Final Program

First International Congress on
Petroleum Contaminated Soils, Sediments, and Water Analysis, Assessment and Remediation

Imperial College, London, U.K.
14-17 August, 2001
The First International Congress on
Petroleum Contaminated Soils, Sediments and Water

The Kuwait Foundation for the Advancement of Sciences

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CEFAS, UK

Mr. Robin Law
California Water Board, USA

Mr. Robin Law
Argentina

Dr. Pablo Lestard
University of Nottingham, UK
All environmental professionals working in the fields of petroleum contamination and officials of governmental and non-governmental concerned establishments are cordially invited to take part in the First International Congress on Petroleum Contamination of Soils, Sediments, and Water 2001 from 14-17 August in London, UK.

The Congress is the first such event to focus world attention on the environmental consequences resulting from petroleum contamination of soils, sediments, and water. The Congress will be the first comprehensive assessment of the status of analytical methodologies, assessment approaches, and remediation technologies for petroleum contamination in the International arena. With an estimated 800 visitors from 50 different countries. The Congress will provide the International community with a unified focal point to discuss and debate the multi-disciplinary issues and develop necessary solutions for those who are concerned with petroleum contamination.

The Congress will be the forum that defines new trends, stimulates new developments and fosters cooperation amongst scientists and non-scientists; theoreticians and practitioners; and the public and private sectors. The breadth and depth of knowledge presented in the Congress will provide a stage for environmental regulators and policy makers, environmental engineers and consultants, petroleum industry researchers, scientists, academicians, and environmental organizations.

We look forward to welcoming you to the First International Congress on Petroleum Contaminated Soils, Sediments, and Water in London.

Dr. Ali A. Al-Shamlan
Director General
The Kuwait Foundation for the Advancement of Sciences

William M. Bulger
President
University of Massachusetts

Paul Kostecki, Ph.D.
Executive Director
Association for the Environmental Health and Sciences
### Congress at a Glance

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<td></td>
<td>9:00am - 9:45am</td>
<td>Speaker: Dr. Adel Al-Sabeeh, Minister of Oil, Kuwait.</td>
<td>Mechanical Engineering Lecture Theatre 220</td>
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<td>10:00am - 1:00pm</td>
<td>Environmental Forensics</td>
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<td>11:00am - 11:30am</td>
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<td>1:00pm - 2:30pm</td>
<td>Lunch</td>
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<td></td>
<td><strong>LUNCHEON SPEAKER</strong></td>
<td>Dr. Farouk El-Baz, Boston University</td>
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<td>9:00am - 9:45am</td>
<td>Speaker: Mr. Abdullatif Al-Torah, Kuwait Oil Company</td>
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<td><strong>Thursday August 16</strong></td>
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<td><strong>LUNCHEON SPEAKER</strong></td>
<td>William Platt III, Shell Oil Company</td>
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Speaker Room Available .......... Mechanical Engineering Room 703
Meditation Room Available .... Mechanical Engineering Room 309
Congress Office ................. Mechanical Engineering Room 470
**Workshops**

**TIME:** 9:00AM-12:00 NOON
**Mechanical Engineering Lecture Theatre 220**

**TITLE:** **WORKSHOP 1**

**Use of Modeling and Computer Visualization for The Remediation and Cost Allocation of Hydrocarbon Contaminated Soils and Groundwater**

**PRESENTER:**
Ashok Katyal, Ph.D.,
*Resources & Systems International, USA*

**DESCRIPTION:**
Remediation costs for petroleum impacted soils and groundwater can be significant. Computer models provide one tool in understanding and simulating the behavior of petroleum hydrocarbons in complex hydrogeological settings as well as simulating the applicability of various remediation strategies. Computer models are also used in the United States as a basis to allocate responsibility for the subsurface remediation. Software and examples used for these purposes include finite element models such as BIOSLURP MARS, MOVER, BIOF&T 3D, MOFAT, AND MODFLOW. Examples where these models are used to investigate the feasibility of remediation approaches, such as dual phase recovery (water, light, non-aqueous phase liquids (LNAPL)), vacuum enhanced recovery (LNAAPL), soil vacuum extraction and air sparging (3D) and pump and treat techniques of groundwater is present. The application of models for cost allocation between multiple parties is presented along with examples. Potential challenges to models and visualizations is presented in the context of their use in environmental litigation, especially for age dating and source identification.

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**TIME:** 9:00AM-12:00 NOON
**Mechanical Engineering Lecture Theatre 342**

**TITLE:** **WORKSHOP 2**

**Introduction to Environmental Forensics**

**PRESENTER:**
Robert Morrison, Ph.D.,
*R. Morrison & Associates, USA*

R. Paul Philp, Ph.D,
*University of Oklahoma, USA*

Glenn Johnson, Ph.D,
*University of Utah, USA*

James Ebert, Ph.D,
'Ebert & Associates, Inc, USA'*

**DESCRIPTION:**
This workshop introduces the attendee to the scientific tools available to identify the source(s), date and distribution of a contaminant in the subsurface. Examples of the methods available for these purposes include aerial photo acquisition and interpretation, isotope characterization, chlorinated solvent and petroleum hydrocarbon pattern recognition, historical use patterns of chemicals, forensic archaeology, contaminant transport/inverse modeling and the use of geographic information systems (GIS) for compiling and evaluating forensic evidence. Case studies illustrating the use of these techniques in addition to the three-dimensional visualization of this information are presented. Information regarding the critical review of forensic information and sources of data bias are shared along with case studies.

