ConSoil 2010
Programme

Opening Session

Wednesday, 22 September, 09.30 – 10.30 hrs. hall Europe
Chairmen: Georg Teutsch, Huub Rijnaarts

Welcome by chairmen

Welcome by Dr. Leopold Zahrer (Lebensministerium, Sektion VI: life cycle management, environmental technology and waste management)

Lecture by Martin Gerzabek (Rector Vienna University of Life Sciences, director of BOKU Vienna BOKU):
The retention properties of soils and the impact of soil formation, land-use and mangement

Closing Session

Friday, 24 September, 12.45 – 13.15 hrs. hall Europe
Chairmen: Georg Teutsch, Huub Rijnaarts

Video of conference highlights

Poster awards

Goodbye by chairmen

Thematic sessions (ThS)

Theme A: Restoration

ThS A1 Footprint assessment

Thursday, 23 September, 09.00 – 10.30 hrs. hall Mozart 3

Chairman: Poul Bjerg

- *A Sustainability Assessment Framework for Remediation Decision-Making Support*
  Lovenburg, Favara (CH2M HILL, USA)
- *Carbon Footprint of Soil Remediation*
  Pijls, Praamstra (Tauw, NL)
- *LCA as decision support for evaluation of environmental impacts of site remediation scenarios*
  Lemming, Hauschild, Chambon, Binning, Bjerg (Technical University of Denmark, DK) Bulle, Margni (École Polytechnique de Montréal, CA)
- *Biofuel on contaminated land – life cycle environmental consequences*
  Suer, Andersson-Sköld (Swedish Geotechnical Institute – SGI, SE) Blom (FB Engineering AB, SE) Bardos (r3 environmental technology ltd, UK) Polland,Track (DECHEMA e.V, DE)
- *Sustainable remediation strategies: multicriteria analysis to select and compare remediation techniques in a sustainability perspective*
  Gautier, Colombano, Saada, Beranger, Merly (BRGM, FR)

ThS A2 Technologies low in footprint

Thursday, 23 September, 14.00 – 15.30 hrs. hall Europe

Chairman: Marco Petrangeli-Papini

- *Integrating treatment process impacts and soil quality changes in the environmental assessment of brownfield and groundwater clean-up projects*
  Vaxelaire, Gautier, Menard, Colombano, Villeneuve (BRGM, FR)
- *Econtrol – a risk based concept for rehabilitation of large contaminated sites with nature. Case: Forest Parkland Noorderbos*
  Dijkcer, Hendriks (Witteveen+Bos, NL) Groenenberg (Alterra WUR, NL) Lacroix (Municipality of Tilburg, NL)
- *"Green" DNAPL remediation with a combined bioremediation and pumping system*
  Baillieul, Scholiers, De Moor, Van Geert, Gevaerts (Arcadis Belgium, BE) Touw (Eastman Chemicals, BE) Claus, Van Wouwe (Sita Remediation, BE)
- *Comparison of remediation alternatives of former Nkala landfill*
  Haapaniemi (Ramboll, FI)
- *Making Cradle-to-Cradle work: first steps for Dutch infrastructure challenges*
  Ketelaars, Venmans (Deltares, NL)

ThS A3 Characterisation

Wednesday, 22 September, 16.00 – 17.30 hrs. hall Mozart 1+2

Chairman: Laurent Bakker

- *Characterisation of Urban Soil Pollution*
  Falkenberg (NIRAS, DK), Højsholt (Danish Environmental Protection Agency, DK) Rokkjær, Wahid (Capital Region of Denmark, DK)
- *Field Characterization of a residual DNAPL source zone using partitioning and interfacial tracers*
  Hartog (Deltares, NL) Cho, Annable (University of Florida, USA) Parker (University of Guelph, CA)
- *Determining the presence of natural katalysts for the Fenton or persulphate reaction by colours reactions*
  Pancras, Schanze (ARCADIS, NL) Bruning (Wageningen University, NL)
- *Development of a system for in situ determination of chlorinated hydrocarbons in groundwater*
  Boutsiadou, Hunkeler (University of Neuchâtel, CH)

- *Soil Contamination following an industrial accident: towards efficient investigations and assessment*
  Hazebrouck, Pagnon (INERIS, FR) Blancher (Asconit Consultants, FR) Verger (Observatoire Régional de la Santé (ORS), FR), Pirard, MOTREFF (Institut de Veille Sanitaire / French Institute for Public Health Surveillance, FR) Heyman (Cellule InterRégionale d`Epidémiologie Nord, FR) Mosqueron (Veolia Environnement Recherche et Innovation, FR) Ricoux (Cellule d`intervention régionale en épidémiologie Languedoc-Roussillon, FR)

ThS A4 Characterization: geophysics and nuclear sites

Friday, 24 September, 09.00 – 10.30 hrs. hall Paracelsus

Chairman: Poul Bjerg

- *Application of radon gas measurement and electrical imaging techniques in hydrocarbon contaminated areas*
  Oliva, Pede, Hung Kiang (Universidade Estadual Paulista, Unesp, BR)
  Du Puits (GICON - Großmann Ingenieur Consult GmbH, DE), Weiß, Schmidt (Centre for Environmental Research-UFZ, DE), Silva Rosa, Quintão (PETROBRAS, CI)
- *Geoelectrical surveys for identification and monitoring of Acid Mine Drainage (AMD) in groundwaters influenced by lignite open-cast mining*
  Hirsch, Weiss (Helmholtz-Centre for Environmental Research - UFZ)
- *Investigation of the Sellafield Nuclear Site: A Case Study of the Development of Strategy and Techniques to Monitor a Complex Industrial Environment*
  Cruickshank (Sellafield Ltd, UK)
- *Characterization of radio-contaminated soils in France: challenges, methods and outcomes*
  Dubot, De Moura (CEA, FR), Desnoyers, Faucheux, Attiogbe, Jeannée (Geovariances, FR)
- *Geophysical monitoring of organic pollutants chemical oxidation in lysimeters*
  Gourry, Naudet, Ignatiadis, Saada (BRGM, FR), Zornig (ADEME, FR)

ThS A5 Characterization: vapor intrusion and investigation strategies

Wednesday, 22 September, 11.00 – 12.30 hrs. hall Mozart 3

Chairman: Valter Tandoi

- *Vapor Intrusion through Sewer Systems: Migration Pathways of Chlorinated Solvents from Groundwater to Indoor Air*
  Riis, Hansen, Nielsen, Christensen (NIRAS A/S, DK) Terkelsen (Capital Region of Denmark, DK)
- *VOCs in groundwater and soil gas - transfer into indoor air?*
  Putzmann (Helmholtz-Centre for Environmental Research – UFZ, DE)
- *Radon as a tracer for VOC vapour intrusion into buildings*
  Hvidberg (Central Denmark Region, DK) Jeppesen, Petersen (NIRAS A/S, DK)
- *Optimising Site Investigation Strategies using Information Management*
  Bartlett (Research Sites Restoration Limited, UK), Coppins (UKAEA, UK)

ThS A6 Mass flux and DNAPL

Wednesday, 22 September, 16.00 – 17.30 hrs. hall Mozart 4+5

Chairman: Iris Bernardt

- *Development and Test of a New Groundwater Flux Sampler*
  Terkelsen (Capital Region, DK) de Jonge, Moeller (Sorbisense A/S, DK) Damgaard, Albinus (Gront Mij/Carl Bro A/S, DK)
- *Model investigation of DNAPL distribution in the saturated zone for varying groundwater flow velocities*
  Erning, Schäfer, Grandel, Dahmke (Christian-Albrechts-University, DE), Luciano, Viotti, Petrangeli Papini (La Sapienza University of Rome, IT)
- *Use of Mass Discharge in Risk Assessment of DNAPL Sites in Different Geological Settings*
  Bjerg, Troldborg, Chambon, Binning (Technical University of Denmark, DK)
- *Uses, Benefits, and Limitations of Mass Flux and Mass Discharge: A Case Study Review*
  Carey (Porewater Solutions, CA)
- *PAH transport characterization in polluted soils using an innovative semi-empirical method at the field scale*
  Lucas (LSGC, FR), Michel, Denys (INERIS, FR)

ThS A7 MNA and bioavailability

Wednesday, 22 September, 11.00 – 12.30 hrs. hall Mozart 1+2

Chairman: Francesca Quercia

- *The Truth is Out There: Unraveling the Mystery of the Missing DCE, Vinyl Chloride & Ethene*
  Cox, Austrins (Geosyntec Consultants, CA), Spain (Georgia Inst. of Technology, USA) Gossett (Cornell University, USA), Edwards, Sherwood Lollar (University of Toronto, CA)
- *How to prove Natural Attenuation of MTBE?*
  Langenhoff, Veld, Gerritse (Deltares, NL) Bosma (University of Utrecht, NL)
- *ATTENA project : Field Tools Development for Monitored Natural Attenuation Demonstration*
  Saada, Gourry, Béranger, Guérin, Proust, Zornig, Colombano, Blessing (BRGM, FR)
- *Speciation and bioavailability of arsenic in contaminated soils using X-ray absorption near edge structure spectroscopy and a sequential extraction procedure*
  Niazi, Singh (The University of Sydney, AU) Shah (Macquarie University, AU)
- *CePBET - A model for the determination of the bioaccessibility of organic pollutants*
  Collins, Gibson, Tilston, (University of Reading, UK)

ThS A8 Sampling methodologies

Wednesday, 22 September, 11.00 – 12.30 hrs. hall Mozart 4+5

Chairman: Frank Swartjes

- *Comparison of purge and no-purge sampling strategies for deep groundwater*
  Verhack, Baillieul, Olivier, Leys, Reynders, Van Geert, Gevaerts (ARCADIS Belgium, BE)
- *Development and application of a novel ground water sampling system for volatile compounds and redox sensitive parameters from groundwater monitoring wells*
  Klaas, Heitmann, Skodic (Universität Stuttgart, DE)
- *Enhanced In Situ Soil Analysis (EnISSA) of volatiles and semi-volatile components*
  Van de Putte, Vansina, Van Straaten,) Van Herreweghe, (MAVA assured environmental solutions, BE)
- *A new cost-effective multilevel groundwater monitoring system to delineate vertical concentration profiles in unconsolidated aquifer*
  Ducommun, Hunkeler (University of Neuchâtel, CH)
- *Adaptive sampling strategies to improve site assessment*
  von Heijne, Maurice, Öhlander (Luleå University of Technology, SE)

ThS A9 Reactive Barriers (1)

Thursday, 23 September, 14.00 – 15.30 hrs. hall Mozart 1+2

Chairman: Francesca Quercia

- *Carbo-Iron - An Alternative to Nano-Iron*
  Mackenzie, Bleyl, Kopinke (Helmholtz Centre for Environmental Research - UFZ, DE)
- *Microbial Hydrogen Consuming Processes in ZVI Permeable Reactive Barriers used for Chloroethene Elimination*
  Tiehm, Schmidt, Schell, Müller, (Water Technology Center, DE)
- *Role of microbial activity within PRB filled with ZVI and a slow releasing carbon source (PolyHydroxyButyrate) for the treatment of chlorinated solvent mixtures*
  Baric, Aulenta, Majone, Beccari, Petrangeli Papini, (Sapienza University of Rome, IT)
- *Pathway Identification During Successful ISCR-Enhanced Bioremediation of a TCE DNAPL Source Area*
  Peale, Bakkom (Maul Foster & Alongi Inc., USA) Mueller, Molin, Przepiora (Adventus Americas Inc., USA)
- *Demonstration of a pilot-scale multibarrier for the treatment of landfill leachate contamination*
  Van Nooten, Bastiaens (VITO, BE), Dirickx (Hooge Maey, BE), Verkaeren (MWH, BE)

