PROGRAMME

PROGRAM

43rd AMOP Technical Seminar on Environmental Contamination and Response

Virtually
June 8 – 10, 2021
<table>
<thead>
<tr>
<th>Time</th>
<th>Session Title</th>
<th>Presenters and Affiliations</th>
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<tr>
<td>10:00</td>
<td><strong>Burn Test Pans: Size Matters</strong></td>
<td>Merv F. Fingas, Spill Science, Edmonton, Alberta, Canada</td>
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<tr>
<td>10:20</td>
<td><strong>Calculating the Concentrations of Oil and Dispersants under Dispersed Oil Slicks</strong></td>
<td>Merv F. Fingas, Spill Science, Edmonton, Alberta, Canada</td>
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<tr>
<td>10:40</td>
<td><strong>Mesoscale In-Situ Burn (ISB) Experiments for Oil Spill Response in Freshwater with Vegetation</strong></td>
<td>Kemal Sarp Arsava, Nathan J. Lamie, and Brandon K. Booker, US Army Engineer Research &amp; Development Center, Cold Regions Research and Engineering Laboratory, Hanover, New Hampshire, USA, Elizabeth Murphy and Alexander Balsley, US Coast Guard R&amp;D Center, New London, Connecticut, USA</td>
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<tr>
<td>11:00</td>
<td><strong>Burning Behaviour of an Oil Slick with Waves</strong></td>
<td>Nathaniel G. Sauer, Mahesh Kottalgi, Kemal Sarp Arsava, and Ali S. Rangwala, Worcester Polytechnic Institute, Worcester, Massachusetts, USA</td>
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<tr>
<td>11:20</td>
<td><strong>The BOREAL Project - In-situ Recovery Techniques, their Limitations, and Lessons Learned during the Cleanup of Sunken Diluted Bitumen in a Freshwater System</strong></td>
<td>Keval Shah, Bruce P. Hollebone, Zeyu Yang, Patrick G. Lambert, and Claire Courtemanche, Environment and Climate Change Canada, Emergencies Science and Technology Section, Ottawa, Ontario, Canada, Jules Blais, Sawyer Stoyanovich, Jonathan Séguin and Jose Rodriguez, University of Ottawa, Ottawa, Ontario, Canada, Stephane Johnson, Eastern Canada Response Corporation, Sarnia, Ontario, Canada</td>
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<tr>
<td>12:00</td>
<td><strong>Assessment and Optimization of Air Assisted Oil Spill Recovery Enhancement Using Numerical Simulation</strong></td>
<td>Vandad Talimi, Lei Liu, Premkumar Thodi, and Jonathon Bruce, C-Core, St. John's, Newfoundland, Canada, Majid Abedinzadega Abdi, MA Procense, St. John's, Newfoundland, Canada</td>
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</tbody>
</table>
Tuesday, June 8 – Mardi 8 juin
Room 1 – Salle 1
Response Technologies and Countermeasures for Oil Spills (continued)
Technologies d'intervention et mesures de prévention pour les déversements d'hydrocarbures (suite)

12:20 Intermission – Pause

13:00 Application of the Field Scale Test Protocol for Type I Sorbents Recovering Oil on Water
Grant Coolbaugh
Kristi McKinney
Bureau of Safety and Environmental Enforcement (BSEE), Sterling, Virginia, USA

Speaker's Corner – Tribune libre
13:20 SMART Protocol Using Polarized Infrared Cameras
Tim Nedwed and Doug Mitchell
ExxonMobil Upstream Research Company, Spring, Texas, USA
Tom Coolbaugh
Exxon Mobil Corporation, Spring, Texas
Wolfgang Konkel
ExxonMobil Biomedical Sciences, Inc., Annandale, New Jersey, USA

Forum on Multi-partner Research Initiatives (MPRI)
Forum concernant l'initiative de recherche multipartenaire

