CODES
ARC CENTRE OF EXCELLENCE IN ORE DEPOSITS

CODES, GHD AND MRT PRESENT…

ADVANCES IN GEO-LOGGING

For the first time in Australia, a course is being offered that focuses on enhancing the geo-logging skills of mining industry professionals with the key aims of improving profitability and efficiency.

DATE: 8 to 11 September, 2014
VENUE: Mineral Resources Tasmania (MRT) facilities, Hobart.

WHO SHOULD ATTEND: Exploration geologists, mine geologists, geotechnical staff, exploration managers, and other mining industry professionals.

COURSE SYNOPSIS

This intensive four-day program will provide attendees with a thorough understanding of the latest logging techniques, and how they can be used to improve geo-investigation, planning, and reduce risk, costs and uncertainty within the mining environment. The course is designed and presented by two leaders in their fields – CODES and GHD Pty Ltd. – with support and facilities being provided by MRT.

Based at the University of Tasmania, CODES is the Australian Research Council Centre of Excellence in Ore Deposits. This internationally renowned Centre is recognised as a world leader in ore deposit research, with a track record for excellence in its postgraduate training. GHD was established in 1928 and is one of the world's leading engineering, architectural and environmental consulting companies, with more than 6,500 employees across five continents. The combination of these two highly credentialed groups provides an exceptional mix of complementary skills that ensure a high quality program.

The course takes a practical, holistic approach to logging during mineral exploration drilling projects, providing a cost effective means of maximising returns from exploration programs. A key feature is the hands-on nature of the classes, with leading industry professionals working closely with attendees to log selected core trays and impart their extensive knowledge and experience.

KEY TOPICS INCLUDE:

- Geological logging – furthering and strengthening attendees' skills.
- Updates to approaches to geometallurgy, petrophysical, mineralisation and alteration logging (using equipment such as handheld XRF analysers and HyLoggers).
- Geotechnical logging – covering key parameters relating to soil and rock mechanics, which will enable the assessment of ground conditions for engineering design of underground and surface infrastructure.
- Logging of geoenvironmental parameters – enabling the assessment of the potential for waste rock to generate acid and metalliferous drainage.
- Hydro-geological conditions – logging parameters that enable the potential for aquifer impacts, water supply, water quality, groundwater discharge and groundwater-dependent ecosystems to be assessed and problems mitigated.

Mineral Resources Tasmania
Department of Infrastructure, Energy and Resources

Tasmania
Explore the possibilities

GHD

UNIVERSITY of TASMANIA

THE PROGRAM

DAY 1 MONDAY 8 SEPTEMBER

Introduction and Course Overview

Geological Scan, Graphic and Structural Logging (Robert Scott, Andrew McNeill, Jocelyn McPhie)

Introduction to the concepts of quick scan, and graphic logging techniques used to determine the major lithologies and components of the core. Graphic logging is a pictorial representation of sections through sedimentary and/or volcanic sequences. The aim is to record the variations in textures, bedforms, grain size and contact relationships in simplified, pictorial form, permitting rapid assessment of stratigraphic trends within, and correlation between, drill holes. Structural logging will also be introduced.

DAY 2 TUESDAY 9 SEPTEMBER

Alteration and Mineralisation (Andrew McNeill, Bruce Gemmell, Robert Scott)

Features of alteration and mineralisation are fundamental to understanding and interpreting an ore deposit, and in determining the feasibility and geotechnical aspects of exploitation. These features will be covered, together with related logging techniques.

Rock Mechanics / Geotechnical Engineering (Graham Granger, Tim Cartledge)

This topic addresses the soil and rock mechanics parameters that can be readily obtained from exploration boreholes, and used by geotechnical and mining engineers to assess ground conditions relevant to mine planning, underground and open-cut mine design and foundation conditions for infrastructure such as buildings, roads, tunnels, waste dumps and dams.

Drilling techniques, core handling and sampling techniques to maximise the geotechnical information obtained from boreholes will also be discussed. Comprehensive descriptive reference sheets will be provided.

The first part of the day will be an interactive presentation, followed by a practical logging exercise with rock cores in the afternoon.

DAY 3 WEDNESDAY 10 SEPTEMBER

Geometallurgy / HyLogger Scanning / Geophysics (Julie Hunt, Michael Roach, David Green, Hugh Tassell)

Geometallurgy involves a quantified and comprehensive approach to ore characterization in terms of critical processing attributes such as blasting, crushing, grinding, liberation, recovery and environmental management. This course will demonstrate a range of techniques and equipment that can be used on drill core to obtain such data.

Improved geometallurgical knowledge leads to improved forecasting, reduced technical risk, enhanced economic optimization of mineral production, and improved sustainability.

The HyLogger, developed by CSIRO, uses visible, near infrared and thermal infrared spectroscopy to identify and characterise minerals at a spatial resolution of one centimetre. HyLogger rapidly logs mineralogy and synchronously captures high resolution digital images of drill core, enabling fast consistent and effective logging of mineralogy in drill core.

The geophysics component teaches the fundamental principles required to understand and interpret geophysical logging data, comprising both theory and practical exercises. Attendees will learn the physical and technical basics of borehole measurements and become familiarised with geophysical log analysis and interpretation. The course emphasises practical aspects of petrophysical measurements on core and integrated interpretation of these measurements with borehole geophysical logs.

DAY 4 THURSDAY 11 SEPTEMBER

Hydrogeology and Geoenvironmental Issues (Robert Virtue, Lee Evans)

This topic covers the benefits of understanding groundwater at the exploration stage. It includes early establishment of baseline data and early identification of issues such as aquifer impacts, water supply, water quality, groundwater discharge and groundwater dependent ecosystems.