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**TIME:** 9:00AM-12:00 NOON
**Sherfield Read Lecture Theatre**

**TITLE:** **WORKSHOP 3**

**Assessing and Restoring Damaged Sediment Environments**

**PRESENTERS:**
David Ludwig and Tim Iannuzzi, Ph.D.
*BBL Sciences, USA*

**DESCRIPTION:**
Aquatic sediment environments are among the most productive and important ecosystems on earth. They are the foundation of many freshwater estuarine and marine food webs, and are vital to the healthy functioning of the biosphere. Yet sediments, because they are “down-gradient” of nearly all sources of impact, are also degraded on a global scale. Runoff, dredging, shipping, fishing activities, impact sediments and chemical pollution from both point and nonpoint sources. It is critical to develop the tools that accurately assess the nature and extent of damage to sediments and restore these systems to health and offset the impacts. Such tools are only now being made available by the scientific community and applied by environmental managers. This workshop will provide an update on the state-of-the-science in the new and exciting field of sediment restoration. Participants will receive a thorough grounding in the methodologies being applied around the world to quantify damage to sediment ecosystems. Restoration and offset techniques will be presented, both in methods discussion and through case histories and experience.
## Workshops

**TIME:** 9:00AM-12:00 NOON
**Mechanical Engineering Lecture Theatre 542**

**TITLE:** WORKSHOP 4
**TPH Risk Assessment**

**PRESENTER:**
Paul Nathanail, Ph.D.,
*University of Nottingham, UK*

**DESCRIPTION:**
This workshop will consider risk-based approaches to the analysis and characteristics of petroleum hydrocarbons. Specifically it will explore the limitations of the TPH parameter, highlight the findings of the TPH Working Party and present a risk-based derivation of the equivalent carbon numbers approach.

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**TIME:** 2:00PM-5:00PM
**Mechanical Engineering Room 310**

**TITLE:** WORKSHOP 5
**Use of VPH/EPH/APH² Data to Characterize Risks to Human Health and the Environment from Petroleum Exposures**

**PRESENTER:**
Peter Woodman, Ph.D.,
*Risk Management Incorporated, USA*

**DESCRIPTION:**
This workshop will build on MADEP³ guidance and the use of VPH/EPH/APH analytical data for soil, groundwater and air, to provide attendees with a practical approach to evaluating the potential risks to human health, public welfare, and the environment from exposures to petroleum releases. Topics to be covered include: chemistry of petroleum fractions and target VOCs⁴ and PAHs⁵; toxicology, fate and transport considerations; VPH/EPH/APH analytical methods; field sampling strategies; data validation; development of exposure point concentrations including use of vapor and dissolved-phase transport models; background screening for PAHs; use of general screening (MCP⁶ Method 1) and site-specific screening (MCP Method 2) risk characterizations to evaluate risk of harm to human health, public welfare and screening against applicable standards and/or criteria for the environment and public health (MCP Method 3). The workshop will use case studies to demonstrate the application of the risk characterization methods, and how the approaches can be applied to other regional, national, or international jurisdictions, to develop risk-based solutions for the clean up of petroleum releases in the environment.

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**TIME:** 2:00PM-5:00PM
**Sherfield Read Lecture Theatre**

**TITLE:** WORKSHOP 6
**MTBE Remediation**

**PRESENTERS:**
Richard Sloan Ph.D.,
*Lyondell Chemical, USA*
Ellen Moyer Ph.D.,
*ENSR, USA*
Richard Woodward Ph.D.,
*Sierra Environmental Services, USA*

**DESCRIPTION:**
This workshop will review physical, chemical, and biodegradation characteristics of methyl tert butyl ether (MTBE). Consideration of these characteristics leading to the optimization of remedial technologies employed at service stations will be evaluated and illustrated through several case studies. Optimal remediation strategies take advantage of the characteristics of MTBE and other gasoline components and often consist of a sequence of actions starting with source control and receptor protection, followed by remediation of residual and dissolved contamination, and ending with natural attenuation. Both current and emerging remediation technologies will be discussed, as will the effective management of the process of assessment, design, construction, and operation.

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**TIME:** 2:00PM-5:00PM
**Tuesday 14th August 2001**

**TITLE:** WORKSHOP 7
**Phytoremediation as an Emerging Technology**

**PRESENTER:**
Lee Newman, Ph.D.,
*University of South Carolina, USA*
Alan Baker,
*University of Melbourne, Australia*

**DESCRIPTION:**
Phytoremediation is an emerging technology that has received a considerable amount of attention. This technology has appeal for responsible parties as a low cost alternative to traditional treatment schemes, and has a high level of public acceptance. However, for the technology to continue to grow, it needs to move from research into implementation. One of the major problems that phytoremediation has in its application are consultants trying to perform the technology without...
**Workshops**

**Tuesday 14th August 2001**

**Workshop 8**

**The Role of Modeling in Natural Resource Damage Assessment for Oil Spills**

**Presenter:** Deborah French McCay Ph.D.

**Description:**
In order to assess impacts and damages caused by an oil spill into an aquatic environment, the oil fates and biological effects need to be mapped and described quantitatively. In order to quantify impacts from field observations, comprehensive sampling of oil chemistry and each of the species affected is needed in both exposed and unaffected areas. Such extensive sampling is not always feasible, given the rapidity at which hydrocarbons disperse and the evidence of impact disappears (by scavenging of killed organisms and by migration of animals into the impacted area). What is feasible and cost effective is to estimate injury to these organisms using existing knowledge of the fates of oils and their toxicity in the form of computer modeling, in conjunction with field data, in assessing impacts.

