint McCullough and an international group of pit lake experts</i>
<b>LANGUAGE:</b>	English

## SHORT COURSE DESCRIPTION:

This course brings together international experts on the science and sustainability of pit lakes to deliver a series of lectures and case studies from initial pit design, through to pit lake development and finally closure and relinquishment.

Talk #	Section	Lead author	Title
1	Background	Devin Castendyk	Lessons from pit lake history
2	Design	Theo Charette and others	A framework for designing pit lake guidelines
3	Design	Mark Lund and others	Restoring pit lakes goals: factoring in biology
4	Design	Alan Puhlovich and others	Backfill options for pit lakes
5	Design	Les Sawatsky and others	Hydraulic design of pit lakes
6	Design	Jerry Vandenberg, and others	Use of Water Quality Models for Design and Evaluation of Pit Lakes
7	Design	Stella Swanson	Lake end use decision support process
8	Design	Eddie van Etten and others	Lake catchment vegetation requirements
9	Development	Marc Wen	Phytoremediation of pit lake water quality
10	Development	Naresh Kumar and others	Sulfate reduction bioremediation of pit lake water quality
11	Development	Martin Schultze and others	Filling and management of pit lakes with diverted river water and with mine water – German experiences
12	Closure	Hugh Jones and others	Pit lake closure regulations and strategies
13	Closure	Trevor Ross and others	Health and Safety around pit lakes
14	Closure	Chris Gammons and others	Pit lake water quality monitoring
	Break away	All delegates	Pit lake closure scenario discussions

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**SHORT COURSE OBJECTIVES:**

To inform consultants, mine managers and closure specialists, regulatory agencies, researchers and stakeholders on current international pit lake closure best practice and how it can be achieved on other mining projects.

**TARGET AUDIENCE:**

Consultants, Mine Managers and Closure Specialists, Regulatory Agencies and Researchers and anyone else associated with the development and legacy of pit lake landscapes

**ABOUT THE FACILITATOR(S):**

	<p>Dr. Clint McCullough is an Aquatic Ecotoxicologist and specializes in mine water and environmental management; and in particular mining pit lakes. Clint has over 17 years’ international research and consultancy experience from alpine to tropical environments. He has authored technical reports and papers on international pit lake management and end use development, water quality remediation and ecosystem restoration and pit lake closure strategies and requirements.</p>
	<p>Dr. Castendyk has published limnological and geochemical predictions of the future Martha Pit Lake in New Zealand, and was Senior Editor of the 2009 SME publication Mine Pit Lakes: Characteristics, Predictive Modeling, and Sustainability. He is currently a scientific advisor for the closure oil sands pit lakes in Alberta, and is supervising the development of the INAP Pit Lake Database.</p>
	<p>Chris Gammons is a Professor in the Geological Engineering Department at Montana Tech, in Butte, Montana, USA. Dr. Gammons' main area of research is the application of geochemistry and stable isotopes to understand the behavior of metals in the Earth's crust, both from an environmental and from a minerals’ exploration point of view.</p>
	<p>Hugh Jones has worked with mine environmental matters for 35 years, as an operator, regulator and consultant and has developed numerous mine closure plans and closure risk assessments internationally for many mine types. Hugh has presented at workshops on closure and has published papers on environmental aspects of mining, concentrating on mine landform requirements at closure and financial surety aspects of closure. Hugh was a Panel Member for Large Volume Waste, Mine Closure and Abandoned Mines section of the Mining, Minerals and Sustainable Development Project (MMSD).</p>

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	<p>Dr. R. Naresh Kumar, specializes in environmental bioremediation with particular research interests in geochemistry and microbiology. Naresh has 10 years of research experience in different areas of environmental science and biotechnology. He has published several articles in reputed international journals on environmental bioremediation. He has been working extensively over the last three years on different acid pit lake bioremediation projects at the Mine Water and Environment Research Centre (MiWER), Edith Cowan University, Australia.</p>
	<p>Associate Professor Mark Lund is head of the School of Natural Sciences at Edith Cowan University in Perth, Western Australia. He is an aquatic ecologist with over 20 years experience in lake rehabilitation and over 15 years experience in researching rehabilitation of pit lakes. Mark's main interests are in nutrient dynamics and trophic interactions. Mark is co-leader of the Mine Water and Environment Research Centre.</p>
	<p>Alan Puhlovich is a hydrogeologist with approximately 20 years' experience, primarily working for Rio Tinto as well as various consultants. He has particular experience in managing closure and rehabilitation research programs, with specific focus on pit backfilling and landform designs and assessing the extent to which they meet post-mining land use objectives and protect receiving environments.</p>
	<p>Les Sawatsky has participated in the design of many pit lakes in support of mine closure plans for oil sands mines. As a hydrologist and geomorphologist, he champions design features that provide for long term self-sustaining performance to enable walk-away mine closure while meeting regulatory obligations for ecological productivity and treatment of residual mine process water following mining cessation.</p>
	<p>Martin Schultze is a chemist and has researched and made management recommendations for water quality predictions and limnology of pit lakes since 1984. Martin has mainly worked with pit lakes in former lignite mines in Germany but has also has experience with other ore types. Martin is co-editor of the Springer book "Acidic Mining Lakes" (2<sup>nd</sup> edition).</p>
	<p>Jerry Vandenberg is an Associate and Senior Water Quality Specialist with Golder Associates in Calgary, Canada. His expertise is in hydrodynamic and water quality modeling, with a focus on oil sands pit lakes.</p>

**Equipment required to participate:** None

**Materials provided to participants:** Newly published, hard bound and colour pit lake design and management book.

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