

Sustainable Approaches to Remediation of Contaminated Land in Europe

(SARCLE-2010)

Final Program



Gent, Belgium

June 8-10, 2010

International Advisory Committee

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Erika Skogsjö, Swedish Environmental Protection Agency, Implementation and Enforcement Department, Sweden

Marek Svab, Dekonta, Prague, Czech Republic

Filip Tack, Ghent University, Belgium

Jaco Vangronsveld, Universiteit Hasselt, Belgium

Lenka Wimmerova, DEKONTA, a.s., Czech Republic

Conference Correspondence

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TUESDAY, JUNE 8, 2010

Track 1: Policy, Regulations and Guidance for Sustainable Remediation

- 8:30 – 8:55am **Flanders Soil Policy: Sustainable Management and Remediation of Soil Contamination**
Johan Ceenaeme, Filip De Naeyer, Els Gommeren, Eddy Van Dyck
OVAM - Public Waste Agency of Flanders, Mechelen, Belgium
- 8:55 – 9:20am **SNOWMAN: A Network for Knowledge on Sustainable Soils**
Sofie Van den Bulck
OVAM, Mechelen, Belgium
Ingrid Van Reijssen
SKB, Gouda, The Netherlands
Kerstin Jansbo
Swedish Environmental Protection Agency, Stockholm, Sweden
Björn Sellberg
FORMAS, Stockholm, Sweden
Nadine Dueso
ADEME, ANGERS Cedex, France
- 9:20 – 9:45am **SuRF-UK: A Framework for Evaluating Sustainable Remediation Options**
**Paul Bardos¹, Brian Bone², Richard Boyle³, David Ellis⁴, Frank Evans⁵,
Nicola Harries^{6*}, Jonathan Smith⁷**
¹ r3 environmental, Reading, UK; ² Environment Agency, Solihull, UK; ³ Homes & Communities Agency, Birchwood, UK; ⁴ DuPont, Wilmington, Delaware, USA; ⁵ National Grid, Warwick, UK; ⁶ CL:AIRE, London, UK; ⁷ Shell Global Solutions, Thornton, UK
- 9:45 – 10:10am **CityChlor: Tackling Urban Soil and Groundwater Contamination Caused by Chlorinated Solvents**
Veerle Labeeuw¹, Bert Van Goidsenhoven¹, Yves Duclos², Benoît Hazebrouck³, Hermann Josef Kirchholtes⁴, Jan Frank Mars⁵, Sabine Gier⁶, Jo Verhenne⁷, Erik Mertens⁸, Albert de Vries⁹
¹OVAM; ²ADEME, ³INERIS; ⁴Landeshauptstadt Stuttgart; ⁵Bodem+; ⁶ITVA; ⁷Stad Gent; ⁸Stad Mortsel; ⁹Gemeente Utrecht
- 10:10 – 10:30am **Coffee Break**
- 10:30 – 10:55am **Soil Inventory of the Brussels-Capital Region: From Now On You Aren't Buying a 'Pig in a Poke'!**
Jean-Pierre Janssens
Head of the Environmental Police and Soils Division of Brussels Environment

- 10:55 – 11:20am **Brussels Greenfields: An Employment-Economic-Environmental Alliance!**
Saïd El Fadili
Head of the Soils Subdivision of Brussels Environment
- 11:20 – 11:45am **Legal Framework for the Use of Excavated Soil in Flanders**
Dirk Dedecker, Filip De Naeyer
OVAM - Public Waste Agency of Flanders, Mechelen, Belgium
- 11:45am-12:10pm **Contaminated Sediment Prioritisation in Flanders**
Ellen Luyten, Tim Caers, Jiska Verhulst, Jeroen Schelkens* and Ward De Cooman*
OVAM Public Waste Agency of Flanders, Mechelen, Belgium
*VMM Flemish Environmental Agency, Erembodegem, Belgium
- 12:10 – 1:30pm **Lunch**
- 1:30 – 1:55pm **Multicriteria Analysis for BATNEEC-Evaluation in Soil Remediation Projects in Flanders**
Nick Bruneel, Amy De Sloovere, Filip De Naeyer, Johan Ceenaeme
OVAM - Public Waste Agency of Flanders, Mechelen, Belgium

