

BOOKING FORM

In Situ Groundwater Remediation

6-8 May 2008

Return to Pat Rayner at the address overleaf

Name
Job title
Organisation
Address
Telephone
Fax
Email

I would like a place on this course **Full Price £695**

I would like a list of accommodation

I would like further information about the Masters programme

I enclose a cheque made payable to the University of Sheffield (*preferred option)

I would like to be invoiced at the above address

I would like to pay by credit card

Number
Expiry date on card
3 digit security code on card
Name on card
Signature on card
I have the following special requirements (eg vegetarian, mobility assistance)
Signed
Date

MSc TRAINING IN URBAN LAND AND WATER

This Short Course is a part of our MSc in Contaminant Hydrogeology and MSc in Environmental Management of Urban Land and Water, both technically focused programmes offering full or part time progression to postgraduate qualifications. We co-run a limited number of our modules each year as CPD Short Courses, but if you're interested in any of our other courses for further professional development, we can usually accommodate you. Please see our website at <http://www.shef.ac.uk/civil/pg/water.html> for a list of modules and more information about our MSc options. Alternatively, tick the box on the booking form if you would like more information posted to you.

FEES AND BOOKING

The course fee is £695 for the three days, inclusive of course notes, lunches, and refreshments. A list of bed and breakfast accommodation in hotels or guesthouses can be provided if needed, but we cannot take responsibility for your choice!

Please complete the booking form and return it to:

Pat Rayner
Civil and Structural Engineering
University of Sheffield
Mappin Street
Sheffield S1 3JD

Tel: 0114 222 5758
Fax: 0114 222 5793
email: p.rayner@shef.ac.uk

YOU MAY BE INTERESTED IN OUR OTHER COURSES

Risk Assessment	12-14 February 2008
NAPLs	11-13 March 2008
Natural Attenuation	3-5 June 2008

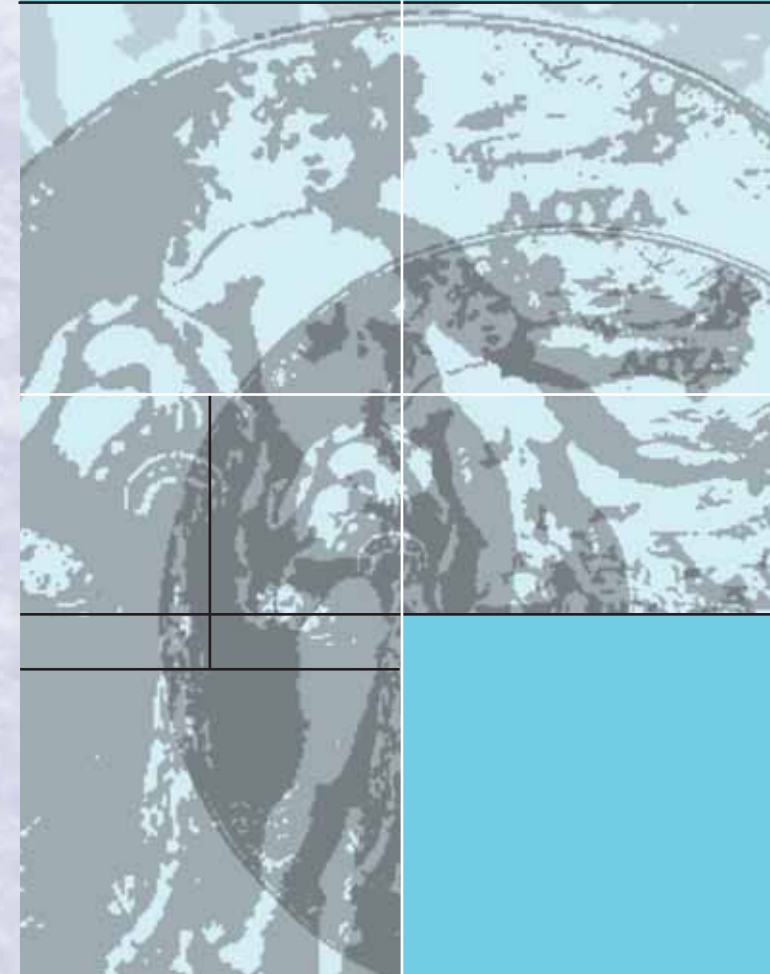
Details from Pat Rayner as above,
or at www.shef.ac.uk/civil/shortcourses



The University Of Sheffield.