Session Chair – Président de séance
Kenneth Lee and Lisa Isaacman

Speaker's Corner – Tribune libre
13:40 Coupled Texas A&M Oil Spill Calculator/Viscous Breakup Model in Jets (TAMOC/VDROP-J)
Simulations of Subsea Blowouts and Pipeline Leaks
Scott A. Socolofsky
Texas A&M University, Zachry Department of Civil and Environmental Engineering, College Station, Texas, USA
Michel Boufadel
New Jersey Institute of Technology, Department of Civil and Environmental Engineering, Newark, New Jersey, USA
Youyu Lu
Dalhousie University, Department of Oceanography, Halifax, Nova Scotia, Canada
J. Samuel Arey
ExxonMobil Biomedical Sciences, Inc., Annandale, New Jersey, USA

Speaker's Corner – Tribune libre
14:00 Delayed Mixing of Oil Droplets Crossing an Oil-Water Interface due to Engulfment by Lingering Thin Water Films
Omri Ram and Joseph Katz
Johns Hopkins University, Department of Mechanical Engineering, Baltimore, Maryland, USA

14:20 End of Day – Fin de la journée
Tuesday, June 8 – Mardi 8 juin  
Room 2 – Salle 2

Detection, Tracking, and Remote Sensing of Oil Spills  
Détection, suivi, et télédétection des déversements d’hydrocarbures

Session Chair – Président de séance Carl E. Brown

10:00 Development and Evaluation of Mid-range Benchtop FTIR as an Integrated Tool for Emergency Oil Spill Response  
Kevin Watson, Patrick G. Lambert, Michael Goldthorp, and Grayson Hatfield  
Environment & Climate Change Canada, Emergencies Science and Technology Section, Ottawa, Ontario, Canada  
Melanie Cyr and Amrah Nasim  
University of Ottawa, Ottawa, Ontario, Canada  
Youssef Bella-Metadamas  
Carleton University, Ottawa, Ontario, Canada

10:20 Characterization of Spectral Signatures of Various Oils on Water  
Igor Zakharov  
C-CORE, Ottawa, Ontario, Canada  
Jerry English and Sherry Warren  
C-Core, St. John’s, Newfoundland, Canada  
Thomas Puestow  
National Research Council of Canada (NRC), Ocean, Coastal and River Engineering, Ottawa, Ontario, Canada  
Robert Brown  
Offshore Safety and Survival Centre, Marine Institute, Conception Bay South, Newfoundland, Canada

10:40 Ultrasonic Techniques to Detect and Monitor Oil Spills  
Anand Prakash, Kanu Raigan, and E.A. Alshaafi  
University of Western Ontario, Department of Chemical and Biochemical Engineering, London, Ontario, Canada

Speaker's Corner – Tribune libre

11:00 Quick Assessment of Spill Paths Using High-resolution Elevation Data Near Spill Sources  
Paul A. Arp and Jae Ogilvie  
University of New Brunswick, Fredericton, New Brunswick, Canada  
Chris Bater and Barry White  
Government of Alberta, Edmonton, Alberta, Canada

Shoreline Response  
Interventions en milieu côtier

Session Chair – Président de séance Sonia Laforest

11:20 Shoreline Contamination from the SS Arrow Spill - Chedabucto Bay, Nova Scotia, Canada  
Sonia Laforest and Patrick G. Lambert  
Environment & Climate Change Canada Emergencies Science and Technology Section, Ottawa, Ontario, Canada  
Shannon Wilde  
Triox Environmental Emergencies Inc., Montréal, Québec, Canada
Shoreline Response (continued)
Interventions en milieu côtier (suite)

11:40 The Role of SCAT-OPS Liaison in a Shoreline Response Program (SRP)
Edward H. Owens
Owens Coastal Consultants Ltd., Bainbridge Island, Washington, USA
Richard Santner and A. Tucker
BP, Sunbury-on-Thames, United Kingdom

Speaker's Corner – Tribune libre
12:00 Data Management for Time-series Profiling Surveys and Sediment Volume Change Calculations
Mark A. Kulp, C.M. Miller, D.F. Maygarden, and L. Glushik
University of New Orleans, Pontchartrain Institute for Environmental Sciences, New Orleans, Louisiana, USA
Edward H. Owens
Owens Coastal Consultants Ltd., Bainbridge Island, Washington, USA
T. Scott
Polaris Applied Sciences Inc., Bainbridge Island, Washington, USA
T.A. Owens