**Time:** 2:00PM-5:00PM
Mechanical Engineering Lecture Theatre 542

**Title:** Workshop 9

**Environmental Fate of Hydrocarbons in Soils and Groundwater**

**Presenter:** James Dragun Ph.D.
The Dragun Corporation, USA

**Description:**
This workshop covers predicting bulk hydrocarbons migration, the extent of adsorption of organic chemicals, chemical volatility in soil, organic chemical reaction rates, and rates of organic chemicals in soils. The information presented is within the context of site remediation, site disposal facilities, and analyzing chemical releases as auditing closures of industrial facilities. James Dragun’s book, Soil Chemistry of Hazardous Material, 2nd edition, will be provided to registered participants.

**Time:** 2:00PM-5:00PM
Mechanical Engineering Room 311

**Opening Ceremony**

**Introduction:**
Dr. Paul Kostecki
Association for the Environmental Health and Sciences

**Addresses:**
Dr. Ali A. Al-Shamlan
The Kuwait Foundation for the Advancement of Sciences

President William Bulger
University of Massachusetts

Mr. Fritz Balkau
United Nations Environmental Program

**Opening:**
Sir Eldon Griffiths
National Chairman
World Affairs Councils of America

Followed by a banquet to be held at the Great Hall, Imperial College Tuesday August 14, 2001 7:00 pm - 11 pm

**Keynote Speakers**

Wednesday 15th August, 9-9:45 am
Dr. Adel Al-Sabeeh
Minister of Oil, Kuwait

Thursday 16th August, 9-9:45 am
Mr. Abdullatif Al-Tourah
Kuwait Oil Company, Kuwait

Friday 17th August, 9-9:45 am
Dr. Raymond Loehr
University of Texas, USA
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<tr>
<td><strong>Moderator:</strong> Dr. Robert Morrison</td>
<td><strong>Moderator:</strong> Dr. Ellen Moyer, ENSR, USA</td>
<td><strong>Moderator:</strong> Virginia King, CH2M HILL, Inc., USA</td>
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<tr>
<td>R. Morrison &amp; Associates, USA</td>
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**Contemporary Chemical Forensics for Identification and Apportionment of Polycyclic Aromatic Hydrocarbon (PAH) Sources in Soils and Sediments: Exxon Valdez and Other Case Studies**
Paul Boehm
Battelle
USA

**Applications of Natural Radiocarbon for Investigating the Source and Fate of Hydrocarbons**
Chris Reddy
Woods Hole
Oceanographic Institution
USA

**Fingerprinting of Fuels in Environmental Analysis**
Ileana Rhodes
Equilon Enterprises
USA

**GC/MS Fingerprinting as a Forensics Toolkit for the Identification of Marine Oil Spills**
Asger Hansen
National Environmental Research Institute
Denmark

**Hydrogeologic Analysis, Transport and Modeling for Environmental Litigation: A Case Study**
Daniel Stephens
Daniel B. Stephens & Associates, Inc.
USA

**The Effect of Warm Equatorial Groundwater on the Degradation of Dissolved Phase Hydrocarbon Concentrations**
Gary Meyers
Texaco Worldwide
USA

**Soil Washing Treatability Study for Remediation of a Soil Contaminated by High Molecular Weight Polycyclic Aromatic Hydrocarbons**
Sabrina Saponaro
Milan Polytechnic
Italy

**Multi-Phase Remediation of a 4,000,000 Litre Diesel Fuel Plume in an Unconfined Sand Aquifer**
John Lammey
Serco Environmental Services
Canada

**Quality and Measurements in Remediation of Hydrocarbon Contaminated Sites: An Italian Case**
Sabrina Saponaro
Milan Polytechnic
Italy

**Remediation of Oil Contaminated Sludge’s and Soil in Kuwait**
Nader Al-Awadhi
KISR, Kuwait

**Applications of Bioslurping for Remediation of Diesel Contamination at an Active Depot Site**
James Wragg
URS Dames & Moore
England

**Remediation of Petroleum Hydrocarbon - Affected Soil by On-Site Blending**
Rodney Crother
LFR Levine Fricke
USA

**A New Colorimetric Method for Assessing Petroleum Hydrocarbon Contamination of Soil and Water in the Field**
Gordon Lethbridge
Shell Global Solutions
England

**Oil Characterization - An Analytical Tool for Risk Assessment, Biodegradability Prediction, and Remediation Technology Selection**
Gerben Van der Sterren
Government
The Netherlands

**Development and Implementation of a Headspace CG-FID Field Screening Method for the Determination of C6 to C14 Hydrocarbons in Jet Fuel Contaminated Soils at a Decommissioned Air Base.**
Aine O’Brien
University of Greenwich
England

**Implementing New Mandatory TPH Analytical Protocols Associated with Risk Based Cleanup Levels: The Massachusetts Experience**
Eric Butler
Gradient Corporation
USA

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**Luncheon Presentation**
1:00pm - 2:30pm Main Dining Hall

**Dr. Farouk El-Baz’s**
"Environmental Impact of the Gulf War on the Desert Surface of Kuwait"
### Data Visualization
**Wednesday 2:30pm - 4:00pm**
MELT 542
**Moderator:** Fusao Tomito, Hokudai University, Japan

**Landslide Thematic Mapper**
Multitemporal Data Analysis of Oil Lakes and Oil Contaminated Soils in the Burgan Oil Field, Kuwait
- Andy Kwarteng
- KISR
- Kuwait

