In Situ Remediation Conference '14

2nd - 4th September 2014

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Dear Colleagues and Friends,

On behalf of the ADVOCATE team it is my pleasure to welcome you to the **In Situ Remediation '14** – "ISR 14" international conference. The conference will provide a comprehensive and stimulating overview of the latest scientific advances, research developments and technical innovations in concepts and approaches for the management and restoration of contaminated land and groundwater. Sustainability is a cornerstone of this process and must be implemented within remediation measures, considering all relevant environmental, economic, societal and technical aspects in decision-making and management practice. Developing the scientific and technical basis to support this ambition is a challenge. "ISR 14" hopes to address this.

The conference is supported by the ADVOCATE (**ADV**ancing Sustainable In Situ Remediati**O**n for **C**ont**A**mina**T**ed Land and Groundwat**E**r) **Marie Curie Initial Training Network**, funded by the European Union. The network was established to coordinate European research on in situ remediation concepts and applications from laboratory scale through to field scale evaluation and technology demonstration. ADVOCATE provides advanced training to early career researchers in the field and is developing new scientific understanding, performance assessment approaches and decision-making frameworks which advance the use of sustainable in situ remediation for contaminated land and groundwater, in ways that traditional methods have not been as successful.

But this conference is much more! These days are the ideal opportunity to meet colleagues, establish new friendships and explore new directions in this important and rapidly developing field. Many distinguished international scientists and researchers will take part in this conference. The papers presented in the oral sessions and posters include contributions on the state-of-the-art in science and technical innovation, carefully selected by the Organising Committee.

We would like to thank our sponsors for their generous support and to our dedicated staff and colleagues for their untiring help, support and advice in planning and arranging this event. We hope that you enjoy the conference and that your interaction with colleagues from many different countries will stimulate a creative exchange of ideas and will be personally rewarding.

Dr Steve Thornton
ADVOCATE Coordinator

Where to go

The Conference will take place in the St James's Suite on the fourth floor. Lunch and refreshments will be served in the Westminster Suite, also on the fourth floor.

Sponsors exhibitions stands and delegate poster displays will be in the Westminster Suite.

The Workshop on 4th September will be held in the Wordsworth Room, with lunch and refreshments served in the Rutherford Room, both on the fourth floor.

Book of abstracts

Your delegate pack includes a CD containing the abstracts of all presentations and posters presented at the conference.

Poster awards

The Best Poster and Best Oral Presentation Awards for Research, Development and Innovation in the field of In Situ Remediation will be selected by the Scientific Committee during the conference. These awards will recognise the quality and impact of the presented work and aim to encourage presenters to continue promoting knowledge and advances in the management and restoration of contaminated land and groundwater. Winners will receive their prizes at the closing presentation.

Conference dinner

The conference dinner will be held on Tuesday, 2nd September 2014 at 19.30. The location is Brasserie Le Blanc, located on the second floor of the gorgeous Covent Garden Market (nearest Underground Station is Covent Garden, Piccadilly Line). We hope that this will provide an excellent opportunity to network with fellow researchers and environmental professionals in a vibrant and relaxing atmosphere, while enjoying delicacies of the French cuisine.

Wireless LAN access

WiFi is available throughout the Queen Elizabeth II Conference Centre. You just have to connect to the SSID called "QEIIGuest".

Name badges

Delegates are asked to wear the name badges at all time while at the conference site. If you lose your badge, a new one can be obtained against proof or your original registration at the conference desk.

Gudrun Massmann, Carl von Ossietzky Universität Oldenburg

Prof. Dr. Gudrun Massmann is professor at the Institute for Biology and Environmental Sciences at the Carl von Ossietzky University Oldenburg. She is head of the research group on Hydrogeology & Landscape Hydrology, which was founded in 2010. The research interests of the group include the fate of emerging organic contaminants in groundwater, managed aquifer recharge, surface water- groundwater interaction, coastal hydrogeology and geoecology. She is currently leading a research project, amongst others, on the redox-dependent biodegradation and long-term persistence of organic trace pollutants from wastewater in aquifers.

Michael Schubert, Helmholtz Centre for Environmental Research - UFZ

PD Dr. rer. nat. habil. Michael Schubert studied geology and palaeontology at the University of Greifswald (1988-90) and mineralogy at University of Goettingen (1990-93). He worked as a consultant for Ove Arup in London/Leipzig until 1998 when he started his PhD studies in the Department of Analytical Chemistry at the Helmholtz Centre for Environmental Research – UFZ. Currently he is head of the Radionuclide Laboratory in the Department of Groundwater Remediation at UFZ and a lecturer at the Leipzig University.