In addition, the day provides an appreciation of key geoenvironmental parameters, which will enable the assessment of the potential for waste rock to generate acid and metalliferous drainage.

Assessment: On the final afternoon, attendees undertake a practical assessment, utilising the skills and knowledge they have obtained during the course to log a selection of core. Upon successful completion of the practical assessment, attendees will receive a Certificate of Completion.

NB. Hours are 9am to 5pm each day.

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THE PRESENTERS

GHD

Tim Cartledge is a Senior Geotechnical Engineer at GHD with experience in mine planning, open pit geotechnics, and investigations for large underground civil infrastructure.

Dr Lee Evans – Hydrogeology and Geoenvironmental Sciences is a Senior Hydrogeologist with GHD. He obtained his doctorate in hydrogeology through the Department of Earth Sciences/CODES at the University of Tasmania.

Graham Granger – Geotechnics; Rock and Soil Mechanics is a Principal Engineering Geologist with over 35 years' experience in the application of engineering geology to civil infrastructure and mining projects. He is a former Senior Lecturer at the Department of Civil and Geological Engineering at RMIT University.

Hugh Tassell – Geophysics is a Senior Geophysicist at GHD with more than 10 years' experience across a diverse range of geophysical techniques. His application of geophysics spans sectors including geotechnical engineering and infrastructure development applications (onshore, transition zone and offshore), continent scale pre-competitive geoscience products and mineral and bulk commodity exploration and production. Hugh has extensive experience in the application of innovative borehole geophysical logging techniques to image and characterise the properties of the near surface environment.

Robert Virtue – Hydrogeology and Geoenvironmental Sciences is a Principal Hydrogeologist with over 25 years' experience in geological, hydrogeological and geochemical investigations for major mining companies; local, state and federal government; and commercial and industrial organisations throughout Australia and in West Papua, Papua New Guinea, New Zealand and Oman. Robert is also GHD's technical leader for Hydrogeology.

CODES

Prof. J. Bruce Gemmell – Alteration and Mineralisation is the Director of CODES. Bruce has 30 years' experience in ore deposit research, primarily in modern and ancient VHMS and epithermal deposits.

Dr Julie Hunt – Geometallurgy is a Research Fellow in geometallurgy: an integrated, cross-disciplinary field that seeks to enhance mineral processing techniques and optimise mineral recovery rates.

Prof. Jocelyn McPhie – Volcanology is Head of Earth Sciences at the University of Tasmania and specialises in facies analysis of volcanic successions, drawing on research experience involving calderas, ignimbrites and the products of submarine volcanism.

Dr Michael Roach – Petrophysics and Geophysics
Dr Michael Roach – Petrophysics and Geophysics is a Senior Lecturer in geophysics, specialising in petrophysical properties of rocks and the application of geophysics to the study and exploration of ore deposits.

Dr Robert Scott – Structure, Alteration and Graphic Logging is a Senior Lecturer in structural geology and the coordinator of the Master of Economic Geology Program at CODES. Robert has developed a novel method for obtaining and quantifying the reliability of structural data from axiallyoriented drill core, using a fabric of known orientation.

MRT

Dr David Green – HyLogger Core Scanner is Senior Geologist at Mineral Resources Tasmania, and oversees operation of the HyLogger core scanner at MRT.

Dr Andrew McNeill – Alteration, Mineralisation and Graphic Logging is Manager Geosciences at Mineral is Manager Geosciences at Mineral Resources Tasmania. Andrew has extensive experience in both ore deposit research and exploration.

ADVANCES IN GEO-LOGGING

8–11 SEPTEMBER, 2014

REGISTRATION FORM

Please note that there is a limit of only 30 participants for this course, so please return this form as soon as possible to secure your place. Registrations close 29 August, 2014.

PERSONAL DETAILS

Title – Please circle (Prof / Dr / Mr / Mrs / Ms / Miss)

First Name _____ Last Name (Surname/Family name) _____

Preferred Name (for name tag) _____

Position _____ Company/University _____

Address _____

City _____ State _____ Postcode _____

Country _____

Email _____ Mobile _____

Phone (home) _____ Phone (work) _____ Fax _____

Dietary requirements/allergies _____

REGISTRATION FEE

The fee is AU$4,400 (including GST) and includes catering and course dinner (one).

EARLY BIRD DISCOUNT OF 10% FOR PAYMENT BY 30 JUNE, 2014.

Please retain a copy of this form for your records and email, post or fax original to:
Dr Robert Scott,
CODES, University of Tasmania, Private Bag 79
Hobart, Tasmania, Australia 7001
Email: Robert.Scott@utas.edu.au
Phone: +61 3 6226 2786 Fax: +61 3 6226 2547

PAYMENTS

Full payment must be received prior to 29 August, 2014.

AMOUNT DUE: AU$4,400
(AU$3,960 if paid by 30 June, 2014 – early bird rate)

Payment options (please tick boxes, where appropriate)

☐ **Credit Card**

Upon receipt of your registration form you will be provided with a payment reference number and web address for on-line payments. Please note: Credit card details cannot be accepted by email.

☐ **Cheque or Bank Draft**

Please make cheques and bank drafts payable to "The University of Tasmania". Bank drafts must be made out in Australian currency.

☐ **Purchase Order**

UTAS Account Number _____

Invoice

Invoices can be issued on request. Please specify name and address to whom the invoice is to be raised (or email this information to Robert.Scott@utas.edu.au).