**Innovative Environmental Risk Management Tools: Relational Databases & GIS for Strategic Management of Environmental Issues**
- Marjorie Hong
- Shell Global Solutions
- England

**Investigation of Near Well Soil Disposals by GIS and RS Methods using Air photos and Field Spectroradiometer**
- Mucsi Laszlo, Ph.D.
- University of Szeged
- Hungary

### Petroleum Production Processes
**Wednesday 4:30pm - 6:30pm**
**Moderator:** Fusao Tomito, Hokudai University, Japan

**Engineered Covers for Mud Pit Closures for Amchitka Island, Alaska and Central Nevada Test Area, Nevada**
- Monica Sanchez
- US Department of Energy
- USA

**Effluent Water Handling in SEK - Solutions**
- Kuwait Oil Company
- Kuwait

**Adsorption Process for Removal of Mercury from Crude Oil**
- Travalloni-Louvisse
- Petrobras Research Center
- Brazil

**Mitigation of Negative Environmental Impact of Semicoke**
- R. Kuusik
- Tallinn University
- Estonia

### Management of Fuel Oxygenates in Soil and Groundwater
**Wednesday 2:30pm - 7:00pm**
MELT 220
**Moderator:** Richard Sloan
- Lyondell Chemical, USA

**Performing Site Assessment at Petroleum Contaminated Sites: Protocols and QA/QC Issues**
- Richard Woodward
- Sierra Environmental Services
- USA

**The Fate and Transport of Oxygenates and Other Petroleum Constituents, and their Influence on Appropriate Remediation Management**
- Michael Day
- Applied Hydrology Associates
- USA

**Remediation Criteria and Risk Assessment Applied to Oxygenated Fuel Sites**
- James Thomson
- Applied Hydrology Associates
- USA

**Defining and Controlling Sources of Petroleum Contamination as a Component of Timely and Cost-Effective Remediation Management**
- Richard Sloan
- Lyondell Chemical Company
- USA

**Technology Sequencing and Remediation Management at Petroleum Contaminated Sites**
- Richard Sloan
- Lyondell Chemical Company
- USA

**Monitored Natural Attenuation and Long Term Site Management at Oxygenated Fuel Sites**
- James Thomson
- Applied Hydrology Associates
- USA

### Remediation 2
**Wednesday 2:30pm - 6:30pm**
MELT 342
**Moderator:** Richard Wenning
- The Weinberg Group, USA

**The Use of Low Temperature Conversion to Treat Contaminated Solid Residues from the Petroleum Industry**
- A.C. Pickler
- Petrobras Research Center
- Brazil

**Framework for Assessing Remediation Alternatives for Petroleum Contaminated Sediments**
- Raymond Loehr
- University of Texas
- USA

**Remedial Options Evaluation for Clean-Up of an Oil Spill in Clayquot Sound Forest, British Columbia**
- Tim Whalen
- Golder Associates
- Canada

**Plasma Treatment of Petroleum Contaminated Soil and Petrochemical Sludge’s**
- R.N. Szente
- University of Sao Paulo
- Brazil

**The Use of Mn (IV) as Alternative Electron Acceptor for Aromatic Compounds Degradation**
- Laura Puig-Grajales
- Instituto Mexicano del Petroleo
- Mexico

**Cost-Effective Adsorbents for Removal of Crude Oil and Hydrocarbons from Polluted Waters**
- B. Koumanova
- University of Chemical Technology and Metallurgy
- Bulgaria
Advanced Oxidative Processes for Treatment of Petroleum Compounds and Recalcitrant Hydrocarbons
Thursday 10:00am - 1:00pm
MELT 342
Moderator: William Kerfoot
K-V Associates, USA

Achieving Groundwater Remediation and Closure Through In-Situ Oxidation
Bruce Ehleringer
Washington Group International, Inc
USA

Remediation of a Petroleum Impacted Site Using In-Situ Ozonation
Julie Hoffman
TriMedia Consultants
USA

Chlorinated Solvent Remediation by Ozone Sparging in the UK
Jonathan Owens
Knight Environmental
UK

Cleanup of a Former Gasoline Station
A. Fijma
Mateboer Milieutechniek
The Netherlands

Thin Layer Criegee-Like Oxidation for Removal of PAH's and PCB's in Sediments
William Kerfoot
K-V Associates
USA

Criegee Oxidation Supersparging for Chlorinated HVOC Removal
William Kerfoot
K-V Associates
USA

Bioremediation 1
Thursday 10:00am - 1:00pm
MELT 220
Moderator: Dr. Raymond Loehr
University of Texas, USA

Development and Demonstration of Subsurface Biobarriers Using Starved Bacterial Cultures
Robert Sharp
Manhattan College
USA

Bioremediation of Crude Oil Contaminated Soil Using Slurry-Phase Biological Treatment and Land Farming Techniques
Maria Kuyukina
Russian Academy of Sciences
Russia

Enhanced Microbial Degradation of Hydrocarbons in Oil Contaminated Soil
Zainab Baroon
KISR
Kuwait

Microorganisms for Bioremediation of Oil Contaminated Sites
Alexander Boronin
Russian Academy of Sciences
Russia

Co-disposal of Activated Sewage Sludge and a Contaminated Harbour Sediment Using Complex Microorganism-Microorganism Interactions
D.J. Van Wyk.
University of Natal
South Africa