ThS A10 Reactive Barriers (2)

Thursday, 23 September, 09.00 – 10.30 hrs. hall Mozart 4+5

Chairman: Iris Bernardt

- *Combined use of ISCO for Source Treatment and Reductive PRB for Plume Control*
  Zychinski, Mathenia (Burns & McDonnell, USA) Molin (Adventus Group, USA) Dingens (Carus Chemical Company, USA)

- *A Technological Group on Abiotic and Biotic PRBs in the Czech Republic*
  Kozler, Kudrlicka (VUANCH, CZ) Jirku (ICT Prague, CZ) Cernik (AQUATEST, CZ) Wimmerova, (DEKONTA, CZ) Byss (MikroChem LKT, Ltd., CZ)
- *Remediation of Inorganic pollutants by means of a Zero Valent Iron PRB*
  Fiore, Zanetti, (DITAG, Politecnico di Torino, IT)
- *Experimental tests for Fe(II) and Mn (II) removal from contaminated groundwater by adsorption: a comparison between activated carbon and low-cost adsorbent materials*
  Boni, Sbaffoni, Tedesco (SAPIENZA, University of Rome, IT)
- *Chemical Regeneration of Activated Carbon and Destruction of Adsorbed MTBE Using Ozone*
  Hung, Hsu-Wen, Lin, Yu-Kuan, Lin, Tsair-Fuh (National Cheng Kung University, CN)

ThS A11 In Situ Chemical Oxidation (1)

Wednesday, 22 September, 16.00 – 17.30 hrs. hall Europe

Chairman: Robert Philipp

- *In -Situ Chemical Oxidation via Activated Persulfate For Remediation of Multiple Organic Contaminants*
  Ross, Dunster, Beswick, Hurst, O`Neill (ARCADIS, UK) Dols (ARCADIS NV, NL) Burdick (ARCADIS US, USA)
- *Full-scale PCE DNAPL remediation using S-ISCO®*
  Rasmussen, Larsen, Christensen, Riis, Jensen (NIRAS A/S, DK) Terkelsen (Capital Region, DK) Hoag, Bytautas, Guite (VeruTEK Technologies, USA)
- *An evaluation of in situ chemical oxidation at tar-contaminated sites*
  Volkering, Van Gool (Tauw bv, NL)
- *Field scale application of persulfate ISCO in a clay till site*
  Tsitonaki, Tuxen, Andersen (Orbicon A/S, DK), Terkelsen, Kerrn-Jespersen (The Capital Region of Denmark, DK)
- *ISCO full scale application at a printing company polluted by toluene*
  Piepoli (A.S.T.C. REMEDIATION srl, IT)

ThS A12 In Situ Chemical Oxidation (2)

Thursday, 23 September, 11.00 –12.30 hrs. hall Mozart 1+2

Chairman: Robert Philipp

- *Evaluation of Fenton's Reagent and Activated Persulfate for Treatment of a Pharmaceutical Waste Mixture in Groundwater*
  Bennedsen, Søgaard (Aalborg University, DK), Kakarla (ISOTEC, USA), Jørgensen (Rambøll Danmark A/S, DK) Dall-Jepsen (COWI A/S, DK), Christophersen (Region of Southern Denmark, DK) Durant (Geosyntec Consultants, USA)
- *Using ISCO enhanced bioremediation for heavy oils*
  Wijn, Pancras (ARCADIS, NL) Xu (Xian University of Architecture and Technology, CN), Grotenhuis (University of Wageningen, NL)
- *Superoxide Catalysts for In-Situ Reduction of VOCs in Soil and Groundwater*
  Bryant (Geo-Cleanse International, Inc., USA)
- *The Intersection of Chemical Oxidation and Bioremediation*
  Block, Osborne (FMC Corporation, USA)
- *Localisation and remediation of a DNAPL – contamination of pah's at the asphaltco site*
  Meskens (Soresma nv, BE) Pels (HMVT, BE) Janssens (OVAM, BE)

ThS A13 (Nano/micro scale) Iron based technologies

Thursday, 23 September, 16.00 – 17.30 hrs. hall Mozart 4+5

Chairman: NN

- *Transport of zero-valent iron colloids in aquifers*
  de Boer, Braun, Klaas, (Universität Stuttgart, DE)
- *Transport of iron micro and nanoparticles in saturated porous media*
  Tosco, Sethi (Politecnico di Torino, IT)
- *Preparation of biopolymers modified zero valent iron nanoparticles for in-situ soil remediation applications*
  Goiti, Ocejo, Moragues, Cagigal (Labein-Tecnalia, ES)
- *Comparison of migration properties of various types of nanoscale zerovalent iron in porous media.*
  Svab, Dosoudil, Turkova, (Dekonta, a.s, CZ.) Svab (Institute of Chemical Technology in Prague, CZ) Svabova (Jan Evangelista Purkyne University, CZ)

- *In situ remediation of a chlorinated ethene contaminated source zone by injection of zero-valent iron: from lab to field scale*
  Uyttebroek, Gemoets, Bastiaens (VITO NV, BE), Baillieul, Scholiers (ARCADIS Belgium, BE) Vermeiren, Devleeschauwer (Smet-F&C, BE)

ThS A14 (Enhanced) Natural Attenuation (1)

Wednesday, 22 September, 14.00 – 15.30 hrs. hall Europe

Chairman: Paul Bardos

- *Bioelectrochemical systems (BES) for remediation of trichloroethene-contaminated groundwater*
  Aulenta, Tocca, Reale, Petrangeli Papini, Majone (Sapienza University of Rome, IT) Rossetti (Water Research Institute, CNR, IT)
- *Application of electrodes to stimulate bioremediation*
  Tiehm, Augenstein, Lohner, Schell (DVGW Water Technology Center, DE)
- *Enhanced natural attenuation of arsenic bearing chemical warfare agents in groundwater*
  Daus, Hempel, Vogt, Weiss (Hemholtz Centre for Environmental Research – UFZ, DE)
- *Metabolic Biodegradation of Lower Chlorinated Ethenes*
  Schmidt, Tiehm (DVGW Water Technology Center, DE)
- *Large scale anaerobic bioremediation of chlorinated solvents in an urban area*
  Ramakers (Province of Noord-Brabant, NL) Nijland (Promeco, NL) Dijkhuis (Bioclear, NL)

ThS A15 (Enhanced) Natural Attenuation (2)

Thursday, 23 September, 09.00 – 10.30 hrs. hall Europe

Chairman: Laurent Bakker

- *Quantitative in-situ dechlorination of chlorinated ethens by adding lactat in low concentrations in a multistage process*
  Theissen (Imago technisch-wissenschaftliche GbR, DE), Müller (Senatsverwaltung Gesundheit, Umwelt und Verbraucherschutz, DE)
- *Remediation of 1,2-Dichloroethane and Vinyl Chloride Contaminated Groundwater: lab and field pilot tests*
  Carboni, Sandrone, Goria, Campi, Micheletti (TRS Servizi Ambiente s.r.l., IT)
- *Anaerobic Bioremediation of DNAPLs with a Combined pH Buffer and Emulsified Oil Substrate*
  Borden (Solutions-IES, USA), Borden (EOS Remediation, USA)
- *Use of a Vegetable Oil Substrate (CAP18) for a Biobarrier to Contain Chloroethenes Off Site Migration*
  Haghebaert (ERT, BE) Sacchetti, Frasco (Carus Europe, IT) Glenn (Treadwell and Rollo, US)
- *Enhanced Reductive Dechlorination for DNAPL Source Area Treatment at a Danish Megasite – Bench and Pilot Test Evaluation*
  Durant, Mackinnon (Geosyntec Consultants, CA) Roberts (SiREM, CA) Jørgensen (Rambøll, DK) Dall-Jepsen, Nissen (COWI A/S, DK) Christophersen, Christensen (Southern Region of Denmark, DK)

ThS A16 (Enhanced) Natural Attenuation (3)

Friday, 24 September, 11.00 – 12.30 hrs. hall Europe

Chairman: Wouter Gevaerts

- *Progress of a stimulated anaerobic dechlorination treatment in Halmstad, SW Sweden*
  Wiklund (Tyréns AB, SE) Davidsson (WSP Environmental, SE), Bergman (MB Enviroteknik AB, SE), Leonard (Regenesis (UK) Ltd, UK) Grip (Stockholm, SE)
- *Clean up strategies for implementation by local authorities at pop contaminated sites*
  Falkenberg (NIRAS, DK) Busuioc (Freelance Consultant, MD) Plesca, Barbarasa (Sustainable POPs Management Office, Ministry of Ecology and Natural Resources, Chisinau, MD)
- *In Situ Bioremediation of PCE-Contaminated Sites in Upper Austria: Applicability Study and A Priori Indicators for Successful Implementation*
  Scherr, Loibner (University of Natural Resources and Applied Life Sciences, AT) Nahold (G.U.T Gruppe Umwelt und Technik GmbH, AT)
- *New technology for the phthalate esters bioremediation*
  Siglova, Mikeš, Minařík (EPS, CZ)
- *ENA at a manufactured gas plant – an example for successful and efficient contaminantion reduction*
  Bender (Björnsen Beratende Ingenieure GmbH, DE)

ThS A17 Heavy metals (1)

Thursday, 23 September, 11.00 – 12.30 hrs. hall Mozart 4+5

Chairman: Jan Japenga

- *Bioprecipitation of CrVI and Enhanced Reductive Dechlorination of TCE*
  Ferriere, Clementelle, Burdick, Dols (ARCADIS, NL)
- *Stability of precipitates formed by in situ metal precipitation*
  Keijzer, Reijling, De Roo, van Gool, Steketee (Tauw bv, NL)
- *In Situ Chemical Reduction (ISCR) of Cr(VI) "A Belgian Case Study"*
  Van Herreweghe, Nackaerts, Vansina, Van Straaten (MAVA assured environmental solutions, BE)
- *Stability of Zn and Co precipitates immobilized by in situ bioprecipitation (ISBP) process in natural and artificial matrixes*
  Satyawali, Van Roy, Dejonghe, Diels, Bastiaens, Vanbroekhoven (VITO, BE) Gommers (UMICORE, BE)
- *By-products in the remediation of mining waste*
  Maurice, Makitalo, Pérez, Öhlander (Luleå University of Technology, SE)

ThS A18 Various in situ and ex situ technologies

Thursday, 23 September, 09.00 – 10.30 hrs. hall Mozart 1+2

Chairman: Grzegorz Malina

- *The Knowledge Transfer of In Situ Remedial Techniques - from Laboratory to Field-scale*
  Wimmerova, Dosoudil, Svab (DEKONTA, Co., CZ), Copan (DEKONTA Slovensko, Ltd., SK) Stiskal (EKORA, Ltd., CZ) Nemecek (ENACON, Ltd., CZ)
- *Stabilization and reuse of soil at a major sports event site, London , UK*
  Pensaert, Staveley, Wardle (DEC NV, BE)
- *Biological in-situ treatment of the recalcitrant fuel oxygenates MTBE and ETBE*
  Fischer, Fahl, Oehm, Werner (Technische Universität Dresden, DE) Selle (ARCADIS Consult GmbH, DE)
- *In Situ Chemical Reduction for Groundwater Chromium Stabilization in a Complex Geologic Environment*
  Mueller, Valkenburg, Molin (Adventus Europe)