12:20 Intermission – Pause

13:00 Field Trials Using Canines to Detect Deep Subsurface Weathered and Heavy Oils
Edward H. Owens
Owens Coastal Consultants Ltd., Bainbridge Island, Washington, USA
Paul C. Bunker
Chiron-K9, San Antonio, Texas, USA
Helen C. Dubach
CTEH, Houston, Texas, USA
Elliott Taylor
Polaris Applied Sciences Inc., Bainbridge Island, Washington, USA

13:20 A Checklist Approach to the Mobilization and Activation of an Integrated Shoreline Response Program (SRP) and a Shoreline Cleanup Assessment Technique (SCAT) Program in the Incident Command System (ICS)
Edward H. Owens
Owens Coastal Consultants Ltd., Bainbridge Island, Washington, USA
J.S. Kitagawa and Scott A. Neuhauser
BP Americas, Houston, Texas, USA

13:40 Introducing the National Environmental Emergencies Centre
Mathieu Dussault
Environment & Climate Change Canada, National Environmental Emergencies Centre, Montréal, Québec, Canada
Tuesday, June 8 – Mardi 8 juin
Room 2 – Salle 2

Environmental Emergency Operations (continued)
Opérations d'urgence environnementale (suite)

Speaker's Corner – Tribune libre
14:00  The NEEC Notification Desk
Jessie Carrière
Environment and Climate Change Canada, National Environmental Emergencies Centre, Montréal, Québec, Canada

Speaker's Corner – Tribune libre
14:20  The National Environmental Emergencies Operations Centre
Leandra Langlois
Environment and Climate Change Canada, National Environmental Emergencies Centre, Montréal, Québec, Canada

Speaker's Corner – Tribune libre
14:40  Geospatial Capabilities Enabling NEEC Operations and Interoperability
Anthony Pouw
Environment and Climate Change Canada, National Environmental Emergencies Centre, Montréal, Québec, Canada

15:00  End of Day – Fin de la journée

Tuesday, June 8 – Mardi 8 juin
Room 3 – Salle 3

Remediation, Restoration, and Rehabilitation of Chemical and Hazardous Material Spills
Dépollution, restauration, et remise en état en cas de déversements de produits chimiques et de matières dangereuses

Session Chair – Président de séance  Michael Goldthorp

10:00  Bacterial and Fungal Enzyme Cocktail for the Biodegradation of a p-Xylene Spill in Groundwater
Saba Miri and Satinder Kaur Brar
York University, Lassonde School of Engineering, Toronto, Ontario, Canada
Saba Miri, Satinder Kaur Brar, Richard Martel, and Tarek Rouissi
Université du Québec, Institut national de la recherche scientifique - Centre Eau Terre Environnement (INRS-ETE), Québec, Québec, Canada

Monitoring and Assessment of Chemical and Hazardous Material Spills
Surveillance et évaluation des déversements de produits chimiques et de matières dangereuses

Session Chair – Président de séance  Michael Goldthorp

10:20  Phospholipid Fatty Acid Analysis for Profiling Microbial Communities Associated with Microbiologically Induced Corrosion in the Submarine Environment
Xing Song, Baiyu Zhang, and Bing Chen
Memorial University, Northern Region Persistent Organic Pollution Control (NRPOP) Laboratory, St. John's, Newfoundland, Canada
Tuesday, June 8 – Mardi 8 juin
Room 3 – Salle 3

Contingency Planning, Preparation, and Prevention of Spills of Chemicals and Hazardous Materials
Déversements de produits chimiques et de matières dangereux - Planification des mesures d'urgence, préparation, et prévention

Session Chair – Président de séance                      Elise DeCola

10:40  Determining the Likelihood of Ship-source Hazardous and Noxious Substance Releases in Canada
David J. Creber and Laura Eldridge
Dillon Consulting, Fredericton, New Brunswick, Canada
Lynn Gagnon
Dillon Consulting, Calgary, Alberta, Canada
Cornelis van der Tak and Max Duursma
Maritime Research Institute Netherlands, Wageningen, Netherlands

Oil Spill Contingency Planning, Preparation, and Prevention
Planification des mesures d'urgence, préparation, et prévention des déversements d'hydrocarbures

