26th June 2018

MINE VENTILATION AND ENVIRONMENTAL ENGINEERING COURSE
Perth, Western Australia – 25th November to 30th November 2018

Dear Sir/Madam,

I would like to invite you to the next Mine Ventilation and Environmental Engineering Course. This year the course is being held at the Parmelia Hilton Hotel, Perth, Western Australia.

As in 2016-2017, the course, developed and previously presented by Dr M J Howes from RHP, will be presented by Dr Roy Moreby of Morvent Mining Ltd.

The course will be delivered over six days covering theory and planning aspects combined with important elements of the heat and refrigeration course material. As an optional addition, course participants can elect to be assessed against AQF unit RIIUND601D Establish and Maintain the Ventilation Management System.

Subject to circumstances outside of our control, we intend to run this course regardless of the number of participants and will endeavour to avoid late cancellation.

The course covers the fundamentals, and background to, mine ventilation design, including management of gases, particulates and heat together with the application to ventilation planning tools using worked examples.

All course costs are inclusive of lunch, morning and afternoon tea/coffee, full set of notes, calculators and an Environmental Engineering text book. I have attached with this letter a nomination form for the course with the costs and the dates they will be running together with a general overview from Dr Roy Moreby on what the course involves.

Payment in advance is necessary to secure participation on the courses. Clemcorp Australia is happy to accept your bookings for the courses; unfortunately we cannot offer you corporate rates at any hotels. You will have to book your own accommodation at a hotel of your choice.

All that is required is for you to enter your details on the attached nomination form and e-mail it back to Clemcorp via sales@clemcorp.com.au. We will arrange for your inclusion on the course(s) requested.

We are proud to once again be associated with this annual course, and look forward to hearing from you in the near future.

If you have any queries please do not hesitate to contact me on +61 8 9406 3000 or sholbeck@clemcorp.com.au.

Kind Regards,
Clemcorp Australia

Saul Holbeck
Technical Services Manager
# NOMINATION FORM

<table>
<thead>
<tr>
<th>Applicants Name (Please print)</th>
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<tr>
<td>Minesite – Address of Accounts Department and name of Manager.</td>
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<td>Applicants Title (e.g: Engineer/Ventilation Officer, etc.)</td>
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<td>Course Section (circle section(s) required)</td>
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<td>1. Core Section &amp; Planning</td>
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<td>2. Assessment for RIIUND601D. Note pre requisites in course description.</td>
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<td>Contact phone, fax &amp; email</td>
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**Purchase Order Placed on Clemcorp (GST Applicable)**

1. Core & Planning Section – (6 days) – $7,750 + GST

2. Optional assessment for AQF unit RIIUND601D *Establish and Maintain the Ventilation Management System* – $1,250 + GST

A valid Purchase Order MUST accompany this nomination form to confirm booking on course

(Authorised by Minesite)
COURSE INTRODUCTION

Roy Moreby is pleased to announce the 44th Mine Ventilation and Environmental Engineering course which is to be held in Perth.

Course History and Background

The course material was developed by Dr Mike Howes (RHP) from the first delivery by him in Australia 37 years ago. The ventilation training courses have become benchmarks in practical mine ventilation education and over 500 personnel from mines, consulting companies and State Mining Inspectorates have attended. The courses started at Mount Isa in 1981 and have since been delivered across Australia. The first Perth course was held in 1995 and has become the main venue for the courses with the majority of attendees from Western Australia.

The course is designed for both practicing mine ventilation personnel and for those with either a planning or a statutory responsibility involving mine ventilation and environmental engineering. To obtain maximum advantage, background experience in mine ventilation is desirable but not essential. The course follows workshop formats with information followed by application where participation results in the maximum benefit.

The 2018 (November) Perth Course

In 2018, the course is again to be presented by Dr Roy Moreby of Morvent Mining Ltd.

The main part is a six day Core and Planning section combined with important elements of the Heat and Refrigeration course material (previously offered as a separate two day course). Subject to expressions of interest, the Heat and Refrigeration material may be offered as a separate extended course in future years. Details of the course’s day by day sessions are shown below.

The six day sessions provide the fundamentals and background to ventilation design and application to ventilation planning with examples.

The development of numerical methods are emphasised that allow alternate systems to be evaluated from an effectiveness and financial standpoint. Actual mine examples are used where applicable to illustrate both methods and derivation of cost effective solutions. To obtain maximum benefit, participants will be supplied with calculators and plenty of paper.

To ensure that participants can obtain maximum benefit from the workshop style of presentation, the numbers on a course are limited so the earliest response is suggested.

In addition to attending the course, participants can opt to be assessed against AQF unit RIIUND601D Establish and Maintain the Ventilation Management System for which, on satisfactorily completing the assessments, a Statement of Attainment will be issued by SIMTARS. Refer to details and pre requisites below.

Course Leader

The course will be led by Dr Roy Moreby who has been involved in mine ventilation and environmental engineering for 37 years. His experience includes 14 years working in the UK, South African and Australian hard rock mines, 5 years working in Australian coal mines followed by 17 years consultancy to the hard rock and coal mine sectors in Australia, North America and China. From 2000, he has been an Associate Professor at the School of Mining Engineering at the University of New South Wales where he has been involved with the development and delivery of ventilation courses to both undergraduates and industry participants. This includes training of Australian statutory coal mine ventilation officers.
Session Details
Each day has four 90 minute sessions starting at 08h30, finishing at 16h30 with 30 minute coffee/tea breaks at 10h00 and 14h30 and a 60 minute lunch break at 12h00.