ThS A19 Special subjects

Thursday, 23 September, 16.00 – 17.30 hrs. hall Europe

Chairman: Tim Grotenhuis

- *Development of a low-cost technique for the treatment of large-scale contaminated groundwater by using constructed wetlands and aerated trenches*
  Fuetterer, Seeger, van Afferden, Reiche, Borsdorf, Rakoczy, Müller, Kaestner, Weiß (Helmholtz Centre for Environmental Research – UFZ, DE)
- *A new in-situ technology to establish a reductive reaction zone in the flooded uranium mine Königstein*
  Uhlig, Kassahun, Luckner (GFI Groundwater Research Institute GmbH Dresden, DE), Jenk (Wismut GmbH, DE)
- *The development of composition and technology of amendment production for rehabilitation of soils contaminated by radionuclides in Belarus*
  Maskalchuk, Baklay, Leontieva, Garkusha (Joint Institute of Energy and Nuclear Research – "Sosny", NAS of Belarus, BY)
- *Degradation of endocrine disruptors using fungal oxidative enzymes*
  Tuomela, Kabiersch, Rajasärkkä, Virta, Hatakka, Steffen (University of Helsinki, FI) Hillebrand (International Graduate School Zittau, DE)
- *The potential of using an acoustic stimulation for enhanced remediation of NAPL*
  Hartog, Westerhoff (Deltares, NL)

ThS A20 In situ biological treatment

Friday, 24 September, 09.00 – 10.30 hrs. hall Mozart 1+2

Chairman: Grzegorz Malina

- Physico-chemical and biological characterization of an aquifer polluted with EtBE
  Benoit, Fayolle-Guichard (IFP, FR), Chancerelle, Pandard (INERIS, FR) Dumestre, Morinière (SERPOL SA, FR) Falcao Salles, Grundmann, Kyselková (Université Lyon 1; CNRS, Écologie Microbienne, FR) Richnow, Rosell (Helmholtz -Centre for Environmental Research-UFZ, DE)

- *In-situ stimulated aerobic biodegradation of MTBE*
  Dijk (Biosoil R&D BV, NL)
- *Sustainable site remediation – anaerobic bioremediation with emulsified oil*
  R.C. Borden, A. M. Borden (Solutions-IES, USA)
- *Biological source zone treatment: effective, cost saving and astonishing fast*
  Henssen, Dijkhuis, de Vries (Bioclear b.v., NL), Peekel (SKB, NL)
- *Lessons from a stimulated anaerobic dechlorination experiment in Sweden*
  Wiklund (Tyréns AB, SE)

ThS A21 Non conventional concepts (1)
Wednesday, 22 September, 14.00 – 15.30 hrs. hall Papageno
Chairman: Tim Grotenhuis

- *Development, technical design and cost estimation of a Vertical Flow Soil Filter System for the remediation of groundwater contaminated with MTBE and benzene.*
  Rahman, van Afferden, Mosig, De Biase, Thullner, Oswald, Müller (Helmholtz Centre for Environmental Research - UFZ, DE)
- *Remediation of the pesticide-contaminated site "Groyne 42": In situ alkaline hydrolysis – a new soil remediation technology*
  Bondgaard (Central Denmark Region (Region Midtjylland), DK)
- *Treatment train for the protection of groundwater in The Capital Region of Denmark (combined use of ISTD, active ventilation and pump & treat)*
  Karlby, Johansen (The Capital Region of Denmark, DK) Juul Jensen, Birch Jensen, Nielsen (Niras, DE), Faurbye, Plou, Jensen (Krüger, DE)
- *Remediation of a Complex Contaminated Heterogeneous Aquifer Using Injection Technologies*
  Held (ARCADIS Consult GmbH, DE)
- *Remediation of a contaminated aquifer: case study on a retail station*
  Pucillo, Trojani, Cremonesi, Pellegatta (AECOM Italy Srl, IT)

ThS A22 Non conventional concepts (2)
Thursday, 23 September, 11.00 – 12.30 hrs. hall Europe
Chairman: Paul Bardos

- *Comparison of innovative remediation methods at decommissioned refinery site*
  Großmann (GICON GmbH Dresden, DE), Dahmke (Christian-Albrechts-Universität zu Kiel, Inst. für Geowissenschaften, DE), Weiß (Helmholtz Zentrum für Umweltforschung-UFZ, DE), Harpke (Landesanstalt für Altlastenfreistellung des Landes Sachsen-Anhalt DE)
- *Field Trials of In Situ Smouldering Remediation for Non-Aqueous Phase Liquid Contaminated Soils*
  Switzer (University of Strathclyde, UK), Pironi, Gerhard (University of Western Ontario, CA),Rein,Torero (University of Edinburgh, UK)
- *EZVI: A New Technology for DNAPL Reduction (Fundamentals and Lessons from Field Implementations)*
  Sacchetti (Carus Europe, ESP), Dingens (Carus Corporation, USA), Booth (Toxicological & Environmental Associates, USA)
- *Full Scale Test of DNAPL Remediation with ZVI-Clay/Soil Mixing. Monitoring of Flux, Remediation Level, Hydraulic Properties and Geotechnical Properties.*
  Terkelsen (Capital Region, Denmark, DK), Riis, Christensen, Walsted, Larsen (NIRAS, DK), Sidelmann Fjordboege, Kjeldsen (Technical University of Denmark, DK)
- *Natural capping of the landfill Volgermeerpolder*
  Clemens, van der Wijk, (Witteveen+Bos Consulting Engineers, NL), Stook (Tauw, NL), van der Pal (Municipality of Amsterdam, NL)

ThS A23 Thermal techniques (1)
Thursday, 23 September, 16.00 – 17.30 hrs. hall Papageno
Chairman: Wouter Gevaerts

- *Removal of CHC from fractured bedrock results of a pilot application using steam-air injection at the site Biswurm (Villingen-Schwenningen, Germany)*
  Trötschler, Koschitzky (VEGAS, University of Stuttgart, DE), Weiß (Helmholtz Centre for Environmental Research – UFZ, DE), Lidola, Epp (Stadtbauamt Villingen-Schwenningen, DE), Schulze (GEOsens, DE)
- *Remediation of a Mixture of Organic Compounds by Six Phase Soil HeatingTM*
  Gevaerts, Baillieul, De Moor, Leys, Van Geert (Arcadis Belgium, BE)

- *Thermally enhanced mobilization and reductive dehalogenation at a voc contaminated site E*
  Dijk, Weerts (BioSoil R&D BV, NL), Manette, De Jong (Tauw BV, NL), van Rouendal (Municipality Haarlemmermeer, NL)
- *Thermally enhanced in situ source zone remediation and its impacts on the groundwater plume*
  Hiester, Müller (reconsite - TTI GmbH, DE), Schobert (Zivilingenieur für Kulturtechnik und Wasserwirtschaft, AT), Brunner, Fellner (Institute of Water Quality, Resources and Waste Management, TU Wien, AT), Hofmann, Kah, Micic, Laumann (University of Vienna, AT)
- *In-Situ Thermal Desorption – Three Full-Scale Applications in Complex Urban Locations*
  Faurbye, Ploug (Krüger A/S, DK), Nielsen (NIRAS A/S, DK), Heron (TerraTherm Inc., CA)

ThS A24 Thermal techniques (2) and Heavy metals (2)

Friday, 24 September, 09.00 – 10.30 hrs. hall Papageno

Chairman:Frank Swartjes

- *In situ thermal treatment in urban polluted areas application of thermopile©*
  Haemers, Saadaoui (L&C – Thermo+ - 163, BE) Falcinelli (Deep Green, BE)
- *Remediation using ISTD and Steam– Source Removal and Plume Effects*
  G. Heron (TerraTherm, DK), Nielsen, Steffensen, T. Heron (NIRAS, DK), Skou (Region of Southern Denmark, DK), Ploug (Kruger, DK)
- *Thermal Treatment of Thick Peat Layers – DNAPL Removal and Shrinkage*
  T. Heron, Nielsen, Jensen, Riis (NIRAS, DK) G. Heron (TerraTherm, DK), Johansen (Capital Region of Denmark, DK), Ploug, Holm (Krüger, DK)
- *Influence of Dissolved Organic Matter on Removal of Heavy Metal from Soils*
  Lo, Yan, Yip (Hong Kong University of Science and Technology, CN), Tsang (University of Canterbury, NZ)
- *Application of In Situ Reactive Zones (IRZ) to the Biologi-cal Stabilization of Chromite Ore Processing Residues (COPR) Heap and Acid Mine Drainage*
  L. Ferriere, T. Gisbert, P. Dols, JI Mauss (Rhodia) (ARCADIS, FR)

ThS A25 Complete cases: lessons learned

Thursday, 23 September, 11.00 – 12.30 hrs. hall Papageno

Chairman: Anna-Maija Pajukallio

- *A Guideline for investigation and remediation of chlorinated solvents caused by (former) dry cleaners*
  Fonteyne, Bruneel, De Sloovere, De Naeyer (OVAM, Public Waste Agency of Flanders, BE)
- *City planning pressures on hepolammi closed landfill*
  Lehtovaara (Ramboll Finland Ltd, FI)
- *Evaluation of 25 Years Containment of the Hamburg-Georgswerder Landfill – Experience and Innovative Concepts for Secured Sites*
  Sokollek, Haupt, Kilger (Hamburg Ministry of Urban Development and Environment, DE)
- *Groundwater containment systems: design, construction and operation experiences on National Priority Sites in Italy*
  Betti, Patata, Pellegrini (Saipem S.p.A., IT)
- *Towards an integrated approach to site divestment*
  Bakker, Kips, Janssen (Tauw, NL)

ThS A26 Complete case studies

Wednesday, 22 September, 14.00 – 15.30 hrs. hall Mozart 4+5

Chairman: Marco Petrangeli-Papini

- *Combination of traditional and innovative technologies to address soil and groundwater contamination on a large former industrial site in an urban setting*
  Van Geert, Baillieul, Ferson, Gevaerts (Arcadis, BE) Burdick (Arcadis, US)
- *Integrated restoration programme of the contaminated area of Porto Marghera facing the Lagoon of Venice.*
  Bernstein (Consorzio Venezia Nuova, IT), Mayerle (Magistrato alle Acque, IT) Bonsembiante, Montobbio, Ochmann (Tetis Spa, IT)
- *Sustainable Remediation of a Tar works in the UK*
  Mackay (WSP Environment & Energy, UK), Clayton (WSP Remediation, UK)
- *Rigorous Field Demonstrations of Enhanced Reductive Dechlorination in Clayey Till and a Sand Aquifer at a Danish Test Site*
  Durant, Cox (Geosyntec Consultants, CA), Scheutz, Broholm, Heisterberg Hansen, Bjerg (Danish Technical University, DK), Nissen, Jorgensen (COWI A/S, DK) Christophersen (Southern Region of Denmark, DK)

- *Green Remediation by Dynamization of Natural Bio-Reactors for Degradation of PAH, BTEX, HCH and chlorinated Solvents: Case studies in France & Germany*
  Karg (HPC Envirotec SA, FR) Hintzen (HPC AG, DE), Henkler (Planreal, DE)

Theme B: New functions of the subsurface

ThS B1 Aquifer thermal energy storage/subsurface thermal storage

Friday, 24 September, 09.00 – 10.30 hrs. hall Mozart 3
Chairman: Sophie Vermooten