Session Chair – Président de séance                      Elise DeCola

11:00  Estimating the Flow of Bulk Oil and Hazardous Materials through Massachusetts: Findings and Recommendations for Improved Data Management
Elise DeCola
Nuka Research and Planning Group, LLC, Plymouth, Massachusetts, USA
Nick Childs
Massachusetts Department of Environmental Protection, Boston, Massachusetts, USA

11:20  Perspectives on Oil Spill Statistics 1970-2020
Dagmar Schmidt Etkin
Environmental Research Consulting, Cortlandt Manor, New York, USA

Speaker's Corner – Tribune libre

11:40  First Nations Capacity-building through Geographic Response Strategy Development - Highlights from 2019 Field Season in the BC Northern Shelf Bioregion
Elise DeCola
Nuka Research and Planning Group, LLC, Plymouth, Massachusetts, USA
Steve Diggon
Coastal First Nations-Great Bear Initiative

12:00  Remote Arctic Storage Facility Management Challenges
Mikkel Foltmar
NORTECH Inc., Anchorage, Alaska, USA
Kirsten Ballard
ARCTOS Alaska, Anchorage, Alaska, USA

12:20  End of Day – Fin de la journée
Wednesday, June 9 – Mercredi 9 juin
Room 1 – Salle 1

Forum on Multi-partner Research Initiatives (MPRI) (continued)
Forum concernant l’initiative de recherche multipartenaire (suite)

Session Chair – Président de séance: Kenneth Lee and Lisa Isaacman

10:00 Enhancing the Dispersant Efficiency by Applying Artificial Energy after Dispersant Treatment
Liv-Guri Faksness, Frode Leirvik, Marius Johnsen, Thor-Arne Pettersen, and Per S. Daling
SL Ross Environmental Research Ltd., Ottawa, Ontario, Canada

Speaker’s Corner – Tribune libre
10:20 Impact of Chemical Oil Herders on Wave Breaking
Lakshmana D. Chandrala, Franz O’Meally, and Joseph Katz
Johns Hopkins University, Department of Mechanical Engineering, Baltimore, Maryland, USA

10:40 Essential Aquatic Toxicology Data Collection Associated with Deployment of Alternate Response Measures Using Non-standard Species and Customized Methods and Biological Endpoints
Benjamin de Jourdan and Chris Bridger
Huntsman Marine Science Centre, St. Andrews, New Brunswick, Canada
Michal Galus and Boumy Sayavong
Fisheries and Oceans Canada, Ottawa, Ontario, Canada
Kenneth Lee
Fisheries and Oceans Canada, Bedford Institute of Oceanography, Dartmouth, Nova Scotia, Canada

Speaker’s Corner – Tribune libre
11:00 Oil Jet in Water: Measurements of Flow Structure and Turbulence in the Nearfield
Xinzhi Xue and Joseph Katz
Johns Hopkins University, Department of Mechanical Engineering, Baltimore, Maryland, USA

Speaker’s Corner – Tribune libre
11:20 A New Decanting Water Onsite Treatment System by UV-enhanced Ozonation for Marine Oil Spill Response
Guihua Dong, Bing Chen, Bo Liu, Baiyu Zhang, and Yiqi Cao
Memorial University, Northern Region Persistent Pollution Control (NRPOP) Laboratory, St. John’s, Newfoundland, Canada
Stanislav Stoyanov
Natural Resources Canada, CanmetENERGY, Devon, Alberta, Canada
Kenneth Lee
Fisheries and Oceans Canada, Dartmouth, Nova Scotia, Canada

11:40 Testing of Alternative Response Options for Spilled Conventional and Non-Conventional Oils Transported in Canada
David Cooper, Dario Velicogna, and James McCourt
SL Ross Environmental Research Ltd., Ottawa, Ontario, Canada
Wednesday, June 9 – Mercredi 9 juin
Room 1 – Salle 1

Forum on Multi-partner Research Initiatives (MPRI) (continued)
Forum concernant l’initiative de recherche multipartenaire (suite)