His R&D is in the investigation and assessment of natural radioactivity in soil, air and natural water including NORM waste; with special experience in using naturally occurring radionuclides as aquatic tracers. He also has experience in the investigation of subsurface contamination by Non-Aqueous Phase-Liquids (NAPLs).

Mette M. Broholm, Technical University of Denmark

Mette M. Broholm is an associate professor in soil and groundwater contamination. Her research focuses on site characterization, organic contaminant fate and transport in the sub surface (incl. DNAPL) and in-situ remediation of organic contaminants by chemical and biological techniques with emphasis on fractured and dual permeability media. She has >25 years experience in consulting, research and teaching of soil and groundwater contamination and remediation.

Willy Verstraete, Gent University

Prof Dr ir Willy Verstraete graduated in 1968 from the Gent University as bio-engineer. In 1971 obtained a PhD degree in the field of microbiology at the Cornell University, Ithaca (USA). Since that year, he has worked at the Gent University, first as assistant and since 1979 as professor and head of the Laboratory of Microbial Ecology and Technology (LabMET - Faculty of Bioscience Engineering). Since October 2011, he has become emeritus professor.

His R&D has a central theme of Microbial Resource Management. He has field experience with respect to drinking water production plants (slow sand filtration), aerobic wastewater treatment (in particular with respect to nitrification-denitrification), anaerobic digestion of wastewaters and sludges, solid state fermentation of organic residues and bioremediation processes of soils and sediments.

Ofer Dahan, Ben-Gurion University of the Negev

Dr Ofer Dahan was teaching assistant and research student at The Hebrew University of Jerusalem (Israel) until he obtained his PhD degree in 1999. Since 2002 he has been a lecturer at the Dept. of Environmental Hydrology & Microbiology, Zuckerberg Institute for Water Research at Ben-Gurion University of the Negev, Israel.

His R&D has a central theme: Vadose Zone Monitoring System (VMS). He also has experiences in other research areas such as: vadose zone hydrology, land use impact on groundwater quality, contaminant transport, vadose zone remediation and development of subsurface monitoring technology.

Ilse Van Keer, VITO

Dr. Ilse Van Keer graduated as geologist in 1991 at the KU Leuven. After being a research assistant in the field of sandstone diagenesis, she obtained her PhD in 1999. Subsequently, she was employed for two years by the centre of nuclear energy (SCK) in Belgium. She joined VITO in November 2000 and has 15 years of experience contributing to and coordinating research projects with respect to the characterisation of soil and groundwater quality and the associated risks for human and ecosystem. She advises the government on soil investigations, risk evaluation, soil remediation and the development of decision support systems.

Tuesday 2nd September 2014

8.30 **Registration**

10.00 **Opening Address**

10.15 **Session 1: Urban groundwater contamination and emerging contaminants**

Co-chair: Mike Mueller (PeroxyChem) & Vidhya Chittoor Viswanathan (EAWAG)

Keynote: Challenges in urban hydrogeology - Examples from Berlin

Prof. Dr. Gudrun Massmann (Carl von Ossietzky Universität Oldenburg)

Groundwater energy and remediation: realising the synergy in the Netherlands

Rachelle Verburg, ARCADIS Netherlands

Emerging contaminants in urban groundwater in areas of Doncaster

Debbie Allen, British Geological Survey

Carbon and chlorine isotopes fractionation of chlorinated ethenes during diffusive transport in low permeability sediments

Philipp Wanner, University of Neuchâtel

Adaptation: A requirement when assessing and managing emerging contaminants — Perfluoroctane Sulfonate (PFOS) as a case study

Adrian Bhreathnach, ARCADIS EC Harris

12.00 **Lunch and Poster Discussion**

13.30 **Session 2: Novel methods for the assessment of in situ remediation processes and performance**

Co-chair: Dr Ian Ross (ARCADIS EC Harris) & Oksana Voloshchenko (UFZ)

Keynote: Radon - An effective environmental tracer for subsurface NAPL contamination and in situ remediation assessment

PD Dr. rer. nat. habil. Michael Schubert (Helmholtz Centre for Environmental Research - UFZ)

Removal of diesel hydrocarbons by constructed wetlands — Isotopic methods to describe degradation

Andrea Watzinger, Austrian Institute of Technology GmbH

To what extent can isotopes help substantiate natural attenuation of chlorinated ethenes?