Day 1 - Fluid Flow, Friction and Shock Losses
1. Background/historical perspective leading to current state of technology. Introduction to fluid mechanics, fluid properties, manometry, pressure measurement.
2. Laminar and turbulent flow, dimensional analysis, steady flow energy equation and flow measurement using orifice plates, venturies and pitot static tubes.
3. Internal flow, Atkinson, Darcy-Weisbach, roughness, Colebrooke & White, application to mine airways.
4. Fluid flow over objects, drag force, pressure loss and application to mine shafts, escape ways and declines. Flow through airway discontinuities, shock losses, equivalent length, bends, inlets, contractions etc.

Day 2 - Network Analysis and Fans
2. Axial and centrifugal fans, design principles, fan construction and fan performance curves.
3. Fan pressures, operating point, fan laws (speed and density changes), series and parallel fan operation.
4. Fan applications, development, booster and main fans, flow measurement, monitoring, jet thrust fans. Long and short development. Leakage in auxiliary systems, derive ventilation design.

Day 3 - Gas Laws, Psychrometry and Gases
1. Gas laws, Psychrometry, pressure surveys, analysis of pressure surveys, measured airway resistances.
2. Biological effects and sources of gases including strata gases, blasting, mine fires and explosions.
3. Operation of diesel powered equipment, application of simple and time modified gas dilution formulae.
4. Control of gases by dilution ventilation, re-entry time after blasting and gas detection.

Day 4 - Heat in Underground Mines
2. Sources of heat in mines, auto-compression of intake air, heat flow from the surrounding rock surfaces, broken rock and fissure water.
3. Diesel and electrical equipment and other sources of heat. Use increased mine depth in mine ventilation design example to provide numerical values and also identify the heat problems in development.
4. Determination of the mine cooling load, climatic profile and ventilation/cooling optimisations.

Day 5 - Dust and Ventilation System Design
1. Biological effects of dust, silicosis, mass/surface area, dust deposition and the respiratory system.
2. Sources of dust, ore passes, dust extraction systems. Dust collectors, dust measurement and assessment. Airflow and dust control in the rock handling system including induced airflows, draw points, ore passes, tips, crushers, loading stations, conveyors.
3. General mine design air quantities and introduce mine ventilation design example. Design criteria, statutory limits and future changes.
4. Ventilation design criteria: velocity, quantity, gases, dust, diesel exhaust, heat stress, radon and noise.

Day 6 - Ventilation System Design
1. Ventilation standards to meet the design criteria for mining and development activities.
2. Airway optimisations, cost functions, general results, outline of the required ventilation system.
3. Use of a skeleton network, determination of fan duties and the main fan operating envelope. Fan selection, effect and design of fan diffuser, fan bend and water drop out if required. Derive ventilation design.
4. Application of Ventsim using input parameters, Setting up Ventsim models, layers and pre sets, stages and dxf file conversion.

Course Material
- Notes (hardcopy and USB)
- Spreadsheets (USB)
- Additional reference material (USB)
- Ventilation text book
- Calculator
- RIIUND601D assessment (hardcopy and USB)
RIIUND601D Establish and Maintain the Ventilation Management System

Supervising Registered Training Organisation (RTO)

Department of Natural Resources and Mines
SIMTARS
Registration number 1828
http://www.simtars.qld.gov.au

Authorised Trainer and Assessor
Dr Roy Moreby
Morvent Mining Ltd
9 Wheatridge
Plymouth PL7 4QZ
United Kingdom

Pre-enrolment Requirements

Course participants electing to be assessed must:

1. Be at least 18 years of age.
2. Work in an underground metalliferous or coal mine or have written approval from the SSE of a working underground metalliferous or coal mine that states that they are permitted access to the underground metalliferous or coal mine to complete their assessment requirements.
3. Be able to understand written and verbal communications and be able to communicate with other persons in English.
4. Have access to an Underground Metalliferous or Coal Mine Safety and Health Management System, Standard Operating Procedure, Registers and Key Site Personnel.
5. Understand that relevant information must be sourced prior to application of a Qualification in regards to licensing, legislative, regulatory and certification requirements. This is because they can vary between states, territories and industry sectors.
6. Have the commitment, time and willingness to complete the programme of work.
7. Be able to access a reliable computer or laptop with Microsoft Word, Excel, PowerPoint, Acrobat Reader (version 5 or later), media player, email and internet connection.

Assessment Requirements

The contents of, and assessment for, RIIUND601D are specified in AQF documents that can be downloaded from https://training.gov.au/Training/Details/RIIUND601D

All material and information required to complete assessment tasks will be provided during the course. Assessment requirements for this course include;

1. Written answers, including calculations, to a series of questions covering performance and knowledge elements of the unit. (approx. 24 hours work).
2. Undertaking a limited ventilation survey at an underground mine to which the candidate has access. Results and analysis, including use of spreadsheets, to be submitted as a report (approx. 18 hours work).

Statement of Attainment

On satisfactory completion of assessments and payment of course fees, participants will be issued with a Statement of Attainment from the supervising RTO, SIMTARS. It is important to note that the Statement of Attainment demonstrates competence to the National Standards for RIIUND601D and therefore passing assessments to an appropriate standard is required.