Extracellular Metabolites of Hydrocarbon Oxidizing Bacteria as a Growth Substrate for Bacterial Sulphate Reduction
T.V. Koronelli
Moscow State University
Russia

Environmental Fate and Modeling
Thursday 10:00am - 1:00pm
MELT 542
Moderator: Dr. James Dragun
Dragun Corporation, USA

Age Dating Diesel Fuel Spills: Using the European Empirical Time-Based Model in the USA
Michael Wade
Wade Research Inc
USA

Fate of Chemicals in Produced Water from North Sea Oil Platforms Sorption Characteristics
E.D. Stutt
University of Plymouth
England

The Fate of Hydrocarbon-Impacted Groundwater Discharging to a River Environment
Sean Westbrook
University of Western Australia
Australia

The Fate of the Oil Residues in Patagonian Soils A Physical Chemistry Approach
N.S. Nudelman
University of Buenos Aires
Argentina

Pore-Scale Modeling of Flowing Volatile Petroleum Components in Porous Media
Steven McDougall
Heriot-Watt University
Scotland

Modeling the Impacts of Oil Spills: Validation and the North Cape Case Study
Deborah French McCay
Applied Science Associates, Inc
USA

Luncheon Presentation
1:00pm - 2:30pm Main Dining Hall
William Platt III
"The Globalization of Environmental Law"
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<tr>
<td>Thursday</td>
<td>Environmental Impact 1</td>
<td>Sherfield Read Lecture Hall</td>
<td>Dr. Manaf Behbehani</td>
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<tr>
<td>10:00am-1:00pm</td>
<td>Discharges of Ba, Ra226, Ra 228, V, Ni, and Pb by Produced Water from the Bacia de Campos Oil Field Offshore Programs</td>
<td>Kuwait University, Kuwait</td>
<td>Sergio Vegueria</td>
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<td>University of Rio de Janeiro, Brazil</td>
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<td>Lessons Learned from a High Altitude Desert Oil Spill</td>
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<td>E.H. Owens Polaris Applied Sciences USA</td>
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<td>Petroleum in Soils of Urengoy Tundra</td>
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<td>Marina Opekunov St. Petersburg State University Russia</td>
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<td>Long-term Impacts of Oil and Brine Spills on Soil Ecosystem in a Pristine Environment</td>
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<td>Kerry Sublette University of Tulsa USA</td>
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<td>Residual Hydrocarbon Contamination in Sandy Soils</td>
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<td>Mohammad Al-Suwaiyan King Fahd University of Petroleum and Minerals Saudi Arabia</td>
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<td>Toxicity of Petroleum Hydrocarbons to Soil Organisms: Interactions of Petroleum Carbon-Fractions</td>
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<td>J.H. McCann University of Waterloo Canada</td>
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<td>2:30pm-7:00pm</td>
<td>Bioremediation 2</td>
<td>MELT 220</td>
<td>Mr. Steve McHugh Texaco, UK</td>
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<td>Potential for Enhancement of In Situ Bioremediation of Petroleum Contaminated Soils by Electrochemical Method</td>
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<td>Akram Alshawabkeh Northeastern University USA</td>
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<td>Application of the Concept of Soil Immobilization to the Biological Treatment of Diesel-Contaminated Groundwater</td>
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<td>D. Karamanev University of Western Ontario Canada</td>
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<td>Degradation of Diesel Oil by Biosurfactant Producing Bacterial Strains</td>
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<td>Lucia Durrant Campinas State University Brazil</td>
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<td>Isolation, Identification and In Vitro Degradability of Some Natural Microflora on Petroleum Hydrocarbons and Detergents</td>
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<td>S. Sudhakaran K.S.R. College India</td>
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<td>Thermally Enhanced Bioremediation of Petroleum Contaminations in Cold Soils</td>
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<td>Stephan Huettmann Groth &amp; Co Germany</td>
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<td>Bioremediation of Soil Contaminated with Petroleum Hydrocarbons</td>
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<td>Morteza Sohrabi Amirkabir University of Technology Iran</td>
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<td>Bioremediation of a Petroleum Contaminated Site in Southern Poland: Phase 1 - Site Characterization and Risk Assessment</td>
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<td>Chris Teaf Florida State University USA</td>
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<td>Thursday 2:30pm - 6:30pm</td>
<td>MELT 342</td>
<td>Environmental Impact 2</td>
<td>Jose Marcus Godoy, National Commission of Energy, Brazil</td>
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<td>Speis Variety Change of Microorganisms as Compensatory Mechanism of Oil Polluted Soil</td>
<td>N.A. Kireeva, Bashkir State University, Russia</td>
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<td>Oil Trenches: A Continuing Threat to the Terrestrial Environment of Kuwait</td>
<td>Raafat Misak, KISR, Kuwait</td>
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<td>Influencing of Prospecting and Crude Oil Production on Geoeological Parameters of the Upper Field of Zones of Permafrost</td>
<td>Elena Stanis, Russian Peoples' Friendship University, Russia</td>
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<td>Ecological Impact of War on the Arid Environment of Kuwait and Land Rehabilitation</td>
<td>Samira Omar, KISR, Kuwait</td>
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<td>Continued Treatment of Oily Sludge at Colombian Refineries ECOPEPETROL</td>
<td>Victor Echeverria, Istituto Colombiano del Petroleo, Colombia</td>
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<td>Oil Effect Concentrations in Marine Sediment for Luminescent Bacteria, Mud Shrimps and Heart Urchins</td>
<td>Jos Brils, Government, The Netherlands</td>
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<td>Environmental Monitoring - A Review of 20 Years with Sediment Monitoring at the Norwegian Sector</td>
<td>Tor Jensen, Environmental Advisory Services, Norway</td>
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<td>Toxicological Characterization of Marine Sediments Receiving Industrial Effluents</td>
<td>M.U. Beg, KISR, Kuwait</td>
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<td>Thursday 5:30pm - 7:00pm</td>
<td>Sherfield Lecture Hall</td>
<td>RBCA Risk Based Corrective Action of Hydrocarbon Contamination at a Major Urban Petroleum Storage Site</td>
<td>Jason Clay, URS Dames &amp; Moore, England</td>
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<td>An Application of Data Quality Objectives and Risk Based Cleanup at a Gasoline Pipeline Release Site</td>
<td>Kiran Srinivasan, Entrix, Inc, USA</td>
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<td>Applying RBCA Outside America-The Atlantic Canadian Experience</td>
<td>Cameron Ells, Cameron Consulting, Canada</td>
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<td>Comparison of European and USA RBCA Health Risk Assessment Results for a UK Oil Refinery Site</td>
<td>Richard Welsh, URS Corporation, England</td>
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## Human Risk Assessment
**Friday 10:00am - 11:00am**
**MELT 220**  
**Moderator:** Sami Al-Yakoob  
*Petroleum Services Co, Kuwait*