- *Formalising Zwolle's vision; a subsurface management plan ('gebiedsbeheerplan')*
  Postma, Slager (Gemeente Zwolle, NL), Dols (ARCADIS, NL), Van de Velde (TTE, NL), In 't Veld (Tauw, NL), Geelen (BuildDesk, NL), Meijerink (AT Osborne, NL), Henssen, (Bioclear, NL), Dijkgraaf (Erasmus Universiteit, NL)
- *BOEG: Manual for application of subsurface thermal storage in and around groundwater contamination*
  Verburg, Slenders, Zaniboni, Dols (ARCADIS, NL), Hoekstra (Deltares, NL), Mimpen, (Rijksgebouwendienst, NL), Guijt (VROM, NL), Van der Mark (Senternovem, NL)
- *In Situ Thermal Desorption - How Cold/Heat storage transforms clean-up costs into a sustainable investment.*
  Haemers (Deep Green, BE)
- *National research program on the effects of aquifer thermal energy storage (ates) use of the subsoil in a sustainable way*
  Drijver (IF Technology, NL), Henssen, Dinkla (Bioclear, NL), Gehrels, van Nieuwkerk (Deltares, NL), Grotenhuis (Wageningen University Research, NL)
- *Modelling the injection of mine drainage groundwater in a vapor dominated geothermal reservoir: preliminary evaluation of permeability damage risks*
  Geloni, Battistelli (Saipem Spa, IT)

ThS B2 New functions of the subsurface

Friday, 24 September, 11.00 – 12.30 hrs. hall Paracelsus
Chairman: Michel Beaulieu

- *Surfacing soil system services*
  Maring, Van der Meulen (Deltares, NL)
- *An integrated approach for the utilization of waste on soil – innovative management and technologies*
  Gruiz, Feigl, Vaszita, Klebercz, Újaczky, Atkári (Budapest University of Technology and Economics, HU)
- *Can we utilize natural soil reactivity to improve air quality?*
  Hartog (Deltares, NL)
- *Managing the risk in the vadose zone associated with the leakage of CO_2 from a deep geological storage*
  Rohmer, De Lary, Blanc, Guérin, Coftier, Hube, Audigane (BRGM, FR)
  Oldenburg (LBNL, USA)
- *Implications of CO_2 geological sequestration regarding the autotrophic microbial communities*
  Dupraz, Fabbri, Garrido, Joulian (BRGM, FR), Ménez (IPGP, FR)

Theme C: Sustainable management of the subsurface

ThS C1 National approaches; Europe

Thursday, 23 September, 14.00 – 15.30 hrs. hall Mozart 3
Chairman: Michel Beaulieu

- *"Contaminated sites management 2010" – developing a new vision and policy-science integration to practical implementation in Austria*
  Müller, Döberl (Environment Agency Austria, AT), Kasamas (Ministry for Agriculture, Forestry, Environment and Water Management, AT)
- *Flanders Soil Policy: Where remediation and land management meet*
  Van Dyck, Ceenaeme, De Naeyer, Gommeren (OVAM - Public Waste Agency of Flanders, BE)
- *Progress in and barriers to the voluntary and regulator required remediation of land affected by contamination in Scotland*
  Mackenzie (Nottingham University, Perth and Kinross Council, UK) Nathanail (University of Nottingham, UK)
- *Sustainable land management in The Netherlands - implementation and evaluation of the Soil Quality Decree*
  Honders, Gadella, Bakker, Bolleboom (SenterNovem, NL) Pruijn, Molenaar (Ministry of Housing, Spatial Planning and the Environment, NL)
- *Findings to date on Pilot Project to Support the Remediation of Unlicenced Waste Disposal Sites in Ireland*
  J. O'Neill, B. O'Neill (Department of Environment, Heritage and Local Government, Custom House, IE) Chan (Environmental Protection Agency, Johnstown Castle, UK) Coffey (Cork County Council, County Hall, UK)

ThS C2 National approaches; World

Friday, 24 September, 09.00 – 10.30 hrs. hall Europe
Chairman: Anna-Maija Pajukallio

- *Derivation of Risk-based Soil Environmental Quality Standards (SEQSs) in China*
  Wang, Hua, Shan, Lin (Nanjing Institute of Environmental Sciences, Ministry of Environmental Protection of the P.R. China, CN), Swartjes, Otte (National Institute of Public Health and the Environment (RIVM), NL)
- *Sustainable Remediation of Land and Groundwater Contamination in Australia*
  Nadebaum (GHD Pty Ltd, AU)
- *The Brownfield Market in Japan under the changes in the law and accounting disclosure.*
  Mitsunari (Mizuho Information and Research Institute Inc., JP)
- *Contaminated land management: opportunities, challenges and financial consequences of evolving legislation in Europe*
  De Groof (Grontmij, NL), Darmendrail (BRGM, FR)
- *The Dutch Inventory 2005 of contaminated sites: the balance after five years*
  Harmsma (ARCADIS Nederland BV, NL)

ThS C3 Soil policy

Thursday, 23 September, 16.00 – 17.30 hrs. hall Mozart 1+2
Chairman: Andreas Bieber

- *Broadening scopes in the Dutch policy on the soil/water system: approaches and associated awareness-building*
  Otte, Dirven (RIVM, NL), Boekhold (TCB, NL), De Cleen (Ministry VROM, NL), Verheul (Senter Novem/Bodem+, NL)
- *Climate change in urban and urban areas. Threats and opportunities for soil*
  Claessens, Dirven, Otte, Van der Wal (National Institue for Public Health and the Environment/RIVM, NL)
- *Soil as a partner in sustainable development: a research agenda for the future*
  De Cleen (Ministry VROM, NL), Otte (National Institute for Public Health and the Environment/RIVM, NL), Boekhold (Technical Soil Protection Committee, NL)
- *Liability Transfer for Brownfield Development: Towards a European Roadmap*
  Heasman (Taylor Wimpey UK Ltd, UK), Westcott (RSK STATS Geoconsult Ltd, UK), Connell (WSP Environment Ltd, UK), Visser-Westerweele (NICOLE, UK)

- *Site-specific assessment and remediation of groundwater pollution in Austria*
  Müller, Weihs (Environment Agency Austria, AT)

ThS C4 Functions and values of soil-water systems (1)

Wednesday, 22 September, 16.00 – 17.30 hrs. hall Papageno

Chairman: Harry Vermeulen

- *Analyzing soil threats*
  Van Wensem (Soil Protection Technical Committee/TCB, NL)
- *Measures and instruments for soil threats*
  van den Brink, Westerhof, Luitwieler (Royal Haskoning, NL), Smits (Province of Drenthe, NL), Hahn (Province of Fryslan, NL), Van Kleef (Province of Noord-Brabant, NL)
- *Carbon footprinting of regional development projects*
  De Kramer, Henrdiks, Nieuwkamer, Fest (Witteveen+Bos, NL)
- *Flourishing Brick Industry in Southern Rajasthan: A Threat to Agriculture and Food Security*
  Shah (Indian Institute of Forest Management, IN)
- *The impact of urban and agricultural dynamics on water consumption in the Distrito Federal do Brasil*
  Höfer, Banzhaf (Helmholtz-Centre for Environmental Research – UFZ, DE), Bilich (Universidade de Brasilia, BR), Hese (Friedrich Schiller University of Jena, DE)

ThS C5 Functions and values of soil-water systems (2)

Thursday, 23 September, 14.00 – 15.30 hrs. hall Papageno

Chairman: Joke van Wensem

- *For the development to the selection of soil bio indicators for soil protection*
  Peres (Université de Rennes, FR), Bispo, Grand, Galsomies (ADEME, FR)
- *A framework for sustainable management of the subsurface*
  Oomes (TCB, NL), Griffioen (Deltares/TNO, NL)
- *Catchment files to improve sustainable drinking water production in Overijssel, the Netherlands*
  Van den Brink (Royal Haskoning, NL) Ten Heggeler, Groenhof (Province of Overijssel, NL)
- *Modeling of soil moisture content as a forecasting tool for the practical assessment of the environmental impact of a drop in the groundwater table*
  Wirsing (Karlsruher Institute of Technology, DE), Deinlein, Maier, Hofmann, Roth (Stadtwerke Karlsruhe GmbH, DE)
- *Bridging the conceptual and methodological gap between soil health and ecosystem health*
  Epelde, Mijangos, Blanco, Garbisu (NEIKER-Tecnalia, ES)

ThS C6 Modelling transport

Thursday, 23 September, 14.00 – 15.30 hrs. hall Mozart 4+5

Chairman: Peter Dietrich

- *Geochemical modelling of contaminant leaching in soils: recent developments, uncertainties and standardisation*
  Comans, Dijkstra, Meeussen (Energy research Centre of the Netherlands (ECN), Petten, NL), Groenenberg (Soil Science Centre, Wageningen University and Research Centre, NL) Spijker (National Institute for Public Health and the Environment, Bilthoven, NL)
- *Modelling fate and transport of As, Ba, V and W in landfill leachate using PHREEQC*
  Keijzer (Tauw bv, NL)
- *Iron and sulphur biogeochemical processes involved in arsenic and mercury mobility in aquifers under anoxic conditions*
  Harris-Hellal, Locatelli, Burnol, Joulian, Garrido, Laperche, DUMONT, CROUZET,Battaglia-Brunet, (BRGM, FR)
- *A 3-D analytical model for the plume length.*
  Yadav, Liedl (Technische Universität Dresden, DE) Dietrich (UFZ, DE)
- *A numerical model of sub-surface flow and transport at Sellafield Site*
  Teasdale (Sellafield Ltd, UK), Holton, Kelly,Carter (Serco Assurance Ltd, UK)

ThS C7 Risk assessment

Thursday, 23 September, 09.00 – 10.30 hrs. hall Mozart Papageno

Chairman: Harald Kasamas

- *An ecosystem function based approach to assess ecological risks caused by contaminated land – a conceptual framework meeting Austrian circumstances*
  Edelmann, Loibner (IFA-Tulln, AT), Doerrie, Mueller (Umweltbundesamt Wien, AT), Reichenauer (Austrian Institute of Technology, AT)
- *Dioxin contaminated soils and sediments – secondary sources of concern*
  Tysklind, Sundqvist, Bergknut, Wiberg (Umeå University, SE)
- *EIF Onshore Discharges: A quantitative risk management tool for soil, groundwater and surface water*
  Firth (Firth Consultants Ltd, UK), Stone (WorleyParsons, UK) Hagemann, Smit, Frost (Statoil, NO)
- *Polar polycyclic aromatic compounds at contaminated sites: occurence, toxicity and mobility*
  Lundstedt (Umeå University, SE)
- *The mathematical model of immobilization of fuel hydrocarbons in soils under the influence of biological and sorption factors*
  Potashev, Malov, Halilova (Kazan State University, KZ)

ThS C8 Standards

Thursday, 23 September, 11.00 – 12.30 hrs. hall Mozart 3

Chairman: Andreas Bieber

- *S-RISK: a new model for calculating soil remediation standards and assessing human health risks of soil contamination*
  Ceenaeme, Van Gestel (Public Waste Agency Flanders/OVAM, BE)
- *The use of soil plant relationships as a tool to improve soil quality criteria for PTEs . The case study of Portugal.*
  Rodrigues, Pereira, Duarte (University of Aveiro, PT), Römkens (Alterra – Wageningen UR, NL)
- *Possible approach for implementing bioavailability of organic contaminants in a policy framework.*
  Brand, Lijzen, Peijnenburg (RIVM - National Institute for Public Health and the Environment, NL)
- *Exposure assessment of humans at contaminated sites*
  Reichenauer, Friesl-Hanl (Austrian Institute of Technology GmbH - AIT, Environmental Resources & Technologies, AT), Dörrie, Müller (Environmental Protection Agency, AT), Edelmann, Loibner (BFE, AT)
- *Human Risk assessment of lead contaminated soil in The Netherlands*
  Lijzen, Otte, Brand, Bakker, Oomen (RIVM, NL)