Track -2: Sustainability Metrics

- 1:55 – 2:20pm **Sustainable Optimization of Site Remediation**
Erica Becvar and Javier Santillan
The Air Force Center for the Engineering and the Environment-AFCEE/TDV,
Brooks City-Base, TX, USA
- 2:20 – 2:45pm **A Sustainability Decision Support Tool for Remediation Options with Respect to the Environmental, Social, Economical as well as Technical Dimensions**
Vincenzo Gente, PhD
Golder Associates s.r.l., Roma, Italy
Robert Noël-de-Tilly, Eng.
Associate, Golder Associates Ltd., Montréal, Québec, Canada
- 2:45 – 3:10pm **Cap and Trade System for Land Use Planning: A Dynamic, Flexible and Sustainable Tool for Planners**
L. Depré
CMS DeBacker, Brussels, Belgium
J. Haemers
Deep-Green SA, Brussels, Belgium
- 3:10 – 3:30pm **Coffee Break**

- 3:30 – 3:55pm **Improving Decision Making for Liability Management, Sustainable Remediation and Brownfield Redevelopment**
Mark Knight,
Director of Contaminated Land, Europe & Africa, Headingley, Leeds, UK
Stuart Cassie,
Regional EcoNomics™ Director, Europe & Africa, Brentford, Middlesex, UK
- 3:55 – 4:20pm **ROSA and REC: Guidelines for Decision Making Regarding Sustainable Remediation**
L. M. M. Bakker, MSc.
Tauw bv, Deventer, The Netherlands
- 4:20 – 4:45pm **Sustainability of Full-Scale Biological In-Situ Remediation Using the TCE Concept**
Site Goudsbloemlaan, Den Haag
Marc van Bommel
Bioclear BV, Groningen, The Netherlands
- 4:45 – 5:10pm **A Tool for Spatially Explicit Assessment of Ecological Risks of Contaminants to Wildlife**
Nico van den Brink
Alterra, Wageningen UR, Wageningen, The Netherlands
- 5:10 – 6:30pm **Poster Session/ Reception**

WEDNESDAY, JUNE 9, 2010

Track -3: Green Technology

- 8:30 – 8:55am **Exploring the Relevance of ‘Green’ at the level of ISCO Reagent Selection**
Jeremy Birnstingl Ph.D.¹ and Ben Mork Ph.D.²
¹Regenesis, Bath, United Kingdom
²Regenesis, San Clemente, CA, USA
- 8:55 – 9:20am **Aggressive Green Remediation to Remediate Hydrocarbon and NAPL Impacts: From Conventional Technologies to Chemical Oxidation**
Charles B. Whisman, P.E
Groundwater & Environmental Services, Inc., Exton, PA, USA
Denise N. Good, PE
Groundwater & Environmental Services, Inc., Exton, PA, USA

- 9:20 – 9:45am **Sustainable Remediation of a Former Tank Farm**
Eric Bergeron (Ing., M.Sc.A.)
Chargé de projet, Golder Associés Ltée, Montréal, Québec, Canada
- 9:45 – 10:10am **Sustainable Green Remediation by Dynamization of Natural Bio-Reactors for Degradation of PAH, BTEX, HCH and Aromatic Amines: Case studies in France & Germany**
Frank Karg
HPC Envirotec S.A. – INOGEN / France, HPC Envirotec S.A., Saint-Gregoire Cedex, France
- 10:10 – 10:30am **Coffee Break**
- 10:30 – 10:55am **Use of Direct Injection Techniques as a Sustainable Approach to In-Situ Remediation**
Eric de Zeeuw, drs.
Groundwater Technology B.V., Rotterdam, The Netherlands
- 10:55 – 11:20am **Brownfield Redevelopment of a Former Metal Casting Production Plant in Roeselare, Belgium**
Peter Vanneck, Kristof De Smet, Ilse De Saegher
Brocap n.v., Gent-Wondelgem, Belgium
- 11:20 – 11:45am **UPSOIL: New Frontiers in Cost-Effective Sustainable In-Situ Remediation Approaches**
Patrick Hambach, Annelies De Ridder
Ecorem n.v., Aartselaar, Belgium
- 11:45am-12:10pm **A Sustainable Greener Remediation Option**
Anthony Evans, MRes. Project Engineer
Groundwater Technology B.V., Rotterdam, The Netherlands
- 12:10 – 1:30pm **Lunch**
- 1:30 – 1:55pm **Use of Zero Valent Iron for Chlorinated Compounds Removal from Contaminated Soil Matrix**
L. Honetschlägerová, P. Janouškovcová, P. Mašín, P. Beneš
Institute of Chemical Technology, Faculty of Environmental Technology, Prague, Czech Republic