- **Human Health Risk Evaluations of Complex Petroleum Hydrocarbon Mixtures-North American Experiences with Hydrocarbon Number Ranges**  
  Michael Hutcheson  
  *Government, USA*

- **Impact of Aging in Soil on the Dermal Bioavailability of Toluene**  
  M. Abdel-Rahman  
  *New Jersey Medical School, USA*

## MTBE
**Friday 10:00am - 1:00pm**
**MELT 342**  
**Moderator:** Dr. Chris Collins  
*Imperial College, UK*

- **Aerobic Cometabolism of MTBE by Mycobacterium vaccae and Graphium sp. Grown on Aliphatic Hydrocarbons**  
  Adriana Martinez-Prado  
  *Oregon State University, USA*

- **Intrinsic Aerobic Biodegradation of MTBE in Gasoline-Contaminated Aquifer Sediments**  
  Mark Widdowson  
  *Virginia Polytechnic Institute, USA*

## Site Assessment
**Friday 10:00am - 12:30pm**
**MELT 542**  
**Moderator:** William Kucharski  
*Ecology and the Environment, Inc. USA*

- **Development of Fiber-Optic Probing System Capable of Direct Measurement of Oil Pollution in Soil**  
  A.M. Qabazard  
  *KISR, Kuwait*

- **Direct Push Sensors for In Situ Measurements of Petroleum Hydrocarbon Contaminants in Soils**  
  Stephen Lieberman  
  *Space and Naval Warfare Systems Center, USA*

- **An Innovative Technology for Characterizing Petroleum Contaminated Sites**  
  Pradeep Kurup  
  *University of Massachusetts, USA*

- **A Classification of Polluted Soils in Kuwait Based on Laser Induced Fluorescence and Diffuse Reflectance Measurements**  
  M. Al-Rashidi  
  *KISR, Kuwait*

- **Soils Screening for Contaminations with a Mobile Electronic Nose**  
  W. Andlauer  
  *Institut fur Instrumentelle Analytik, Germany*
Platform Sessions

**Afternoon Sessions**

**Marine Spills**
Friday 2:30pm - 4:00pm  
MELT 342  
**Moderator:** Admiral Michael Stacey  
marine Pollution Consultancies, UK

- **Automated Oil Spill Detection System**  
  John Andrews  
  Space and Naval Warfare Systems  
  USA

- **Global Oil Pollution-The Maritime Perspective**  
  Michael Stacey  
  Marine Pollution Consultancies  
  England

- **Pattern Recognition Based Software For Oil Spills Identification by Gas Chromatography and IR Spectrophotometry**  
  Dumitru Staniloae  
  Waste Water Treatment Institute  
  Romania

**Ecological Risk Assessment**
Friday 2:30pm - 5:30 pm  
MELT 542  
**Moderator:** Dr. Nader Al-Awadhi  
KISR, Kuwait

- **Assessment of the Toxicity of Hydrocarbon to Terrestrial Organisms**  
  G.F. Whale  
  Shell Research Ltd  
  England

- **Ecological and Human Health Risk Assessment for Petroleum Contaminated Sediments Adjacent to Oil Pipe-Line Terminals**  
  William Gala  
  Chevron Research & Technology Company  
  USA

- **Toxic Equivalency Factors for PAH and Their Applicability in Shellfish Pollution Monitoring Studies**  
  Robin Law  
  CEFAS  
  England

- **Ecological Risk Screening Criteria for Petroleum Contaminated Sites**  
  Michael Swindoll  
  ExxonMobil Biomedical Sciences  
  USA

- **Case Study of a Remediation Project Using Risk Assessment Techniques and a Novel Remediation Technology**  
  Peter Zimmerman  
  BP Canada Energy Company  
  Canada

**Phytoremediation**
Friday 2:30pm - 6:00pm  
MELT 220  
**Moderator:** Dr. Alan Baker  
University of Melbourne, Australia  
Dr. Guy Lanza  
University of Massachusetts, USA

- **Microbial Diversity Associated with Roots of Plants Growing in Petroleum Contaminated Soils**  
  J.J. Germida  
  University of Saskatchewan  
  Canada