ThS C9 Modeling vapor intrusion

Friday, 24 September, 11.00 – 12.30 hrs. hall Mozart 1+2

Chairman: Valter Tandoi

- *Modeling risks of vapor intrusion*
  Picone, Valstar (Deltares, NL), Grotenhuis, Rijnaarts (Wageningen University, NL) Pasini, Gargini (University of Ferrara, IT)
- *Transfer of volatile compounds from soil: comparison between predictions and field measurements with different models; development of the VOLASOIL model for a depleting source*
  Hulot, Gay, Hazebrouck, Thiam (INERIS, FR) Marot (ADEME, FR)
- *Vapor emission at polluted sites: comparison between model predictions and field data*
  Saponaro, Puricelli, Sezenna (Politecnico di Milano – DIIAR, IT)
- *Modelling of vapor intrusion from contaminated soil and groundwater accounting for aerobic biodegradation*
  Verginelli, Baciocchi (University of Rome “Tor Vergata”, IT) Grillo, Massetti, Sordini, (Eni S.p.A. Div. Refining & Marketing, IT)
- *Exclusion Distance Criteria for Assessing Potential Vapor Intrusion at Petroleum Hydrocarbon Release Sites*
  Lahvis (Industry - Shell Global Solutions, UK) Devaull (Industry - Shell Global Solutions, US)

Theme D: Management of contamination at regional scale

ThS D1 Land

Friday, 24 September, 11.00 – 12.30 hrs. hall Mozart 4+5

Chairman: Jos Brils

- *Assessment and management of health risks posed by environmental arsenic at Pirkanmaa region, Finland*
  Sorvari (Finnish Environment Institute, FI) Lehtinen, Mäkelä-Kurtto (MTT Agrifood Research Finland, MTT, FI) Rossi (Esko Rossi Oy, FI) Ruskeeniemi, Backman, (Geological Survey of Finland (Geological Survey of Finland, FI)
- *Hasloc, a GIS tool for interaction between site development and remediation*
  Staes (Royal Haskoning Belgium nv, BE)
- *Management of contaminated soils in urban areas in Ore Mountains (Germany)*
  Hertwig, Zeißler (Beak Consultants GmbH, DE), Müller (Sächsisches Landesamt für Umwelt, Landwirtschaft und Geologie, DE)
- *Sustainable remediation of soil and groundwater at post industrial areas: The role of site characterization, monitoring of geochemical processes and modelling*
  Malina (AGH - University of Science and Technology, PL)
- *Sustainable soil management in the city of Rotterdam, a heavily industrialized urban area, builded on peaty (sub)soils*
  Roeloffzen (DCMR EPA Rijnmond, NL)

ThS D2 Water

Wednesday, 22 September, 14.00 – 15.30 hrs. hall Mozart 1+2

Chairman: Sophie Vermooten

- *Motorway runoff in the Netherlands, runoff and spray pollution, legislation and prevention measures*
  Van Grinsven (Ministry of Transport, Public Works and Water Management, Directorate-General for Public Works and Water Management (Rijkswaterstaat), Water Service, Section Soil and maintenance, NL) Van Muiswinkel (Ministry of Transport, Public Works and Water Management – Rijkswaterstaat, NL)
- *Effective use of groundwater is an essential tool for tackling extensive groundwater contamination. An illustration of necessary policy change and cases*
  Slenders (ARCADIS, BE)
- *Dealing with large scale mixed groundwater contamination*
  Tuinstra (Soil Protection Technical Committee/TCB, NL)
- *Integrated approaches for large scale groundwater contaminants*
  Bakker (Tauw, NL) Slenders (Arcadis, NL)
- *Development of rehabilitation technologies and approaches for multipressured degraded waters and the integration of their impact on river basin management*
  Bastiaens (VITO, BE), AQUAREHAB consortium (BE)

ThS D3 Management and communication

Wednesday, 22 September, 11.00 – 12.30 hrs. hall Papageno

Chairman: Jos Brils

- *An Enterprise Approach to Receptor Risk Management*
  Well (ENFOS Inc., US)
- *Environmental liability transfer in Europe*
  Heasman (NICOLE/Taylor Wimpey, UK), Wescott (NICOLE/RSK, UK), Connell (NICOLE/WSP, UK), Visser-Westerwelde (NICOLE, UK)
- *Intense communication and personal approach: crucial instruments for a successful, integrated remediation of regional, contaminated residental areas in Flanders (Belgium).*
  de Mulder, Wille, Casier (OVAM, BE)
- *PPP (Public Private Partnership) in land management at regional scale*
  Knappik (Technische Universität Dortmund, BE)
- *The Quebec ClimatSol Program: influencing the market to foster contaminated sites green revitalisation projects.*
  Beaulieu (Ministry of the Environment, CA)

ThS D4 Sediment management

Thursday, 23 September, 16.00 – 17.30 hrs. hall Mozart 3

Chairman: Dominique Darmendrail

- *The prioritisation of contaminated sediment investigation in Flanders*
  Verhulst, Luyten, Caers (OVAM, BE), Schelkens, De Cooman (VMM, BE)
- *Results from sediment monitoring networks examined with respect to the carcinogen (H7), mutagenic (H10) and toxic for reproduction (H11) criteria of the EU Directive on wastes*
  Mouvet (BRGM, FR)
- *Dredged material as a resource: options and constraints*
  D`Haene (DEME Environmental Contractors, BE), Murray (CEFAS, UK), Hakstege (RWS, NL)
- *Lower Fox River Operable Unit 2 – 5 Remediation Works*
  Peeters (Boskalis Dolman, NL)
- *Sustainable Management of Contaminated Sediments: Amoras Case Study in the Port of Antwerp*
  Vandekeybus (MWH Europe North, BE), Rapisardi (MWH S.p.A., IT) Apitz (SEA Environmental Decisions, Ltd., UK)

= Special Sessions on next page =

Special sessions (SpS)

SpS 1 Challenges and strategies in land management in Central and East European Countries

Thursday, 23 September, 16.00 – 17.30 hrs. hall Paracelsus
Chairman: Martin Schamann

Industrial land uses, mining activities, military sites and accidents lead and still lead to partly considerable soil and groundwater contamination – also in Central and Eastern European Countries. The fall of the Soviet regime, supported by privatization processes and structural changes brought significant changes in industrial and regional development. The question of contaminated land has been respected in a certain way.
However, there are still many sites and large areas of contaminated land remaining – stating challenges for current and future land use and regional development. Due to the current practice that industrial and regional development significantly takes place by consuming greenland, derelict, partly contaminated land increases - often located in inner urban areas with sound infrastructure.
In order to face the problems and to foster a balanced territorial development and territorial integration, the implementation of strategies for rehabilitation of brownfields, protection of soil and integrated policies for reaction to environmental risks are – among others – objectives for providing funds by the EU in its European Territorial Cooperation Programme.
The Special Session gives an overview over the current situation in regional development by presenting the status of landtake and derelict land and brownfield redevelopment by highlighting the question in what way “contamination” influences regional development. The EU vision for territorial development, underlaying the European Territorial Cooperation Programme for Central and Eastern Europe is presented. At the hand of case studies the current practice in regional development projects and possible future development will be discussed.

SpS 2 Austria: Transforming experiences and socio-economic frames onwards to new strategies and practices

Wednesday, 22 September, 11.00 – 12.30 hrs. hall Europe
Organizers: Ministry of Agriculture, Forestry, Environment and Water management; supported by Environment Agency Austria
Chairman: Martin Schamann

In 1987 first reports regarding a landfill threatening groundwater resources and drinking water wells of some hundred-thousand people in the vicinity of Vienna hit the public in Austria. High public awareness triggered policy to adopt legislation on coordinating and financing clean-up actions. Since 1989 several complex remediation projects as well as other action lines regarding systematically mapping and investigating took place and highlight the successes so far. Hence experiences gained within the last 20 years proofed also that involved stakeholders are less facing ticking time-bombs but society is challenged regarding sustainable development and liability. Still the crucial question stays the same like regarding any risk management topic: *How to optimize benefit in a sustainable manner from while minimizing the negative consequences of the associated risks?*

Key notes will outline positions regarding:

- scientific insights on a holistic understanding of natural systems changed and impacted by contamination,
- changes in policy drivers and frames and possible future responses,
- prerequisites for win-win-situations by investing and developing contaminated land

A moderated panel discussion will involve international experts to question given positions. Interacting with the audience it is the general objective of this session to discuss and identify important and promising elements to develop Austrian experiences and socio-economic frames onwards to new strategies and practices.

<u>Speakers and presentations:</u>

1. *Understanding land management integrative; Martin Gerzabek (Vice-chancellor of the University of Natural Resources and Applied Life Sciences ;Vienna)*

2. *Reframing contaminated land policy targets; Christian Holzer (Ministry for Agriculture, Forestry, Environment and Water management)*
3. *Supporting economic development through solutions and innovation; Martin Schamann (Environment Agency Austria)*

Invited international experts:

- *Georg Teutsch (UFZ Leipzig)*
- *Eddy van Dyck (OVAM, Belgium)*
- *Anja Sinke (BP International & NICOLE)*

SpS 3 Latin America: Contaminated sites, remediation and redevelopment approaches

Thursday, 23 September, 14.00 – 15.30 hrs. hall Paracelsus
Chairman: Holger Weiss

This regional session will include presentations about:

- *Jet fuel remediation under water table fluctuation in a tropical climate area*
  Pede, Marco and Kiang, Chang (UNESP LEBAC, BR)
- *The clean up and reutilization project of the former Refinery "18 de Marzo" in Mexico City. Management issues on the remediation of large scale projects in Latin America*
  Ruiz Saucedo, Ulises (Mexican Environmental Ministry SEMARNAT) Schmidt, Winfried (German Technical Cooperation Agency GTZ)
- *Contaminated land management and brownfiled redevelopment in Mexico*
  Ruiz Saucedo, Ulises (Mexican Environmental Ministry SEMARNAT) Schmidt, Winfred (German Technical Cooperation Agency GTZ)
- *Derivation of a soil quality standard for cadmium for tropical regions, based on soil-plant relations*
  Carrijo Azevedo Melo, Leonidas (University of São Paulo) Swartjes, Frank A. (National Institute for Public Health and the Environment)
- *The Latin American network for contaminated site remediation RELASC*
  Ruiz Saucedo, Ulises (Mexican Environmental Ministry SEMARNAT) Alarcon, Teresa (CIMAV, Chihuahua)

SpS 4 Novel approaches for the integration of monitoring data into mapping

Friday, 24 September, 11.00 – 12.30 hrs. hall Papageno
Chairman: Peter Dietrich

Soil erosion, local and diffuse contamination, sealing, compaction are only some of the soil threats caused by human activities. As formulated in the European "Thematic Strategy for Soil Protection" soil degradation is a serious problem also in Europe.

Property maps are required to on the first hand to improve the understanding and quantification of the worldwide issue of soil degradation, high-resolution soil and on the other hand to achieve the objectives of the "Thematic Strategy for Soil Protection" such as preventing further soil degradation, preserving soil functions and restoring degraded soils. Such maps will assist the specific protection of soil functions and the restoration of degraded soils as well as contribute towards sustainable land use, water and environmental management.