Alice Badin, University of Neuchâtel

Assessment of residual Dense Non-Aqueous Phase Liquid (DNAPL)

Thomas Held, ARCADIS Deutschland

Microbial nitrogen transformation in constructed wetlands treating contaminated groundwater

Oksana Voloshchenko, Helmholtz Centre for Environmental Research - UFZ

15.15 **Coffee Break**

15.45 **Session 3: Permeable reactive barriers, in situ chemical oxidation, enhanced abiotic and thermal treatment technologies**

Co-chair: Dr David Major (Geosyntec Consultants) & Franklin Obiri-Nyarko (HydrogeotechnikavSp. Zo.o.)

Keynote: Challenges in subsurface in situ remediation of chlorinated solvents

Associate Professor Mette Martina Broholm (Technical University of Denmark, Department of Environmental Engineering)

Integrating sustainable in situ thermal and biological treatment at a fractured bedrock site

James Baldock, Environmental Resources Management

Use of electrokinetically-enhanced bioremediation (EK-BIO) and chemical oxidation (EK-ISCO) to remediate source areas in clay and silt

Marcus Ford, Geosyntec Consultants

Application of permeable reactive barriers for sustainable remediation of groundwater contaminated by heavy metals and BTEX

Franklin Obiri-Nyarko, Hydrogeotechnika Sp. z o.o.

A combination of high vacuum extraction and in situ chemical oxidation for the recovery and destruction of chlorinated hydrocarbons

Chris Taylor-King, Celtic Ltd

17.30 **Close of First Day**

19.30 **Conference Dinner in Brasserie Le Blanc, Covent Garden (Central London)**

Wednesday 3rd September 2014

9.00 **Session 4: Natural attenuation and engineered in situ bioremediation**

Co-chair: Dr Jeremy Birnstingl (Regenesis) & Uwe Schneidewind (VITO, Ghent University)

Keynote: Microbial services and their management: recent progress in soil clean-up and bioremediation technology

Prof Dr ir Willy Verstraete (LabMET, Ghent University)

Performance of an in situ chemical reduction bio-barrier for remediation of tetrachloroethene and trichloroethene in a chalk aquifer

David Granger, URS Infrastructure & Environment UK Limited

Permeable reactive interceptors: blocking diffuse nutrient and greenhouse gases losses in key areas of the farming landscape

Owen Fenton, TEAGASC

Enhanced biodegradation using nano-scale iron oxides

Thomas Held, ARCADIS Deutschland

Bioremediation of groundwater enhanced by microbial interaction with solid state electrodes

Wei Huang, University of Sheffield

10.45 **Coffee Break**

11.15 **Session 5: Fate and transport of contaminants in the vadose zone**

Co-chair: Felipe Couto (RemedX) & Natalia Fernandez de Vera (University of Liège)

Keynote: Optimization of remediation strategies using vadose zone monitoring systems

Dr Ofer Dahan (Zuckerberg Institute for Water Research, Ben-Gurion University of the Negev)

Vadose zone studies at an industrial contaminated site: The vadose zone monitoring system and cross-hole geophysics

Natalia Fernández de Vera, University of Liège

LNAPL transport and fate in the subsurface: Remediation industry best practice guidance

Gary Wealthall, Geosyntec Consultants

Reactive transport in porous media: Verification of subsurface processes with stable isotope fraction

Ali Mongol, Helmholtz Centre for Environmental Research - UFZ

Investigating the impact of heterogeneity in streambed sediments on flow, transport and biodegradation processes in the hyporheic zone

Uwe Schneidewind, VITO and SOCON, Ghent University

13.00 **Lunch and Poster Discussion**

14.30 **Session 6: Sustainability assessments of in situ remediation technologies, including economic aspects and feasibility studies**

Co-chair: Dr Joe Teer (Celtic Ltd) & Alistair Beames (VITO, Ghent University)

Keynote: Innovative remediation techniques: The key to sustainable and green remediation?