- **Biochemical, Toxicological and Bacterial Aspects of the Removal of Phenanthrene by Hydroponic Cultures of Alfalfa (Medicago Sativa L.)**  
  C.G. Flocco  
  University of Buenos Aires  
  Argentina

- **Soil Biotic Processes on Hydrocarbon Contaminated Sites and Model Trials for Phytoremediation by use of Different Plant Species**  
  S. Tischer  
  Institute of Soil Science and Plant Nutrition  
  Germany

- **Phytoremediation of Hydrocarbon Contaminated Soil Using Plants Adapted to Cold Climates**  
  R. Farrell  
  University of Saskatchewan  
  Canada

- **Growth and Physiological Status of Ornamental Plants in Bioremediated Oil Contaminated Soils**  
  Hani Al-Zalzalah  
  Kuwait Institute For Scientific Research  
  Kuwait

**Natural Attenuation**
Friday 4:30pm - 6:30pm  
MELT 342  
**Moderator:** Gianniantonio Petruzzelli  
Institute of Soil Chemistry, Italy

- **Role of Evaporation in Degrading “Oil Lakes” of Kuwait**  
  Ahmad Bu Farsan  
  Public Authority for Applied Education and Training  
  Kuwait

- **Relationship Between NAPL Mass and Remediation Time Using Monitored Natural Attenuation**  
  Mark Widdowson  
  Virginia Polytechnic  
  USA

- **Natural Attenuation of Petroleum Products in Extreme Environments**  
  Gregory Douglas  
  Arthur D. Little Inc.  
  USA
**Environmental Impact**

Benthic Meiofauna Study Around an Offshore Oil Production Platform in Southeast Brazilian Continental Shelf
Abilio Soares-Gomes, Oliveira Batista, Universidade Federal Fluminense, Brazil; Irene Gabardo, Petrobras, Brazil; Silva Carreira, University of Rio de Janeiro, Brazil; Borges Fernandez, Federal University of Rio de Janeiro, Brazil

Ecological Monitoring Soils in River Basins Impacted by Oil Production
Oleg Merzlyakov, Tomsk State University, Russia

A Case Study of Polycyclic Aromatic Hydrocarbon Contamination Around a Former Gasworks Site
Carole Kelly, Robin Law & Kerry Baker, Centre for Environment, Fisheries and Aquaculture Science (CEFAS), UK

Classification of Polycyclic Aromatic Hydrocarbons Profiled in Caged and Native Mussels: A Chemiometric Approach
F. Valerio, A. Stella, M. Piccardo, R. Coradeghini, National Cancer Research Institute, Italy

Impact of Contaminants from Oil Shale processing on the Forest Ecosystem
Malle Mandre and Henn Parn, Forest Research Institute, Estonia

Taxonomic Sufficiency for a Monitoring Program in a Tropical Continental Shelf, Rio de Janeiro, Brazil
Cristiane Fiori and Abilio Soares-Gomes, Universidade Federal Fluminense, Brazil

Distribution of Bottom macrofauna in Vasyugan River Affected by Oil Hydrocarbons Contamination
D. Verobyov and A. Ruzanova, Tomsk State University, Russia

Petroleum Contamination of Pleistocene on the Romanian Black Sea Coast, Southeast of Constantza
V. Ungureanu, Irina Dinu, Rodica Popescu, University of Bucharest, Romania; Dan Jipa, Adrian Stanica, National Institute of Marine Geology and Geocology, Romania

Impacts of Oil Spills along the Nigerian Coast
P.C. Nwilo and O.T. Badejo, University of Lagos, Nigeria

Case Study of Petroleum Contaminated Area of Novi Sad after NATO Bombing in Yugoslavia
Bozo Dalmacija, Ivana Ivancev-Tumbas, Jasmina Zejek and Maja Djurendic, University of Novi Sad, Yugoslavia

**Well Site Inventory Surveys: Evaluation of Oil-Contaminated Soils In Onshore Oil and Gas Fields**
A.M. Mianzan, ERM, UK

**Prevention Against Fuel Leaks and Spills on Confirmed or Suspected Petroleum Releases in Belo Horizonte**
Osvaldo de Oliveira Aleixo Rodrigues, Secretaria Municipal de Meio Ambiente, Brazil

**Study Experience of Soil, Surface and Underground Water Petroleum Contamination in the Republic of Belarus**
A.M. Grechko, Central Scientific Research Institute for Complex Development of Water Resources, The Republic of Belarus

**Petroleum Contaminated Soil in Umm Al-Alish Area, Kuwait**
Ebtisam Al-Obaid, Environmental Public Authority, Kuwait

**Compensation Programs for Communities of the Bolivian Altiplano Affected by the OSSA II Spill**
Tony Henshaw, Gavin Magregor-Skinner, Apolinair Gomez, Transresdes, Santa Cruz; Vicky Copeman, ERM, UK; Elliot Taylor and Charles Getter, Polaris Applied Sciences, USA

**Role of Sorption in the Transport of petroleum Hydrocarbon Pollutants in Northern Kuwait**
M.N. Viswanathan, KISR, Kuwait

**Petroleum Contamination and Water Resource Development in Per-Urban Areas in Ghana**
Kwasi Nsiah-Gyabaah and Eric Nsiah-Gyabaah, Sunyani Polytechnic, Ghana