High-resolution soil property maps are one major prerequisite for the implementation of the Soil Thematic Strategy and the preparation of the planned Soil Directive. However, such maps are not available in the same resolution and level in detail in Europa. Conventional, sample-based soil property mapping is very time-consuming, cost-intensive, and the data collected are available only for discrete points in a landscape. Additionally, as laboratory analyses are expensive, many soil properties are estimated in the field by different soil surveyors, resulting in subjective, non-reproducible, and non-transferable data. Thus, sample-based soil mapping is not reasonably applicable for large areas. It could be recognized that currently available techniques for soil mapping still have deficiencies in terms of reliability and precision, the feasibility of investigation of large areas (e.g.catchments and landscapes) and the assessment of soil degradation threats at this scale.

Therefore, there is a significant demand to develop new strategies and innovative methods for generating high- resolution and accurate soil property maps and on the other hand to reduce the costs compared to traditional soil mapping. This requires the improvement as well as integration of geophysical and spectroscopic measurement techniques in combination with advanced soil sampling approaches, pedometrical and pedophysical approaches.

This session will introduce two collaborative projects funded by the EU and show some examples.

This session will include presentations about:

- *DIGISOIL: a geophysical multi-sensor acquisition and processing system for mapping soil properties*
  Grandjean, Gilles (BRGM)
- *iSOIL - Interactions between soil related sciences – Linking geophysics, soil science and digital soil mapping*
  Dietrich, Peter and Werban, Ulrike (Helmholtz Zentrum fuer Umweltforschung GmbH - UFZ)

- *Magnetism of soils and sediments as a tool for estimation of soil erosion and heavy metal pollution – case studies*
  Jordanova, Diana (Geophysical Institute, Bulg. Acad. Sci.), Jordanova, Neli (Geophysical Institute)
- *Cross-scale application and validation of a combined geophysical and pedometrical approach for digital soil mapping*
  van Straaten, Leonardo (Geo-Infometric GmbH) Werban, Ulrike (UFZ)

SpS 5 New approaches in non- or low-invasive site characterization towards sustainable remediation

Friday, 24 September, 09.00 – 10.30 hrs. hall Mozart 4+5
Chairman: Matthias Kästner

Conventional techniques for site characterization are time consuming, cost intensive, and do not support decision making. Therefore, new techniques for step by step site characterization strategy with smart feed back loops are necessary and are focused on by the ModelPROBE project. Advanced geophysical site characterization techniques combined with new types of vegetation analysis (tree monitoring) are developed. Based on these non-invasive surveys, the extension of sources, contamination levels (THP, BTEX, PAH, CHC, explosives, heavy metals and radio nuclides) and soil heterogeneities can be localized. Hot spots can then be investigated by new direct push probing systems integrated with geophysical & hydrogeological methods and combined with chemical & isotopic contaminant analysis for source localization and identification. The actually occurring bioprocesses, such as contaminant degradation or precipitation/mobilization processes, can be assessed using biosensors, in situ microcosms, and stable isotope and biomarker analysis. Some of these new techniques and tools were successfully evaluated against best practice of conventional methods at fully equipped and characterized European reference sites available in the project. Methods and techniques will be provided to consultants and SME´s for application. Integrated statistical analysis and modelling at different stages of the step by step approach will result in an improved view of soil and subsurface contamination and will provide a profound basis for risk assessment and decision.

Presentations:

- *Model driven Soil Probing, Site Assessment and Evaluation– First results of the EU Project ModelPROBE* - Matthias Kästner[1)] and Giorgio Cassiani[2)] - [1)] UFZ - Helmholz Centre for Environmental Research, Leipzig, Germany, [2)] University of Padua, Department of Geoscience, Italy

- *Assessment of in situ microbial activity in a BTEX contaminated aquifer during exposure to different electron acceptors* - Christian Schurig, Petra Bombach, Anja Miltner and Matthias Kästner (UFZ – Helmholz Centre for Environmental Research, Germany)

- *In situ molecular tracking of dehalogenating bacteria in groundwater and soil contaminated by chlorinated solvents; first results of the EU project ModelPROBE*. - Rossetti S. [(1)], Matturro B.

(1), Aulenta F. (2), Petrangeli Papini M. (2), Majone M. (2), Tandoi V. (1). (1) Water Research Institute, CNR, IT, (2) Department of Chemistry, Sapienza University of Rome, IT

- *Laboratory studies of the natural electrical potential of contaminants in unconsolidated Soils* - Konstantin Titov (1), Enzo Rizzo (2), Alexis Maineult (3), (1) St. Petersburg State University, (2) Institute of Methodologies for Environmental Analysis, Italian National Council of Research, Italy. (3) Institut de Physique du Globe de Paris, France.
- *Trees as indicators of subsurface pollution: experimental approach and statistical analyses at a actual Chlorinated Ethenes Contamination Site* - Arno Rein (1) *,Ulrich Gosewinkel Karlson (2), Carl Einar Amundsen (3), Stefan Trapp (1) - (1) Technical University of Denmark, (2) University of Aarhus, Denmark, (3) Bioforsk-Norwegian Institute for Agricultural and Environmental Research, Norway and Wahyudi, Agung and Bogaert, Patrick (Université catholique de Louvain)
- *Laboratory experiments on DNAPL distribution in saturated porous media and on source reduction processes* - Luciano, Antonella; Petrangeli Papini, Marco; Viotti, Paolo (Sapienza University of Rome, IT)
- *A contaminant trap as a tool to isolate and quantify the non-accessible fraction of polycyclic aromatic hydrocarbons in soil* - Philipp Mayer[1], Jannik L. Olsen[1], Varvara Gouliarmou[1], Eva Edelmann[2], Romana Kendler[2], Andreas P. Loibner[2] - [1]National Environmental Research Institute, Aarhus University, , Denmark, [2]Department for Agrobiotechnology, IFA Tulln, University of Natural Resources and Applied Life Sciences, 3430 Tulln, Austria

SpS 6 Enhancing the output efficiency of research projects; examples and opportunities

Thursday, 23 September, 09.00 – 10.30 hrs. hall Paracelsus
Chairman: Harry Vermeulen

In the last decades a lot of research money is invested in the field of soil contamination and soil quality management. In Europe and most EU countries there is a need to improve the impact of these investments in daily practise by way of knowledge dissemination and application in practise of new knowledge and technologies.

There is a common understanding that involving stakeholders in research programming and execution of research projects will improve the introduction of new technologies and knowledge in practice. But experiences in research projects showed that it is not easy to involve stakeholders in research projects. It is not easy on a national level and it is even more complicated on an international, European level.

The issue of soil contamination and remediation has been, like most environmental issues, a policy driven issue. Involving stakeholders in research was focussed for that reason on involving policy makers in research programming and execution. Studies have been carried out and projects executed about science and policy interfacing. During the implementation of soil contamination and remediation policies in combination with the philosophy ”the polluter pays” private industries and other landowners became important stakeholders who participated in policy and technology development. On a European level, for instance, the NICOLE network appeared as a result of this stakeholder involvement.

With the new issues in soil quality management a greater variety of stakeholders will appear and not all issues will be primary policy driven. Issues that are coming up like biodiversity, ecosystem services and groundwater quality management have to deal with a lot more diffuse and complex network of stakeholders. Apart from national and European authorities and policy makers, industry, agricultural organisations and other private stakeholders are involved and probably the interaction between policy makers and other private stakeholders will become more intense.

This raises the question how to improve stakeholder participation in research on a European level in an environment that is getting more complex. In what way can we structure the interaction between national and European policy makers and national and European stakeholder platforms.

In this session we want to invite some European policy makers in research and national representative of successful stakeholder participation in soil quality management research projects. The outcome of the session can be initiatives to improve the interaction between R&D policy makers in Europe and international networks of stakeholders.

SpS 7 EU Soil Strategy; Legal issues

Wednesday, 22 September, 14.00 – 15.30 hrs. hall Paracelsus
Chairman: Dominique Darmendrail

The publication of the European Union thematic strategy for the protection of soil by the European Commission in 2002 marked the transition towards a more formal European Union policy. The proposal of Directive would like to establish a common strategy for the protection of soil, based on the principles of:

– Integration of soil concerns into other sectoral policies,
– Prevention of threats to soil and mitigation of their effects,
– Preservation of soil functions through the identification of priority areas and establishment of actions programmes for most of the identified threats (erosion, sealing, organic matter loss, …),
– Identification and remediation of contaminated sites,
– Awareness raising, reporting and exchange of information.

After the Portuguese, French, and Czech EU presidencies Spain has continued the discussions in the Soil Protection Framework Directive.

Some experienced Member States have main concerns on the recent developments of EU legislation related to soil issues (opposition on grounds of the subsidiarity principle, costs and administrative burdens, prioritisation process…). Therefore, no political agreement has been reached up to now.

Nevertheless some important provisions on soil issues have been introduced during the last years in different European legal documents, such as:

• the Environmental Liability Directive (ELD, for new pollution) which has been transposed in almost all national legal frameworks,
• the revised Waste Directive (in particular for the excavated soil management issues) that needs to be transposed before December 2010 by Member States,
• the renewable energies Directive adopted in December 2007,
• the IPPC directive is under revision (second lecture at the Parliament planned for spring 2010), with new provisions for soil monitoring and site closure procedure.

The development of such provisions in different EU legal documents will need more integration and a clear definition of what should be the objectives of a framework directive on soil protection.

The ***special session*** will be focused on three issues: i) the reasons of the current situations (context, content, blocking minority on the current version of the directive, soil issues already covered by EU policies), ii) potential activities during the Belgian Presidency iii) how to move forward on this EU Directive proposal (definition of common ground for EU objectives, potential tools, possible milestones).
Chairs: Dominique Darmendrail (Common Forum), Marijke Cardon / Eddy Van Dyck (OVAM Belgium)

SpS 8A&B Sustainable Remediation

In the past decade, decisions on the management of historically contaminated land have progressed toward project related risks to human health and the environment. More recent interest has been shown in including sustainability as a decision-making criterion for remediation practice. Sustainability concerns include the environmental, social and economic consequences of risk management activities themselves, and also the opportunities for wider benefit beyond achievement of risk-reduction goals alone.
In broad terms sustainable remediation is the application of the principles of sustainable development, as described by the Brundtland Report, to risk based contaminated land management. As such sustainable remediation encompasses four broad aims: achieving risk based land management; ensuring that the wider effects of this risk management action are acceptable; ensuring the engagement of stakeholders and the transparency of decision making processes; and supporting balanced outcomes in terms of the environmental, social and economic elements of sustainable development.

Currently there a number of international cross-sectoral sustainable remediation networks listed in the table below. The situation is very fluid, for example, new initiatives are being discussed in Canada and the Netherlands. Special Session 8A focuses on understanding the drivers, constraints and activities of a number of these initiatives. Special Session 8B aims on providing sustainable remediation case studies linked to these initiatives.