Dr. Ilse Van Keer (VITO - Flemish Institute for Technological Research, Environmental Modelling Unit)

Sustainable application of steam enhanced dual phase extraction in the treatment of heavier end and high viscosity hydrocarbons

Felipe Couto, RemedX Ltd

Sustainability assessment and temporal variations between remediation technologies

Alistair Beames, VITO and SOCON, Ghent University

A review of the legislative and regulatory basis for sustainable remediation in the European Union and United Kingdom

Steven Tan, URS Infrastructure & Environment UK Limited

The influence of feasibility study in selecting a sustainable approach for the remediation of soils and deep impacted groundwater at active petrol stations

Michael Murphy, RemedX Ltd

16.15 **Award of Prizes and Closing Address**

16.30 **Conference Close**

Thursday 4th September 2014 - In Situ Remediation of Contaminated Sites" Workshop 08.30 –13.00

Turning environmental challenges into a competitive advantage

All remediation challenges are unique, and as such, need a unique offering: one that is tailored to meet our clients' needs. At ARCADIS EC Harris we focus on delivering measurable positive outcomes combined with outstanding credentials and technical excellence.

We design and implement effective risk and remediation strategies to turn land condition liabilities into assets. We draw from our global expertise and hands-on experience of innovative technologies for the assessment and treatment of hydrocarbons, chlorinated compounds, metals and emerging contaminants. We offer:

- High resolution site characterisation
- Industry leading risk assessment and NAPL evaluation
- Remediation strategy development and design
- Turn-key remediation solutions
- Award winning Health and Safety performance.

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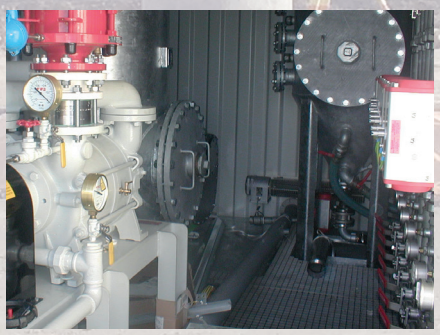
ARCADIS EC HARRIS

www.echarris.com/environment

Celtic enGlobe

CELTIC IS THE LEADING REMEDIATION CONTRACTOR IN THE UK, WITH A PROVEN TRACK RECORD OF DELIVERY AFTER MORE THAN 20 YEARS IN THE INDUSTRY. CELTIC IS PART OF ENGLOBE CORP, A WORLD LEADER IN PROVIDING INTEGRATED ENVIRONMENTAL SERVICES WHICH OPERATES IN THE UK, FRANCE, ISRAEL, THE USA AND CANADA. BY PARTNERING WITH CELTIC, YOU ARE ABLE TO RELY ON OUR EXTENSIVE EXPERIENCE AND DELIVERY CAPABILITY.

A PROVEN RECORD THROUGH EXPERIENCE AND INNOVATION



Innovative, design led problem solving has been at the core of Celtic's successful delivery of cost effective remediation. Our team of leading specialists have pioneered a number of new technologies that have now been adopted as standard throughout the industry including surfactant flushing, chemical oxidation and in situ stabilisation and solidification.

Our sister company Biogenie are world leaders in the bioremediation of contaminated soils, operating 22 treatment facilities worldwide, 3 of which are in the UK. This gives Celtic the flexibility to deliver an in house off site treatment and landfill tax free disposal route should that be the best option for the project.

Celtic has won numerous awards recognising our quality of service and technological innovation on a wide range of projects throughout recent years

2014 Finalist - *Contractor of the Year. Ground Engineering Awards 2014.*

2014 Winner - *Project of the year: CN Specialists awards.*

2014 Winner - *Sustainability Award. Ground Engineering Awards 2014.*

2014 Winner - *Technological Application Award, Chartered Institution of Highways and Transportation (CIHT) Awards.*

2014 Highly Commended - *Award for Technical Excellence. Ground Engineering Awards 2014.*

2013 Winner - *Best use of a combination of Remediation Techniques: Brownfield Briefing.*

2013 Highly Commended - *Best use of a combination of Remediation techniques: Brownfield Briefing.*

2012 Finalist - *Contractor of the year, Ground Engineering Awards.*

bb AWARDS 2013 WINNER

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construction news specialists awards 2014 10th ANNIVERSARY WINNER