Speaker's Corner – Tribune libre
12:00  An Investigation into the Geographic Distribution and Variability of Inorganic Fine Particles in Canadian Marine Environments
Edward H. Owens
Owens Coastal Consultants Ltd., Bainbridge Island, Washington, USA
Elliott Taylor
Polaris Applied Sciences Inc., Bainbridge Island, Washington, USA
C. An and Z. Chen
Concordia University, Montréal, Québec, Canada
Kenneth Lee
Fisheries and Oceans Canada, Dartmouth, Nova Scotia, Canada

12:20  Intermission – Pause

Speaker's Corner – Tribune libre
13:00  Role of Nanomaterials in Oil-Water Separation
Suboohi Shervani, Jiabin Liu, Jingjing Ling, Javid Shadbahr, and Tahir Husain
Memorial University, Faculty of Engineering and Applied Science, St. John's, Newfoundland, Canada

Speaker's Corner – Tribune libre
13:20  Metal Organic Framework MOF-5 Based Mesh for the Separation of Oil-Water Mixture
Mohammad Alsakit, Suboohi Shervani, Jiabin Liu, and Tahir Husain
Memorial University, Faculty of Engineering and Applied Science, St. John's, Newfoundland, Canada

Speaker's Corner – Tribune libre
13:40  Simulation of Oil Droplet Formation from Vertical and Crossflow Jets - Experiments and Improvements within VDROPJ
Michel C. Boufadel, Ruixie Liu, and Cosan Daskiran
New Jersey Institute of Technology, Center for Natural Resources, Civil and Environmental Engineering Department, Newark, New Jersey, USA
Thomas King, Brian Robinson, and Kenneth Lee
Fisheries and Oceans Canada, Dartmouth, Nova Scotia, Canada
Scott A. Socolofsky
Texas A&M University, Zachry Department of Civil Engineering, College Station, Texas, USA

Speaker's Corner – Tribune libre
14:00  Structural and Rheological Changes of Water in Crude Oil Emulsions Caused by Dispersants
Diego F. Muriel Delgado and Joseph Katz
Johns Hopkins University, Department of Mechanical Engineering, Baltimore, Maryland, USA

Speaker's Corner – Tribune libre
14:20  Development of an Oil Dispersant Using Biosurfactants for Oil Spill Treatment in the North Atlantic Ocean
Zhiwen Zhu, Baiyu Zhang, Bing Chen, and Jingjing Ling, Memorial University, Faculty of Engineering and Applied Science, St. John's, Newfoundland, Canada
Kenneth Lee, Fisheries and Oceans Canada, Bedford Institute of Oceanography, Dartmouth, Nova Scotia, Canada

14:40  End of day – Fin de la journée
Wednesday, June 9 – Mercredi 9 juin  
Room 2 – Salle 2  

Oil Spill Modelling  
Modélisation des déversements d'hydrocarbures

Session Chair – Président de séance  
Christopher Barker

10:00  
**Physical Model Studies of Innovative Oil Containment Boom Designs**  
Scott Baker, Andrew Cornett, Hossein Babaei, and Vahid Palechi  
National Research Council Canada, Ottawa, Ontario, Canada  
Steve Potter  
SL Ross Environmental Research Ltd., Ottawa, Ontario, Canada  
Kristie McKinney  
Bureau of Safety and Environmental Enforcement (BSEE), Sterling, Virginia, USA

10:20  
**Effectively Communicating Oil Spill Modeling Results: Electronic Forums for Environmental and Emergency Response Information**  
Matthew Horn and Jenna Ducharme  
RPS Ocean Science, South Kingstown, Rhode Island, USA

10:40  
**Floating Oil Emulsification - Review of Models, Input Requirements, and Research Needs**  
Deborah P. French-McCay and Anusha L. Dissanayake  
RPS Ocean Science, South Kingstown, Rhode Island, USA  
William H. Lehr (Emeritus) and Robert Jones  
National Oceanic and Atmospheric Administration (NOAA), Office of Response (OR&R), Seattle, Washington, USA  
Karen Stone  
Bureau of Safety and Environmental Enforcement (BSEE), Sterling, Virginia, USA  
Benjamin G. Fieldhouse  
Environment & Climate Change Canada, Emergencies Science and Technology Section, Ottawa, Ontario, Canada  
Guillaume Marcotte  
Environment and Climate Change Canada, Meteorological Service of Canada, Dorval, Québec, Canada  
Anusha L. Dissanayake, Per S. Daling, and Jørgen Skancke  
SINTEF Ocean AS, Trondheim, Norway