- 1:55 – 2:20pm **Sustainable Management of Metal Contaminated Soils in the Campine Region Using Phytoremediation with Short Rotation Coppice**
S. Van Slycken¹, N. Witters², L. Meiresonne³, E. Meers¹, K. Adriaensen⁴, T. Thewys², J. Vangronsveld⁴, F. M. G. Tack¹
¹Laboratory of Analytical Chemistry and Applied Ecochemistry, Ghent University, Gent, Belgium
²Centre for Environmental Sciences, Department of Economics, Hasselt University, Diepenbeek, Belgium
³INBO, Research Institute for Nature and Forest, Geraardsbergen – Belgium
⁴Centre for Environmental Sciences, Laboratory of Environmental Biology, Hasselt University, Diepenbeek, Belgium
- 2:20 – 2:45pm **Enhanced Phytoextraction of Cd and Zn Using Rapeseed**
Mohammad Ghani, Stijn Van Slycken, Erik Meers and Filip. M. G. Tack
Laboratory of Analytical Chemistry and Applied Ecochemistry, Ghent University, Gent, Belgium
- 2:45 – 3:10pm **Predicting VOC Emissions: An Automated Monitoring and Feedback System for Bioventing**
Annelies Aarts¹, Michiel Van Gestel², Jo Bonroy², Piet Seuntjens^{2,3}
¹Universoil, Brussels, Belgium
²Ghent University, Department of Soil Management, Ghent, Belgium
³VITO, Flemish Institute for Technological Research, Environmental Modeling Unit, Mol, Belgium
- 3:10 – 3:30pm **Coffee Break**
- 3:30 – 3:55pm **Applying Predictive Models for Ecological Risk Management during Bio-Remediation**
M. Van Gestel¹, A. Aarts², J. Bonroy¹, P. Seuntjens^{1,3}
¹Ghent University, Department of Soil Management, Ghent, Belgium
²Universoil, Brussels, Belgium
³VITO, Flemish Institute for Technological Research, Environmental Modeling Unit, Mol, Belgium
- 3:55 – 4:20pm **Design Considerations and Performance Evaluation of an Organoclay Permeable Reactive Barrier**
Chuck Hornaday
CETCO, Hoffman Estates, IL, USA
Neil Davies
CETCO Europe Ltd, Birch House, Scotts Quays, Birkenhead, UK

- 4:20 – 4:45pm **Feasibility Study for Wastewater Reuse of Soil Washing Process**
Yeong-Shing Wu, Chih Huang, Shuman Lin, Yu-Jen Chung
Sinotech Engineering Consultants, Inc., Environmental Engineering Research Center, Taipei, Taiwan
- 4:45 – 5:10pm **Experiments and Computer Simulations as a Green Chemistry Approach: New Mechanisms for TiO₂ Photocatalysis**
Cecilia B. Mendive¹, Thomas Bredow², and Detlef W. Bahnemann¹
¹Laboratory for Nano and Quantum Engineering, Institute for Technical Chemistry, Leibniz Universitaet Hannover, Hannover, Germany
²Institute for Physical and Theoretical Chemistry, University of Bonn, Bonn, Germany
- 5:10 – 5:35pm **Application of In-Situ Precipitation to Remediate Heavy Metals Contamination in Groundwater**
Stephane Muguet¹, Paul Verkaeren¹, Guillaume de Bournonville¹, Karolien Vanbroekhoven², Johan Gemoets², Ludo Zeuwts³, Koen Gommers⁴
¹MWH, Battelsesteenweg, Mechelen, Belgium
²Environment and process technology, VITO, Mol, Belgium
³Smet GWT, Dessel, Belgium
⁴Umicore Research, Olen, Belgium

THURSDAY, JUNE 10, 2010

Track 4: Case Histories

- 8:30 – 8:55am **Ecosystem Impact of Metals in Contaminated Dredged Sediment-Derived Soils: Implications for Management**
Filip M. G. Tack^a and Bart Vandecasteele^b
^aGhent University, Department of Applied Analytical and Physical Chemistry, Belgium
^bInstitute for Agricultural and Fisheries Research (ILVO), Merelbeke, Belgium
- 8:55 – 9:20am **Establishment of an Environmental Management System as Sustainable Approach for Rehabilitation and Environmentally Sound Land Use in Armed Forces – Implementation project in Georgia**
Jörg Frauenstein¹, Guido Hingst², Peter Heuschneider²
¹UBA Dessau-Roßlau; ²IABG