GROUND ENGINEERING AWARDS 2014 WINNER

CIHT AWARDS 2014

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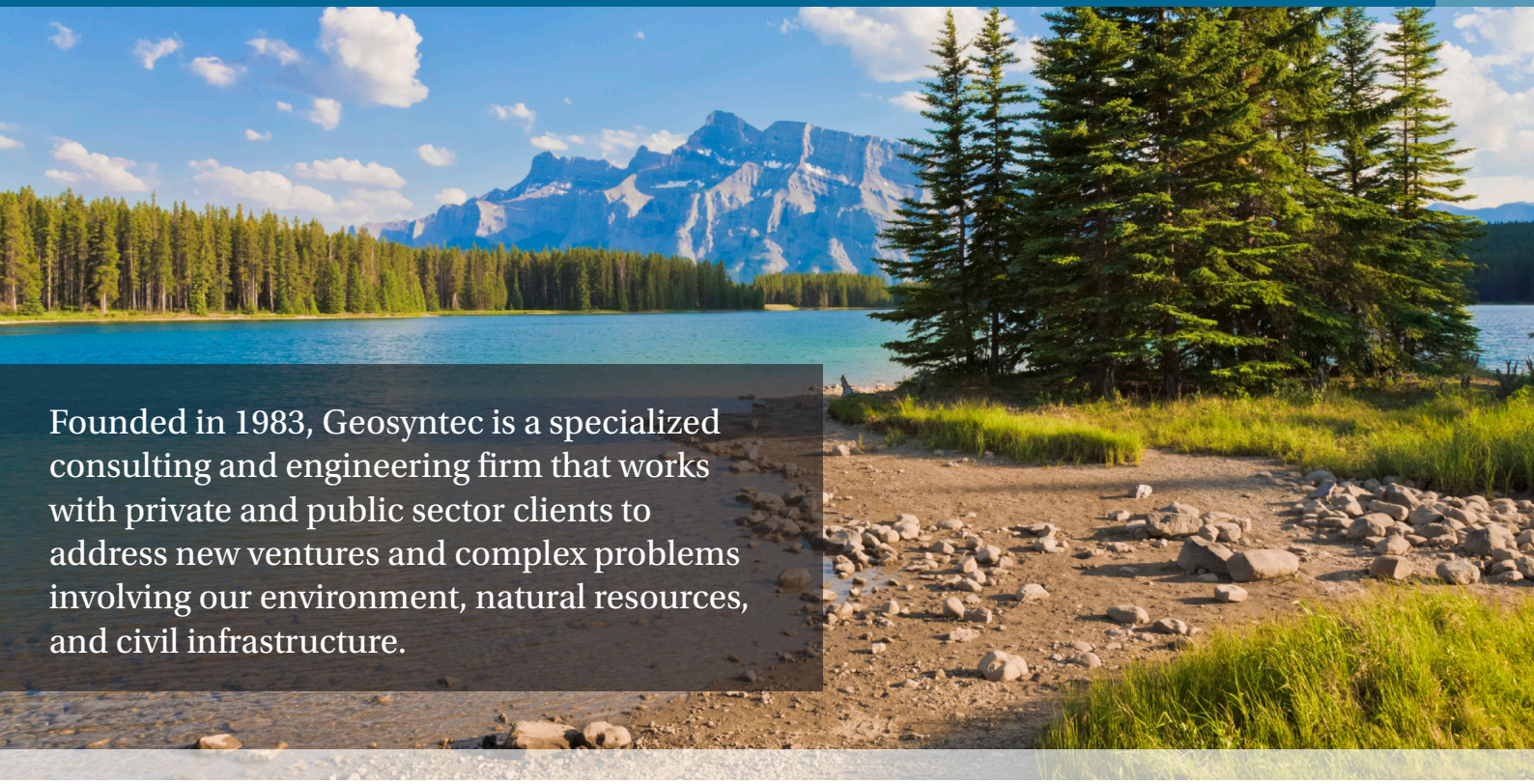

Founded in 1983, Geosyntec is a specialized consulting and engineering firm that works with private and public sector clients to address new ventures and complex problems involving our environment, natural resources, and civil infrastructure.

Geosyntec is the consultant and engineer of choice for first-class clients, and the employer of choice for exceptionally talented engineers and scientists

Geosyntec at a Glance

Geosyntec is a specialised environmental and engineering consulting practice in Europe, working with private and public sector clients on operational, legacy and new venture sites. Geosyntec has a particularly strong reputation for understanding and solving difficult problems linked to contaminated land and water, waste management, infrastructure, and at operationally complex sites.

Geosyntec provides our clients with technical services in earth and environmental sciences, environmental, geotechnical, and hydrological engineering consulting and design, and construction management and quality assurance.

We maintain a strong reputation for practice leadership, broad experience, technological innovation, and exceptional client service. Our professionals continue to develop new technology applications and capabilities. Our applied research partnerships with leading universities, regulators and other organizations are producing better methods for the in-situ and ex-situ remediation of recalcitrant chemicals in the environment.