Name	Geographical Coverage	Outputs and Web links
Canada	Remediation tool used for Federally funded remediation in Canada	www.gold-set.com/portal/ProjectDetail3.html
EURODEMO+	EU	www.eurodemo.info EURODEMO 2007
Green Remediation	USA, US EPA led linked with other Federal and State initiatives and standards development by ASTM Committee E50 (www.astm.org)	US EPA 2008, 2009 www.clu-in.org/greenremediation/
ITRC, Interstate Technology & Regulatory Council	USA and Canada	http://www.itrcweb.org/teampublic_GSR.asp
NICOLE Sustainable Remediation Working Group	EU	Bardos 2003, 2008, 2009, NICOLE 2010 www.nicole.org/sustainableremediation
Sustainable Remediation Forum (SURF)	Largely USA based	SURF 2009 www.sustainableremediation.org
SuRF-Australia	Australia	http://www.crccare.com/working_with_industry/surf.html
SuRF-UK	Largely UK based	CL:AIRE 2009 and CL:AIRE 2010 www.claire.co.uk/surfuk

SpS 8A Sustainable Remediation – International Initiatives

Wednesday, 22 September, 16.00 – 17.30 hrs. hall Paracelsus
Chairman: Nicola Harries (CL:AIRE, UK)

On July 12th 2010 a number of international sustainable remediation initiatives took part in interactive Internet Seminar (webinar) discussing US and EU perspectives on green and sustainable remediation[1]. Around 150 participants registered from around the world, hearing about green remediation from the US Environmental Protection Agency (EPA), using ecoefficiency in remediation decision making from the EURODEMO+ network, and about wider concepts of sustainable remediation from Environment Canada, Sustainable Remediation Forum (SuRF) United States, United Kingdom, and the Netherlands, NICOLE and the Common Forum. The webinar has been recorded and is available from www.clu-in.org.

The webinar explored how regulatory, market and policy drivers have led to these various initiatives, and the constraints that affect their outcomes and approach. The findings of this webinar will be distilled into a discussion paper which will be presented at Special Session 8A.

The key focus of Special Session 8A will be to continue an exchange of views between these initiatives and identify how these initiatives can develop their collaboration and exchange of ideas further.

Our American colleagues have already begun a sustainable remediation standards discussion via ASTM (www.astm.org). There are also positive discussions about how the European

[1] Green remediation is concerned with optimising the wider environmental merit of remediation solutions.

initiatives can produce a common vision and tools for sustainable remediation. It will be fascinating to see how this discussion develops at Consoil Special Session 8A.

The outputs of this special session will be listed on a web site.

SpS 8B Sustainable Remediation – Case studies

Wednesday, 22 September, 11.00 – 12.30 hrs. hall Paracelsus
Chairman: Dietmar Müller (EURODEMO+)

Sustainability touches not only upon concepts, frameworks and improving our common understanding but in particular on how to incorporate sustainable approaches into the practice of site remediation. The challenge is to provide solutions which optimise benefits to all parties involved to a project while minimizing the negative consequences and associated risks. This involves the planning process and preparing decisions as well as implementing solutions, applying technologies and optimising performance site-specifically and continuously. Case studies will present backgrounds and 'real world' situations to share experiences underpinning advantages and benefits but moreover also on particular constraints given by regulatory frames or within participatory processes. Case studies are being prepared from the UK, USA and Australia for presentation and discussion at this Special Session. The outputs of this special session will be listed on a web site.

SpS 9 Ecosystem services

Thursday, 23 September, 11.00 – 12.30 hrs. hall Paracelsus
Chairmen: Joke van Wensem (TCB,Netherlands), Suzanne van de Meulen (Deltares, Netherlands), Martin Schamann (Umweltbundesamt, Austria)

The ecosystem services concept has gained much attention since the publication of the Ecosystem Millennium Assessment in 2005. In this report the concept was used to explain the importance of biodiversity for human well being. Ecosystem services are the benefits people obtain from ecosystems. Four types of services are being distinguished: providing (e.g. food, genetic resources), regulating (e.g. seed dispersal, pollination), cultural (e.g. knowledge system, sense of place), and supporting services (photosynthesis, nutrient cycling), the latter being supportive to all other services. Ecosystems provide services that humans optimize for their own use. A specific type of land use requires certain ecosystem services (e.g. agriculture requires provision of crop, pest control, pollination, water and nutrient regulation; a city requires water regulation, climate control, stability, sense of place, aesthetic values).
The ecosystem services concept is being used, amongst others, in projects that aim at evaluating the necessary soil quality in chemical, biological and physical terms for providing the required ecosystem services, given the land use. The scale of these project typically range from municipality to regional scale.
The special session will consist of two parts: presentations and discussion. The presentations will concern a general introduction on the ecosystem services concept, and (at least) two presentations on projects. There will be ample time for discussion. The discussion will focus on the suitability of the ecosystem services concept to broaden the scope of soil policies, management and research.

SpS 10A&B Russia and other CIS countries: Remediation concepts and technologies

Soil and groundwater contamination by dangerous substances has become a serious ecological problem for Russia and CIS countries. Areas of contamination have been created by the industrial activity of humans (pollution with heavy metals, radioactive substances, polychlorinated and poly-nucleic aromatic hydrocarbons, oil hydrocarbons and products of their processing) as well as being the result of agricultural activity (pesticide contamination). Chemical contamination causes significant harm to natural biocenosis, and in some cases causes their whole destruction. In Russia alone, 800,000 hectares of soil requires remediation.

The role of Russian and CIS environmental professionals in solving environmental issues is significant. ISTC created favorable conditions for the development of more than 430 ecological research projects. Following fifteen years of successful project implementation, a broad range of technologies for soil remediation are now available to read on the ISTC's public database. Projects include in-situ and ex-situ treatment methods, biological and non-biological treatments, thermal desorption, encapsulation, multi-phase extraction, electrochemical remediation, phytoremediation, stabilization and containment, membrane technology and many other. Technologies have been tested and backed-up under both laboratory and field conditions.
The purpose of these special ISTC sessions is twofold: firstly, to bring valuable results obtained in the framework of ISTC projects to public awareness and discussion, and secondly, to analyze the results of projects in order to bring a focus to the future direction of research in the area of soil and groundwater remediation.

SpS 10 A Biological treatment

Wednesday, 22 September, 14.00 – 15.30 hrs. hall Mozart 3
Organization: International Science and Technology Center (ISTC), Moscow, Russia

- Rudneva V Ya. International Science and Technology Center (ISTC), Moscow, Russia
  ISTC activity in the development of technologies for remediation of contaminated soils
- Filonov A.E, Laboratory of Plasmid Biology, G.K. Skryabin Institute of Biochemistry and Physiology of Microorganisms RAS, Pushchino, Moscow region
  Remediation of oil-spilled territories, using a biopreparation "MicroBac", a consortium of plasmid-bearing strains "V&O" and associated plant
- Kapranov V.V, Division for Ecological Biotechnology, State Federal Enterprise For Science "Research Center for Toxicology and Hygienic Regulations Of Biopreparations", Serpuchov, Moscow region
  Technology for microbial bioremediation of soils and silt contaminated by polychlorinated biphenyls
- Abdrashitova S.A, Institute of Microbiology and Virology, Almaty, Kazakhstan
  Development of bioremediation technology for mercury contaminated groundwater
- Kozminykh, A.N, JSC "Center of ecological Initiatives "Press-Torf, Kirov, Russia
  Technology of microbiological utilization of organic-mineral sorbent
- Sadunishvili, Durmishidze Institute of Biochemistry and Biotechnology (DIBB), Tiblisi, Georgia
  Strategy of combined application of higher plants and microbial consortia for remediation of oil polluted soils

SpS 10 B Other technologies

Wednesday, 22 September, 16.00 – 17.30 hrs. hall Mozart 3
Organization: International Science and Technology Center (ISTC), Moscow, Russia

- Breus, I.P, Division of Environmental Chemistry, Institute of Chemistry, Kazan State University, Tatarstan, Russia
  The technology of creation of protective hydrocarbon-impervious screens in soils preventing downward migration of hydrophobic contaminants
- Ilyushchenko M.A, Almaty Institute of Power Engineering and Telecommunication (AIPET), Almaty, Kazakhstan
  Change of a concept of remediation technologies for cases of mercury contamination
- Kydralieva K, Institute of Chemistry and Chemical Technology, National Academy of Sciences, Bishkek, Kyrgyz Republic
  Magnetoseparation technology for removal of uranium and heavy metals using magnetoactive humics-based sorbents
- Pomogailo A., Institute of Problems of Chemical Physics, RAS /Head of Laboratory of Metalopolymers, Moscow, Russia
  Molecular imprinting technique for binding of target heavy metals
- Marchenko, A.I, Research Centre for Toxicology and Hygienic Regulation of Biopreparations, Serpukhov, Moscow region, Russia
  Urgent need of radical improvement of degraded soils

- Nurzhanova A.A, Laboratory of Physiology and Biochemistry of Institute of Plant Biology and Biotechenology, Almaty, Kazakhstan
  Pollution of environment by obsolete pesticides and phytoremediation contaminated soil in Kazakhstan

SpS 11 Contamination and Remediation of Agricultural Soils in East Asia; Effects on Human Health and Ecosystems

Friday, 24 September, 11.00 – 12.30 hrs. hall Mozart 3
Chairmen: Luo Yongming, Jan Japenga

The use of (industrial) waste water for irrigation and the vicinity of polluting industries and mining areas are important sources of contamination of agricultural land in East Asia. Contaminants can be taken up by crops and then can cause severe effects on humans and ecosystems. The Itai-Itai disease in the 1960s in Toyama, Japan is an early example of such severe effects on humans. Effects on ecosystems and accumulation in livestock and food-chains have been observed as well.
As East Asian countries are densely populated and need their fertile land for food crop production, setting aside fertile but contaminated land generally is no option. Soil remediation is a too costly affair as contaminated agricultural land occupies extended areas. Effects on humans and ecosystems (without full-blown soil remediation) can however be reduced to acceptable levels by different approaches, which include the use of:

- soil amendments to reduce the contaminant uptake by the crops,
- the selection of alternative crops, including other varieties of the same crop species, and
- phytoremediation and microbial remediation.

Due to the Itai-Itai incident, contamination of agricultural land has become a hot issue in Japan already more than 30 years ago and continues to be so. It led to (proposed) policies to reduce the effects on human health and ecosystems. In some other East-Asian countries extensive research and monitoring efforts have taken place and are now leading to the definition of measures at the policy level as well. In recent years more intensive contacts between the countries have been established on this issue, both at the level of applied research and at the policy level.
This special session focuses on

- national/regional policies in East Asia, regarding contamination of agricultural soils in relation to effects on human health and ecosystem functioning,
- mitigation/remediation approaches and
- research progress.

Presentations are given by invited speakers from different East Asian countries to give a clear overview to the ConSoil audience regarding the different mitigation and bioremediation approaches to metals, organics and/or petroleum contaminated farmland soils. Speakers will focus on both policy and technical aspects and relevant scientific research results will be presented as well. The audience will be given the possibility to discuss the issue with the speakers.

US EPA sessions

USEPA will provide five training sessions on current best practices in areas experiencing significant advances.

1. Investigation Process Optimization
2. Green Remediation Footprint Reduction
3. Design Optimization Through Independent Design Review
4. U.S. Information Resources
5. Remedy Optimization Through Remedial System Evaluation

Courses will be taught by subject matter experts from EPA and supporting organizations. POC Carlos Pachon (pachon.carlos@epa.gov)

EPA Session 1: Investigation Process Optimization

Presenters: Dan Powell (US EPA) and Jody Edwards (Tetra Tech)

Thursday, 23 September, 11.00 – 12.30 hrs. hall Trakl

Environmental optimization best management practices (BMPs) encompass strategies, tools, and technologies that can be used at every phase of site cleanup from initial planning to site closure. These BMPs can reduce cost, schedule, and uncertainty by improving the effectiveness and efficiency of remedial strategies and monitoring activities that comprise environmental site cleanup.