**Predicting the Toxicity of Petroleum Hydrocarbons Following a Spill in Central Australia**
Ann-Murree Mulhali, Rick Krasso, Peta Hunt and Colette Thomas, Sinclair Knight Merz Ectotoxicology Laboratory, Australia; Carmine Ciccióoppo and Louise Tedmanson, Sinclair Knight Merz, Australia; Steve Turnstil, Santos Ltd, Australia

**Soil Contamination with Oil Products in Cities and Impact Zones on the Territory of Belarus**
V. Khomich and T. Kukharchyk, Territory of Belarus

**Geotechnical problems of Oiled Debris**
Jose Tavares Araruna Junior, Ana Carolina Campos and Taco Mauro Pereira de Campos, Pontifical Catholic University of Rio de Janeiro, Brazil

**Background Tarball Strandings on Northeastern Pacific Beach**
Gary Mauseth, Polaris Applied Sciences, Inc. USA

**Microbiological Quality of Groundwater in Drinking Water Resources of Novi Sad after an Oil Spill Due to Bombarding of Oil Refiner.**
Olga Petrovic, Boza Dalmacija, Jelica Simeunovic, University of Novi Sad, Yugoslavia; Nada Lazic and Slavko Kulacin, Water Supply and Sewerage Company, Yugoslavia

**Hydrocarbon in Underground water samples of Araucaria Ecosystem Following a Crude Oil Spill**
Maria de Fatima Guadalupe Meniconi, Irene Terezinha Gabardo, Carlos Eduardo Ferreira da Silva, PETRO-BRAS/CENPES, Brazil; Adely Cristiane Hochsteiner Kreusch, PETROBRAS/REPAR, Brazil

**Loss Lubrication in Inland and Coastal Water Activities**
Pieter van Broekhuizen, University of Amsterdam, The Netherlands

**Human Risk Assessment**

Reference Dose for the Aromatic Fraction of Jet Fuel: Insight into Complex Mixtures
Michael Hutcheson, Massachusetts Department of Environmental Protection, USA; Sandra Baird, Menzie-Cura & Associates, Inc, USA; Suneeta Mahagoakar, Pennzoil-Quaker State Company, USA; David Mattie, Wright-Patterson AirForce Base, USA; Teresa Sterner, OpTech Corp, USA; Donna Vorhees, Menzie-Cura & Associates, Inc, USA; Wade Weisman, Elmendorf Airforce base, USA; Tsedal Zewdie, Massachusetts Department of Environmental Protection, USA

**Site Assessment**

Soil Contamination Types Identified in Al Burqan Oil Field, Kuwait
Samira Omar, KISR, Kuwait; Gerard Grealis, AACM International, Australia

Laser Induced Fluorescence and Diffuse Reflectance Measurements: An Oil Polluted Soil Survey Application in Kuwait
M.F. Quinn, O. Alemeddine, A.M. Qabazaed, M. Rashidi, KISR, Kuwait; G. Grealis, AACM International, Australia

Contaminant Source and Levels Used to Prioritize Immediate Response Actions
Evelina Vaughan, John Clement, New England Environmental Technologies, Corp, USA
Adaptive Contour sampling: A Sampling Strategy for Organic Pollutants in Soil
Enrique Chacon and Eduardo de Miguel, University of Madrid, Spain; Antonio Callaba, Spanish Geological Survey, Spain

Aquatic Bioassays for Determining the Impact of Fuels on Groundwater Quality
R. Dewhurst, P. Sheehan, C. Smith, K. Pearce, D. Walker, J.D. Mather, A. Callaghan and M. Crane, Royal Holloway, UK

Role of Springs in the Groundwater Monitoring Contamination by Petroleum and its Products
V.S. Nazarenko, O.V. Nazarenko, Rostov State University, Russia

Strategies for Determining background Indoor Air Above a Hydrocarbon Groundwater Plume in a Urban Setting
Rex C. Bryan, Geostat Systems Inc. USA

An Improved Method of Interpretation of the Electrical Resistivity Index of Underground Reservoirs
C. Tsakiroglou, C. Karahaliou, P. Kлепetasнis and M. Theodoropoulou, Foundation for Research and Technology, Greece

GIS Application for a Regional Groundwater Management Program - Emeryville, California
Lester Feldman, Geomatrix Consultants, Inc. USA

GIS Application to Groundwater Protection
Fagorala Adedoyin O, California Environmental Protection Agency, USA

Petroleum Production Processes Decontamination Technology of the radioactive Slimes Deposit
E.I. Krapivsky, O.V. Nekoutchaev, Yu Smirnov, Ukhta State Technical University, Russia; V.N. Ruzakov, Enterprise "Severgasprom", Russia

The Vacuum Thin Film Regeneration of Oil-Products
A.K. Rebrov and I.I. Gogonin, Russian Academy of Sciences, Russia

Alternative Infrared Methods for TOG/TPH Analysis in Water
Keith Golding, Quantiteck, UK

Application of ASTM Method D 5831 Using the Diesel Soil Test Kit at Fuel Contaminated Sites
John Schabron, Susan Sorini, Western Research Institute, USA; Eric Butler, Gradient Corporation, USA

How to Measure Soil Volatile Organic Compounds Accurately: From Sampling to Analysis
David Turriff, En Chem, Inc. USA

Determination of Integral Coefficient of Absorption in the Three-Component Mixture of Hydrocarbons in CCL4
V.O. Nekoutchaev, V.A. Latysheva, A.A. Latyshev. Ukhta Technical University, Russia

Laser Induced Fluorescence (LIF) Measurements of Crude-Oil Polluted Soils: The Need for Calibration
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