Our private sector clients come from a variety of industries including oil and gas, chemical, aerospace, pharmaceutical, diversified manufacturing, advanced technology, power and other utilities, waste and environmental management. Our clients also include regional and national developers, large commercial property owners, and the legal sector. Our public sector clients include municipal, regional, and national governments.

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PeroxyChem

Brand new name. Decades of experience.

FMC Environmental Solutions is now PeroxyChem.

You might not have heard of PeroxyChem, but we've been in the business of soil and groundwater remediation for quite some time. As a division of FMC, we've worked to develop an ever-expanding portfolio of technologies that includes *In Situ* Chemical Oxidation, *In Situ* Chemical Reduction, bioremediation and stabilization. With these groundbreaking products and time-tested expertise from the industry's top minds, we can help you develop and execute site-specific solutions that address your environmental challenges.

A wide range of products for one-of-a-kind solutions

Klozur® | PermeOx® Ultra | EHC® | EHC Metals | EHC Liquid
ELS™ | ISGS™ | Daramend® | Terramend®

Environmental Solutions

www.peroxychem.com/remediation
Formerly a division of FMC Corporation

REGENESIS

Your In Situ Groundwater Remediation Partner

Regenesis is the global leader in the research, development and provision of engineered solutions for in situ groundwater remediation.

Since 1994, Regenesis technologies have been applied on 20,000 sites worldwide, making our experience of in situ remediation second to none.

We offer an integrated suite of innovative technologies and specialist application services directly to the environmental industry.

We deliver accurate remedial solutions by identifying the optimal integration of remediation technologies for your site. We provide:

- Remediation design and technical support
- 14 Innovative in situ remediation technologies
- Site application and project management
- Treatment of a wide range of contaminants, at all concentrations
- Minimisation of site disturbance and cost
- Pilot studies
- Performance-based solutions

To find out more, contact:

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or visit www.regenesis.co.uk | www.regenesis.com

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Technology-based Solutions for the Environment

REMEDX rethink remediation

Project experience

RemedX has successfully carried out many remediation projects across the UK, Ireland and continental Europe.

Ex situ bioremediation for the treatment of Grassmoor tar lagoons

RemedX was awarded a contract to remediate the Grassmoor tar lagoons, which is one of the most contaminated sites in Europe.

Following a remediation options appraisal, windrow turning was chosen as the most suitable method.

Once results had indicated that the contaminants of concern were below the site-specific target levels, the material was then reused on-site.

Petroleum sites in the UK, Ireland, France, Turkey and Romania, 2004–present

RemedX has a strong track record working for all the petroleum majors. We typically design, install and operate in situ remediation systems at operational forecourts, oil depots and terminals. Some of the systems we are currently operating include SVE, MPE, DPE, steam-enhanced extraction, chemical oxidation and air sparging.

RemedX is a design-led soil and groundwater remediation specialist capable of designing, fabricating, installing, operating and maintaining in situ and ex situ remediation systems using its own highly experienced personnel.

RemedX has been leading the field in remediation for over 15 years and can offer cost-effective solutions to its clients' contamination issues.

Remediation consulting services

- Preliminary risk assessment (PRA)
- Remediation contracting services
- Remediation design as part of a turnkey contract, including pilot testing and feasibility studies
- Enabling works for site development
- Full regulatory and stakeholder liaison
- Remediation system installation and commissioning
- Remediation system operation and maintenance
- Validation sampling and analysis

Remediation contracting services

- Remediation design as part of a turnkey contract, including pilot testing and feasibility studies
- Enabling works for site development
- Full regulatory and stakeholder liaison
- Remediation system installation and commissioning
- Remediation system operation and maintenance
- Validation sampling and analysis

Permits, licensing and commitment to environment, health and safety

RemedX holds an Environment Agency-issued environmental permit that enables it to remediate soil and groundwater with no limit on volume.

Technologies that we are licensed to use and have successfully implemented include

- soil vapour extraction (SVE)
- multiphase extraction (MPE)
- dual-phase extraction (DPE)
- air and biosparging
- steam-enhanced remediation
- landfill mining
- windrowing and bioremediation
- in situ chemical oxidation (ISCO)
- soil washing, solidification and stabilisation.

For further information, please contact:

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Tel: +44 (0)117 947 1007 Email: info@remedx.co.uk **www.remedx.co.uk**

In Situ Remediation'14

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www.theadvocateproject.eu/

This conference is organised within the framework of the Marie Curie Initial Training Network ADVOCATE - Advancing sustainable in situ remediation for contaminated land and groundwater, funded by the European Commission, Marie Curie Actions Project No. 265063