IN SITU
GROUNDWATER
REMEDICATION

Presented by the Groundwater Protection and Restoration Group



6-8 May **2008**
at the University of Sheffield



THE ISSUES

Dissolved phase contaminant plumes are the path linking source and receptor in standard risk assessment models. Where natural attenuation does not occur, or does so at a rate insufficient to avoid risk, some form of engineered remediation may be required. *In situ* remediation systems have a number of advantages, but the number of options on offer makes it a challenge to select the optimal approach for a given scenario. Inappropriate technology selection or poor system design stems from i) a weak understanding of the science underpinning remedial approaches, ii) no appreciation of relevant advantages and disadvantages, and iii) no clear remediation target and/or performance monitoring metric in place. As a result, success or failure (and the associated reasons) cannot be clearly demonstrated, which provides no experiential learning for successful application at other sites. Appropriate training can mitigate the financial and environmental consequences of failure, leading to more cost effective, sustainable development.

WHY YOU SHOULD DO THIS COURSE!

On this course, you will gain a conceptual understanding of what controls the fate and transport of organic and inorganic contaminants in both unconsolidated and fractured rock geology. This understanding is a prerequisite to building site conceptual models - critical in the selection of remedial methods. You will also examine in detail how standard and more novel remediation approaches work, what affects their performance, and how to robustly demonstrate achievement of cleanup targets. Basic hydrogeological theory supports practical exercises to demonstrate how to approach remedial system selection and design for a range of contaminant/aquifer scenarios.

The course instructors boast 60+ collective years of experience in contaminant fate, transport and remediation. Lectures highlight this expertise and experience to provide both theoretical underpinning and practical context to allow direct application to real world remediation challenges. Besides gaining cutting-edge knowledge from research-driven content, this course is a chance to network with your colleagues in the consulting and regulatory arenas as well as our internationally recognised experts.

WHO CAN BENEFIT?

Technical and managerial staff from civil engineering and environmental consultancies, site owners, environmental regulators, remediation technology vendors and PhD students can all benefit from this course. The balanced theoretical and practical content should appeal to academic and practitioner audiences equally.

TOPICS COVERED

- Introduction to the philosophy of *in situ* groundwater remediation
- Fundamentals of dissolved organic and inorganic contaminant transport and fate
- Active physical treatment: pump and treat, air sparging, soil vapour extraction
- Semi-passive treatment: vertical recirculation, horizontal flow treatment well pairs
- Creating passive treatment zones – hydraulic considerations
- Passive biological treatment: requirements, design, implementation
- Passive abiotic treatment: permeable reactive barriers (zero valent iron, zeolites, carbon-based)
- *In situ* treatment in fractured rock aquifers
- Remediation performance assessment - monitoring strategies and performance metrics
- Case studies from the US, Canada and Europe

ABOUT THE LECTURERS

Ryan Wilson is a Lecturer in the Department of Civil and Structural Engineering at the University of Sheffield. His research interests include contaminant plume fate and transport, *in situ* remediation design, and performance assessment. He has 15 years of field and lab-based experience in this area, and has published widely on passive remediation systems. He co-holds a US patent on the Waterloo Emitter™ - a method of diffusive amendment delivery to support *in situ* bioremediation.

Adam Jarvis is Environment Agency Research Fellow in the School of Civil Engineering and Geosciences at the University of Newcastle. He is an internationally recognised expert in the areas of mine water pollution, migration and treatment. He was a member of the 5-strong international Steering Committee for the Global Acid Rock Drainage (GARD) guide initiative led by the International Network for Acid Prevention (INAP). His publications include a number focussed on *in situ* treatment of mine waters using a range of technologies.

Mario Schirmer is Professor and Head of the Department of Hydrogeology in the Helmholtz Centre for Environmental Research (UFZ) in Leipzig, Germany. In March 2008, he moves to EAWAG, the Swiss Federal Institute of Aquatic Science and Technology. He has 15+ years of experience and over 30 publications related to contaminated groundwater assessment and treatment, contaminant transport modelling and treatment performance metrics. His interests are in biodegradation kinetics, groundwater sampling techniques and mass flux measurements. Recent research activities include *in situ* remediation of fuel/oxygenates, urban hydrogeology and contributions of groundwater contamination to global warming.

Bruce Unger is an Environmental Standards Advisor for the Shell Group of companies, with over 16 years of experience in undertaking and overseeing the investigation and remediation of contaminated land. In his role for Shell, he reviews proposed and operational remediation systems for efficacy, and liaises with remediation contractors on how to optimise performance. He also provides expert advice to the Shell Group in support of legal claims. He has gained a global view of current practice through working on projects in Europe, Africa, the Far East, and North and South America.