11:00  
**A Comparison of Drift Prediction Modelling Methodologies**  
Nancy Soontiens, Jennifer Holden, and Fraser Davidson  
Fisheries and Oceans Canada, St. John's, Newfoundland, Canada
Wednesday, June 9 – Mercredi 9 juin  
Room 2 – Salle 2  

Oil Spill Modelling (continued)  
Modélisation des déversements d’hydrocarbures (suite)

11:20  
**Optimizing Improvement in Spill Response Models to Meet the Needs of the On-scene Command**  
Bill Lehr and Chris Barker  
NOAA Emergency Response Division, Seattle, Washington, USA  
C.J. Beegle-Krause  
SINTEF Ocean AS, Trondheim, Norway  
Michel Boufadel  
New Jersey Institute of Technology, Center for Natural Resources, Department of Civil and Environmental Engineering, Newark, New Jersey, USA  
Tom Coolbaugh  
Applied Research Associates (ARA), Inc., Leonardo, New Jersey, USA  
Claire Paris-Limouzy  
University of Miami, Miami, Florida, USA  
Scott A. Socolofsky  
Texas A&M University, Zachry Department of Civil and Environmental Engineering, College Station, Texas, USA  
Lin Zhao  
ExxonMobil, Irving, Texas, USA

Speaker’s Corner – Tribune libre

11:40  
**Non-linear Source Term and Scenario for Operational Oil Spill Model**  
Kuo-Hsien Chang, Eric Legault-Ouellet, Guillaume Marcotte, and Paul Pestieau  
Environment & Climate Change Canada, Canadian Meteorological Centre, Dorval, Québec, Canada

Speaker’s Corner – Tribune libre

12:00  
**Oil Droplets at the Water Surface: Breakup and Diffusion**  
Michel C. Boufadel, Fangda Cui, and Xiaolong Geng  
New Jersey Institute of Technology, Center for Natural Resources, Department of Civil and Environmental Engineering, Newark, New Jersey, USA  
Brian Robinson, Thomas King, and Kenneth Lee  
Fisheries and Oceans Canada, Bedford Institute of Oceanography, Dartmouth, Nova Scotia, Canada

12:20  
**Intermission – Pause**  

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Wednesday, June 9 – Mercredi 9 juin  
Room 2 – Salle 2  

Fate and Effects of Oil  
Devenir et effets des hydrocarbures

Session Chair – Président de séance  
Bruce P. Hollebone

13:00  
**Tools and Methods Used to Assess the Fate and Transport of a Heavy Oil Release in the North Saskatchewan River**  
Shaun Toner and Scott Purves  
Matrix Solutions, Guelph, Ontario, Canada  
Tara Murfitt  
Matrix Solutions, Calgary, Alberta, Canada  
Jocelyn Richards  
Matrix Solutions, Cold Lake, Alberta, Canada
**Wednesday, June 9 – Mercredi 9 juin**

**Room 2 – Salle 2**

**Fate and Effects of Oil**

**Devenir et effets des hydrocarbures**

**Speaker's Corner – Tribune libre**

**13:20**  
A Characterisation of the Geochemical Evolution and Subsequent Aquatic Toxicity of Diluted Bitumen within Shallow Groundwater Systems over Time  
Scott Hepditch, Tuan Anh To, Ève Larocque, Juan-Manuel Gutierrez-Villagomez, Richard Martel, and Valerie S. Langlois  
Institut national de la recherche scientifique - Centre Eau Terre Environnement (INRS-ETE), Québec City, Québec, Canada  
Jason M.E. Ahad  
Natural Resources Canada, Geological Survey of Canada, Québec City, Québec, Canada