The investigation phase of an environmental cleanup project is subject to significant uncertainties and other influences that can effect the successful execution and results of the project. The U.S. EPA has developed an Investigation Process Optimization (IPO) methodology to ensure investigation projects are designed and performed effectively to ensure successful remedial decisions and outcomes, regardless of the regulatory program driving the execution of the project.

IPO is comprised of a series of integrated BMPs used to optimize the investigation process, including five key BMPs: Independent Project Review (IPR), conceptual site models (CSM), systematic project planning (SPP), dynamic work strategies (DWS), and real-time measurement technologies. IPO draws on science and technology advancements and practitioner experience to develop strategies for making investigations more scientifically-defensible, resource-effective, adaptive to changing project needs, and responsive to stakeholder concerns. Applied to new or active projects, IPO can be used to significantly reduce data collection costs, expedite project schedules, enhance stakeholder communication, and improve project and site decision quality.

An IPR involves a team of expert scientists and engineers, independent of the project, who conduct a third-party evaluation of an investigation project. It is an in-depth evaluation that considers site understanding, project planning and design, uncertainty management, technology use, decision-making goals, metrics and methods and other factors that comprise the myriad actions that must be completed effectively to ensure project success. The IPR ensures that project integrity is maintained to ensure protectiveness, cost-effectiveness and maximizing the use of data to make robust project and site decisions.

Projects are framed in the context of a CSM life cycle which is linked to the major stages of environmental cleanup with expected levels of maturity defined to support specific project decision needs. Well-constructed CSMs used in the context of robust SPP efforts are highly-effective in driving data gap identification; exit strategies; characterization strategies; sampling plan design; data collection, analysis and management; risk assessment; remedial technology evaluation and selection; and design basis development.

DWS and real-time measurement technologies enable the use of innovative strategies and technologies to collect collaborative data sets and use of field-based decision logic to enable stakeholders to perform real-time decision-making.

Case studies will highlight the benefits of using IPO concepts at hazardous waste sites within a variety of programmatic and regulatory frameworks.

EPA Session 2: Green Remediation: Reducing the Environmental Footprint of Cleanups

Presenters: Carlos Pachon (US EPA) and Doug Sutton (GeoTrans, Inc.)

Thursday, 23 September, 14.00 – 15.30 hrs. hall Trakl

Green Remediation is the practice of considering all environmental effects of remedy implementation and incorporating options to minimize the environmental footprint of cleanup actions. The U.S. EPA advocates applying five core elements for environmental footprint assessments as BMPs during the cleanup process:

- Minimizing total energy use and maximizing the use of renewable energy
- Minimizing emissions of air pollutants and greenhouse gases
- Minimizing water use and impacts to water resources
- Protecting land and ecosystems
- Reducing, reusing and recycling material and waste

Green Remediation can be incorporated into all phases of a site cleanup effort. For example, during site investigation the use of innovative field analytics and direct sensing tools can reduce the environmental footprint by increasing the density of analytical data, thus limiting the total number of field mobilizations required to characterize a site. Green concepts can also be incorporated into remedy design, implementation and operations and maintenance (O&M).

Examples of Green Remediation BMPs include:

Energy Requirements
- Selecting the optimal size and type of equipment for each task to avoid unnecessary energy consumption while achieving comparable outcome.
- Using "smart grid" meters for electricity consumption monitoring and control, enabling treatment processes to operate heavily during off-peak utility periods.

Air Emissions
- Covering excavated areas with single-use biodegradable fabric to suppress dust while providing a substrate for favorable ecosystems.
- Retrofitting equipment engines with high-performance features such as multi-stage filters for cleaner exhaust.

Water Requirements and Resources
- Designing a closed-loop engineered system to maximize use of grey water during an ex situ treatment process.
- Incorporating low-impact development concepts for stormwater treatment such as substituting traditional, non-porous concrete with newer forms of pervious concrete.

Land & Ecosystems
- Using geophysical methods to identify subsurface anomalies (such as underground storage tanks and buried drums) without disturbing land.
- Conducting an inventory of ecological species, land contours, and drainage patterns prior to remedy construction to facilitate restoration to original conditions.

Material Consumption and Waste Generation
- Salvaging uncontaminated objects with potential recycle, resale, donation, or onsite infrastructure value such as steel, concrete, granite, and storage containers.
- Reusing durable goods throughout remedy construction and maintenance.

This session will discuss EPA's Principles for Greener Cleanups as well as how environmental footprints are being evaluated. The training will also cover how project managers and other stakeholders can apply the principles of green remediation to the remediation of contaminated sites, while maintaining the cleanup objectives, ensuring protectiveness of a remedy, and improving its environmental outcome. Case studies that have shown successful use of Green Remediation Practices will also be presented.

EPA Session 3: Design Optimization Through Independent Design Review

Presenters: Dan Powell (US EPA) and Doug Sutton (GeoTrans, Inc.)

Thursday, 23 September, 16.00 – 17.30 hrs. hall Trakl

Environmental optimization best management practices (BMPs) encompass strategies, tools, and technologies that can be used at every phase of site cleanup from initial planning to site closure. These BMPs can reduce cost, schedule, and uncertainty by improving the effectiveness and efficiency of remedial strategies and monitoring activities that comprise environmental site cleanup.

The remedy implementation phase of an environmental cleanup project is typically more costly and longer-lasting than the proceeding phases, and these costs are directly tied to the remedy design. As a result, U.S. EPA has developed the Independent Design Review (IDR) approach to incorporate third-party perspective during the remedy selection stage, design stage, or remedy "re-design" stage. IDRs are objective-based efforts to identify critical design flaws, leverage unexploited process efficiencies, and to reduce costs without altering remedial system performance.

An IDR involves a team of expert scientists and engineers, independent of the site, conducting a third-party evaluation of site operations. It is a broad evaluation that considers the goals of the remedy, conceptual site model (CSM), and cleanup objectives. The evaluation includes reviewing existing site documents and data, interviewing the site team, potentially visiting the site, and compiling a report that includes recommendations to improve the system. Recommendations with cost and cost savings estimates are provided to improve remedy effectiveness, remedy efficiency, and remedy duration.

The recommendations are intended to help the site team (the responsible party and the regulators) identify opportunities for improvements. In many cases, further analysis of a recommendation may be needed prior to implementation. EPA has utilized the IDR process at its own sites as well as at responsible party sites to provide a valuable additional technical perspective.

The fresh, unbiased perspective of an IDR team often results in a more efficient and effective remedy. The process and unbiased perspective also assists with building stakeholder consensus. Recommendations might suggest additional characterization to better focus source area remediation, additional characterization to refine pump and treat extraction rates, or bioremediation reagent injections, and focused pilot studies. Recommendations frequently include designing and implementing a remedy in stages so that information from the first stage can be used to inform decisions regarding later stages. This helps avoid over-design and improves the overall effectiveness of a remedy, reducing the chance of operational ineffectiveness and premature replacement.

This session will provide a primer on IDR, present case studies where IDR has been used to add value to cleanup efforts, provide an update on EPA's efforts to promote the use IDR, and provide specific examples of strategies, tools and technologies common to IDR efforts for various types of remedial programs that can be employed on projects.

EPA Session 4: U.S. Information Resources

Dan Powell (US EPA) and Carlos Pachon (US EPA)

Friday, 24 September, 11.00 – 12.30 hrs. hall Trakl

The mission of the US EPA is to safeguard the environment and protect human health. EPA primarily supports this mission through the use of traditional and innovative technologies to investigate and remediate contaminated sites. A secondary element of EPA's support is technology transfer; i.e. the dissemination of information on environmental practices to EPA personnel; local, state, tribal and international governments; private contractors; and the public. Because information distribution is fundamental to achieving EPA's goals, it is accomplished via various methods to accommodate the wide variety of information media available today.

Two key frameworks for technology transfer employed by EPA are publications and tools, and training.

- Publications and Tools – Publications include technical bulletins, fact sheets, primers, case studies, profiles and other high application materiel. Tools include various processes generally encoded in electronic format that can be used repeatedly across multiple projects to provide

answers to issues of quantity and/or decision-making. Both are available online for direct viewing or download, or ordered in hardcopy. In addition, EPA offers information via a Really Simple Syndication (RSS) feed, emailed subscription, and is currently exploring the use of social media as a mechanism for technology transfer.

- Training resources – EPA provides training information on a myriad of topics that is available from the remediation community. Training is provided in-person, via remote webcast, and through archived training viewing on the Internet.

This workshop will discuss information, technology, and training resources pertinent to the remediation community that are provided by the EPA, as well as other US agencies, and the best ways to access them. Participants will be exposed to a framework and an overview of information, tools and other resources available to assist them in all aspects of environmental cleanup. This session will provide insights on the best approaches and processes to locate information and resources that respond to practitioners' specific needs.

EPA Session 5: Remedy Optimization Through Remedial System Evaluation

Presenters: Carlos Pachon (US EPA) and Doug Sutton (GeoTrans, Inc.)

Friday, 24 September, 09.00 – 10.30 hrs. hall Trakl

Environmental optimization best management practices (BMPs) encompass strategies, tools, and technologies that can be used at every phase of site cleanup from initial planning to site closure. These BMPs can reduce cost, schedule, and uncertainty by improving the effectiveness and efficiency of remedial strategies and monitoring activities that comprise environmental site cleanup.

The remedy implementation phase of an environmental cleanup project is typically more costly and longer-lasting than the proceeding phases. Noting the excessive cost and number of sites 'stuck' in this phase, many regulatory programs and responsible government agencies, including U.S EPA, have instituted systematic processes for evaluating existing cleanup and monitoring systems with the goals of improving effectiveness and reducing and controlling overall site cleanup costs without increasing risks. The EPA has commissioned over 40 third-party Remedial System Evaluations (RSE) at Superfund, Resource Conservation and Recovery Act (RCRA), and Leaking Underground Storage Tank (UST) sites.

The RSE process involves a team of expert scientists and engineers, independent of the site, conducting a third-party evaluation of site operations. It is a broad evaluation that considers the goals of the remedy, conceptual site model (CSM), above-ground and subsurface performance, and site closure strategy. The evaluation includes reviewing existing site documents and data, visiting the site for up to 1.5 days, and compiling a report that includes recommendations to improve the system. Recommendations with cost and cost savings estimates are provided in the following four categories:

- Improvements in remedy effectiveness
- Reductions in operation and maintenance costs
- Technical improvements
- Gaining site closeout

The recommendations are intended to help the site team (the responsible party and the regulators) identify opportunities for improvements. In many cases, further analysis of a recommendation may be needed prior to implementation. As the recommendations represent the opinions of the RSE team, they do not constitute requirements for future action, but rather are provided for the consideration of all site stakeholders.

The fresh perspective of an RSE team often assists in improving the CSM, adjusting a remedy to better address existing site conditions (which may have changed during remedy operation), and either providing a defined strategy for site closure or identifying valuable next steps. Recommendations are often detailed and provide the framework for work plans and site-specific steps to improve remedy effectiveness. Removing redundant treatment processes, streamlining a monitoring program, or downsizing motors might be suggested from reducing costs. The framework of an exit strategy may be provided to assist with reaching site closure.

This session will provide a primer on RSE, present case studies where RSE has been used to add value to cleanup efforts, provide an update on EPA's efforts to promote the use RSE, and provide specific examples of strategies, tools and technologies common to RSE efforts for various types of remedial programs that can be employed on projects.