- 9:20 – 9:45am **An Innovative Remediation Strategy in a Paper Sludge Restoration Case**
Alessandra Bonoli
 Civil, Material and Environmental Engineering Department, University of Bologna, Italy
Alice Dall'Ara
 Italian National Agency for New Technologies, Energy and Sustainable Economic Development (ENEA), CR Faenza, Italy
Valerio Marroni
 Regional Agency for Environment Protection and Health Prevention, Emilia Romagna, Imola, Italy
- 9:45 – 10:10am **Sustainable Synergies for Large Scale Contaminated Groundwater: Cleaning By Using, an Illustration with Cases**
Rachelle Verburg¹, Hans Slenders¹, Pieter Dols¹, Marc van Tulder¹, Albert De Vries², Jack Schreurs³, Ron Nap^{1,3}
¹ARCADIS, ²Municipality of Utrecht, ³Philips Environmental Services, ^{1,3}Municipality of Apeldoorn
- 10:10 – 10:30am **Coffee Break**
- 10:30 – 10:55am **In-Situ Bioremediation of Pesticides in Soil at Large Scale**
Allan Seech, Ph.D.
 Adventus Group – Canada, Mississauga, Ontario, Canada
John Valkenburg, P.E. (MI)
 Adventus Group – USA, DeWitt, MI, USA
Michael Mueller, M.B.A.
 Adventus Europe, Zirl, Tirol, Austria
- 10:55 – 11:20am **Sustainability of Treatments by In-Situ Remediation Techniques**
Thomas Caro, Ph.D.
 c/o Zech-Umwelt GmbH, Bremen, Germany
 Office Aachen, Aachen, Germany
- 11:20 – 11:45am **Characterisation and Remediation of Oil Sludge (Romania)**
Alain Pieters¹, Mathias Van Damme¹, Peter Joos¹, Wouter De Weirdt², Jeroen Donneaux³ and Pieter Frederickx³
 Envisan n.v. (member of the Jan De Nul group)
¹R&D Department Envisan, ²project manager Envisan, ³project engineer Envisan
- 11:45am-12:10pm **Steam Enhanced In-Situ Remediation: Completed Site Restoration Cases at (Former) Industrial Sites with Costs & Carbon Footprint Analyses**
Yvo Veenis, drs.
 Groundwater Technology B.V., Rotterdam, The Netherlands

- 12:10 – 1:30pm **Lunch**
- 1:30 – 1:55pm **Risk-based Approach Proposal for a New Development of an Abandoned Industrial Site**
Jiri Tylcer, Lukas Zenaty, Lukas Semerak
AQD-envitest, s.r.o, Czech Republic
- 1:55 – 2:20pm **Redevelopment of a Former Railway Yard in Brussels**
Ir. E. Vermaut, Dr. Ir. T. Rommens, Ir. P. Hambach
Ecorem n.v., Aartselaar, Belgium
- 2:20 – 2:45pm **Maximising the Economic Value of a Site Encumbered with a Stockpile of Asbestos Waste, Belgium**
ir Evert Vermaut, ir Jan Van Schaeren
Ecorem n.v., Aartselaar, Belgium
- 2:45 – 3:10pm ***In-Situ* Full-Scale Remediation of Diesel-Contaminated Soil**
Paula Cajal-Mariñosa^{1*}, Liisa Peltola^{1,2}, Adela Ramos³, Mikko Kotro⁴, and Tuula Tuhkanen¹
¹Department of Chemistry and Bioengineering, Tampere University of Technology, Tampere, Finland
² Division of Geophysics and Astronomy, Department of Physics, University Helsinki, Helsinki, Finland
³E.T.S of Agronomic Engineering, Universidad Politécnica de Madrid, Madrid, Spain
⁴Nordic Envicon Oy, Koetilantie 3, Helsinki
- 3:10 pm **Adjourn**

Exhibitors

Envirocern, CA, USA

MWH bv, The Netherlands

REGENESIS LTD, United Kingdom

Remediation Service International, CA, USA

Posters

Bioremediation Experiments: Large Scale Approach

E. González¹, E. Moliterni¹, L. Rodríguez¹, and J. Villaseñor²

¹ Alquimia Soluciones Ambientales, S.L. C, Daimiel, Ciudad Real, Spain

² Chemical Engineering Department, Institute for Chemical and Environmental Technology (ITQUIMA), University of Castilla-La Mancha, Ciudad Real, Spain

Innovative On-Spot Purification of PCB-Contaminated Sediment

Wim De Windt, Dr. Ir.

Biorem Engineering, Zwijnaarde, Belgium

Frédéric Lakaye, Ir.