**13:40**  
Variability in Acute Toxic Response of American Lobster Larvae (Homarus americanus) to Oil Constituents Using Water Accommodated Fraction (WAF) and Chemically Enhanced Water Accommodated Fraction (CEWAF) Methods  
Tahereh Boloori and Benjamin de Jourdan  
Huntsman, Marine Science Centre, St. Andrews, New Brunswick, Canada

**14:00**  
End of day – Fin de la journée

**Thursday, June 10 – Jeudi 10 juin**

**Room 1 – Salle 1**

**Physical and Chemical Properties and Behaviour of Oil Spills (continued)**

**Comportement et caractéristiques physiques et chimiques des déversements d'hydrocarbures**

**Session Chair – Président de séance**  
Merv F. Fingas

**Speaker's Corner – Tribune libre**

**10:00**  
The Agia Zoni II Oil Spill - Imprint and Environmental Consequences on the Marine Ecosystem of Saronikos Gulf (Greece)  
Hellenic Centre for Marine Research (HCMR), Institute of Oceanography, Anavyssos, Attika, Greece

**10:20**  
Comparing Oil Fingerprints or Diagnostic Ratios  
Merv F. Fingas  
Spill Science, Edmonton, Alberta, Canada

**10:40**  
Simultaneous Quantitation of Dispersant and Fingerprinting Analysis of Oil in Aqueous Samples Using Commercial Solid Phase Extraction (SPE) Cartridge and Liquid/Gas Chromatography-Mass Spectrometry (LC/GC-MS)  
Chun Yang, Alexander Waldie, Justin Lai, Benjamin G. Fieldhouse, Zeyu Yang, Bruce P. Hollebone, and Patrick G. Lambert  
Environment and Climate Change Canada, Emergencies Science and Technology Section, Ottawa, Ontario, Canada
Thursday, June 10 – Jeudi 10 juin
Room 1 – Salle 1

Physical and Chemical Properties and Behaviour of Oil Spills (continued)
Comportement et caractéristiques physiques et chimiques des déversements d'hydrocarbures (suite)

11:00  Introduction to Oil Visual Guides: New Information Products for Oil Spill Response
Fatemeh Mirnaghi, Zeyu Yang, Callum Blaney, Victor Maldonado, Keval Shah, Diane Dey, and Bruce P. Hollebone
Environment and Climate Change Canada, Emergencies Science and Technology Section, Ottawa, Ontario, Canada

11:20  Generation and Characterization of Representative Oil-in-Water Emulsion for a Laboratory Study of Decanting as a Potential Alternative Oil Spill Response Measure
Vladimir Blinov, Benjamin G. Fieldhouse, Konstantin Volchek, Chun Yang, Patrick G. Lambert, Steven Ong, and Jill Yuen
Environment and Climate Change Canada, Emergencies Science and Technology Section Ottawa, Ontario, Canada

Speaker's Corner – Tribune libre
11:40  Toluene Impact on Aquatic Environments - Anthropogenic or Naturally Occurring?
Virgil Guran, Michael Sheppard, and Taras Obal
Bureau Veritas Laboratories, Mississauga, Ontario, Canada

12:00  Conservative Release of Benzene and Toluene to Water following an Oil Spill
Mahyar Sakari and Ron Brockbank
AGAT Laboratories, Centre of Excellence and Innovation, Forensics Science, Calgary, Alberta, Canada
Mahyar Sakari
Royal Roads, University, Environment and Sustainability, Victoria, British Columbia, Canada
Jackson Bergmann
Southern Alberta Institute of Technology, Calgary, Alberta, Canada
Ryan Staub
AGAT Laboratories, Petroleum Testing Services, Calgary, Alberta, Canada
Nathan Scott
AGAT Laboratories, Operations Division, Calgary, Alberta, Canada
Lisa Neville and James MacDonald
AGAT Laboratories, Technical Sciences, Calgary, Alberta, Canada

12:20  Intermission – Pause

13:00  Characterization of Natural Conditions in the Lower Fraser River and the Salish Sea in Support of an Assessment for Oil-Mineral Aggregate Formation Potential
Aurelien Hospital
Tetra Tech Canada, Vancouver, British Columbia, Canada

