**Training
Workshop**

PBMO^{TM} Decision Support Tool for Optimising Mine Dewatering

HydroGeoLogic (HGL), Inc. will be presenting a pre-conference workshop at the International Mine Water Association (IMWA)'s 2012 Symposium in Bunbury - Western Australia (29th September 2012) on application of PBMO^{TM} (Physics Based Management Optimisation) Tool for supporting mine dewatering operations. HGL is an engineering and technical services firm, headquartered in Reston, Virginia, USA. Since its inception, HGL has developed several advanced optimisation and modeling codes to support a wide range of water resources and environmental consulting projects. Their software products have been utilised by numerous users globally to analyse a wide variety of water resource and contamination problems. The PBMO^{TM} integrates linear and non-linear management optimisation modules with MODFLOW-SURFACT/MODHMS, a complete simulator for flow and transport in the groundwater and surface water systems. The coupling of optimisation with modeling enables the user to optimally manage water resources and mining operations subject to practical constraints.

This workshop is suitable for mining geologists, engineers and scientists who are concerned about effective management of water resources and mitigation of surface and subsurface contaminant problems.

Topics covered in the course include:

- Introduction to PBMO^{TM} Medallion System
    - Capabilities *(linear, mildly non-linear and fully non-linear optimisation*)
    - Applicability *(mine dewatering, groundwater plume control, environmental restoration*)
- Introduction to MODHMS/MODFLOW-SURFACT^{TM} Simulator
    - Capabilities (*Groundwater and surface water*)
    - Applicability *(mine dewatering, groundwater plume control, environmental restoration*)
- In Class-Examples:
    - Groundwater dewatering example *(linear and non-linear optimisation*)
    - Contaminant plume hydraulic containment (*non-linear optimisation*)
- Examples of Site Applications:
    - Mine dewatering optimisation (*Rio Tinto: proposed Nammuldi Mine Site, Western*
    - *Australia's Pilbara region*)
    - Groundwater Remedy Optimisation (*Umatilla Army Depot, Oregon, USA*)
- Summary
    - Applying optimisation to complex sites, advice and lessons learned

INSTRUCTORS' BIOGRAPHICAL SKETCHES

Varut Guvanasen is a Registered Professional Engineer with over 30 years of experience. Dr. Guvanasen received his PhD from the James Cook University of North Queensland. He has extensive experience in developing and applying mathematical models in hydrology, hydrogeology, and geomechanics; performing hydrogeological and hydrological investigations; investigating groundwater flow and contaminant transport in porous and fractured media; and developing and applying methodologies for uncertainty analysis in multimedia risk assessments. Dr. Guvanasen has developed many theoretical models and computer codes, including a 3-D finite-element code that simulates simultaneous hydrothermoelastic deformation of fractured rock masses, variably saturated groundwater flow, heat transport, and radionuclide transport. Dr. Guvanasen is Vice President of R&D at HydroGeoLogic and the current lead developer of MODHMS, an integrated surface water/groundwater flow and transport code. He is active in mathematical modeling, and has taught a number of courses in groundwater modeling and integrated surface water/ groundwater modeling in Australia, Asia, North America and Europe.

Larry M. Deschaine is a Registered Professional Engineer with 28 years of experience. He graduated from the Massachusetts Institute of Technology, and is completing his PhD at Chalmers University of Technology, Gothenburg, Sweden. His over 100 open literature works have received numerous awards, including a U.S. Vice Presidential Hammer Award for optimisation in 1998. He is a recognised expert in the development and application of simulation and optimisation tools, including real-time automated learning and control techniques for large-scale environmental restoration, water resources, and energy systems. His expertise is in linear and nonlinear systems modeling and optimisation, including the PBMO^{TM} algorithm and software development, multi-objective decision making, specialised large-scale optimisation algorithms, and machine learning. He is a Principal Engineer at Hydrogeologic, Inc.