Biorem Engineering, Stella Plage, France

Nanoscale Iron Particles for Environmental Remediation: Heavy Metal

“In- Situ” Stabilisation, and Impact on Microbial Communities

C. Fajardo¹, A. Pérez-Sanz², L. Ortíz¹, J. Alonso², ML Rodríguez-Membibre¹, M. Nande¹, M.C. Lobo², M. Martín¹

¹ Universidad Complutense de Madrid, Madrid, Spain

² Instituto Madrileño de Investigación y Desarrollo Rural Agrario y Alimentario, Madrid, Spain

Impact of an Electro-Bioremediation Process on Microbial Communities within a Gasoil Contaminated Soil

O. Gonzini¹, C. Fajardo², A. Plaza³, M. Nande², M. Martin², M. C. Lobo³

¹ Universidad La Sapienza. Roma. via Eudossiana, Rome, Italy

² Universidad Complutense de Madrid, Madrid, Spain

³ Instituto Madrileño de Investigación y Desarrollo Rural Agrario y Alimentario, Madrid, Spain

Environmental Impact of Reused Dredged Sediment

Hakim Hamdoun*, Fabienne Baraud, Benoît Basset, Lydia Leleyter and Mélanie Lemoine

Université de Caen Basse-Normandie Equipe de Recherche en Physico-Chimie et Biotechnologies (ERPCB), Caen Cedex, France

Introducing a Clean Top Soil Layer on a Contaminated Dredged Sediment-Derived Soil: Effects on Litter Metal Concentrations

Suzanna Lettens¹, Filip M. G. Tack², Kurt Jordaens³, Bruno De Vos¹ & Bart Vandecasteele⁴

¹ Research Institute for Nature and Forest, Geraardsbergen, Belgium

² Ghent University, Department of Applied Analytical and Physical Chemistry, Gent, Belgium

³ University of Antwerp, Department of Biology, Antwerpen, Belgium

⁴ Institute for Agricultural and Fisheries Research, Merelbeke, Belgium

Plant-Associated Bacterial Dehalogenation of Toxic Organic Compounds in Soil: Potential for Bioremediation

Martina McGuinness, Edwina Brennan and David Dowling

Department of Science and Health, Institute of Technology Carlow, Carlow, Ireland

Phytostabilisation of Heavy Metals for the Ecological Restoration of an Old Mine Site

J. Pastor¹; M^a J. Gutierrez-Ginés²; A. J. Hernández²

¹CCMA, CSIC, Dpto. Ecología de Sistemas, Madrid, Spain

²Dpto. de Ecología, Universidad de Alcalá, Madrid, Spain

Soil Quality at Contaminated Site: New Approaches in Remediation Strategies

Francesca Pedron Giannantonio Petruzzelli

Institute of Ecosystem Study CNR, Pisa, Italy

Biodegradation of Low Chlorinated PCBs under Laboratory Conditions

Mihaela Preda, Eugenia Gament, Dumitru Marian Motelică, Mirela Matei, Veronica Tanase, Nicoleta Vrinceanu

National Research and Development Institute for Soil Science, Agrochemistry and Environmental Protection Bucharest, Bucharest, Romania

Are Soils Non-Suitable for Agriculture Options for Energy Production?

K. Sergeant and J. F. Hausman

CRP – Gabriel Lippmann, Department Environment and Agro-biotechnologies, Belvaux, Luxembourg

S-Risk: A New Model for Calculating Soil Remediation Standards and Assessing Human Health Risks of Soil Contamination

Griet Van Gestel, Johan Ceenaeme

OVAM Public Waste Agency of Flanders, Mechelen, Belgium

In-Situ Remediation of Heavy Metal Polluted Soils Using Some Organic and Inorganic Additives

Nicoleta Olimpia Vrinceanu, D.M. Motelică, Eugenia Gament, M. Dumitru, I. Calciu, Veronica Tănase, Mihaela Preda

National Research and Development Institute for Soil Science, Agrochemistry and Environmental Protection Bucharest, Bucharest, Romania

Overview of the Environmental Use of the Recycled Aggregates in South Korea

Heesoo Woo¹ and Junbom Park²

Department of Civil and Environmental Engineering, Seoul National University, Seoul, S. Korea

The Removal of Polychlorinated Biphenyl Molecules from Drinking Water

A report submitted in partial requirement for the diploma in Chemical Engineering Technology

Laurence G. D'Alberti – ChE,

Project Manger, United Manufacturing International, Ryerson Polytechnical University, Canada

Cr (VI) Removal from Wastewater / Contaminated Soil by *Lemna Minor* in Association with Chromate Reducing Bacterial Strain *Bacillus Cereus*

Muhammad Faisal* and Shahida Hasnain

Department of Microbiology and Molecular Genetics, University of the Punjab, Lahore, Pakistan