Speaker's Corner – Tribune libre
13:20  Environment and Climate Change Canada's Open Data Oil Properties Database
Fatemeh Mirnaghi and Bruce P. Hollebone
Environment and Climate Change Canada, Emergencies Science and Technology Section, Ottawa, Ontario, Canada
Thursday, June 10 – Jeudi 10 juin
Room 1 – Salle 1

Physical and Chemical Properties and Behaviour of Oil Spills (continued)
Comportement et caractéristiques physiques et chimiques des déversements d'hydrocarbures (suite)

Speaker's Corner – Tribune libre
13:40  A Novel Approach for Oil Spill Forensics Using GC/QToF and Principal Components Analysis
Dayue Shang, Pamela Brunswick, Honoria Kwok, and Graham van Aggelen
Environment & Climate Change Canada, Pacific Environmental Science Centre, Pacific and Yukon
Laboratory for Environmental Testing, North Vancouver, British Columbia, Canada
Candice Chua and Marcus Kim
Agilent Technologies Canada Inc., Mississauga, Ontario, Canada

Thursday, June 10 – Jeudi 10 juin
Room 1 – Salle 1

Case Histories and Recent Oil Spill Experiences
Cas concrets et expériences récentes de déversements d'hydrocarbures

Session Chair – Président de séance  Patrick G. Lambert

Speaker's Corner – Tribune libre
14:00  Recent Oil Spill Experiences
Angela Pinzón
International Tanker Owners Pollution Federation (ITOPF) Ltd., London, United Kingdom

14:20  End of Technical Seminar - Fin du Colloque technique

Thursday, June 10 – Jeudi 10 juin
Room 2 – Salle 2

Remediation, Restoration, and Rehabilitation of Oil Spills
Dépollution, restauration, et remise en état en cas de déversements d'hydrocarbures

Session Chair – Président de séance  Thomas King

Speaker's Corner – Tribune libre
10:00  Biotransformation of Dispersed Weathered Oil Released from Melted Sea Ice
Synnøve Lofthus and Ingrid Bakke
Norwegian University of Science and Technology (NTNU), Institute of Biotechnology and Food Science, Trondheim, Norway
Charles W. Greer
National Research Council Canada, Energy, Mining and Environment Centre, Montréal, Québec, Canada
Odd Gunnar Brakstad
SINTEF Ocean AS, Trondheim, Norway
Thursday, June 10 – Jeudi 10 juin
Room 2 – Salle 2

Remediation, Restoration, and Rehabilitation of Oil Spills (continued)
Dépollution, restauration, et remise en état en cas de déversements d'hydrocarbures (suite)

10:20 Integrated Spill Response Strategies - Unseen Consequences of Inland Spills
Nick Dyer
Oil Spill Response Limited, Southampton, United Kingdom
Jack Shore
REGENESIS, Bath, United Kingdom

10:40 Phytoremediation as a Strategy for Remote Contaminated Sites
Elizabeth Murray, Ben Poltorak, Kent Cryer, Adam Dunn, Michael Quesnel, and Perry Gerwing
Earthmaster Environmental Strategies Inc., Calgary, Alberta, Canada
Bruce Greenberg
University of Waterloo, Department of Biology, Waterloo, Ontario, Canada

11:00 Improving Contaminated Soil Remediation – Using Plants to Promote Beneficial Bacteria
Michael Quesnel, Kent Cryer, Ben Poltorak, Adam Dunn, Leonid Rogochevski, Perry Gerwing and Elizabeth Murray
Earthmaster Environmental Strategies Inc., Calgary, Alberta, Canada
Bruce Greenberg
University of Waterloo, Department of Biology, Waterloo, Ontario, Canada

11:20 Treatment of Co-mingled Plumes of Petroleum Hydrocarbons (PHC) and Per- and Polyfluorinated Alkyl Substances (PFAS): Options and Tools
Krista Barfoot
Stantec Consulting Ltd., Waterloo, Ontario, Canada
Ruth Bonneville
Stantec Consulting Ltd., Edmonton, Alberta, Canada
Ken Martins
Stantec Consulting Ltd., Irvine, California, USA

Speaker's Corner – Tribune libre
11:40 Physical and Biological Removal of Unconventional Oils in Fixed Bed Bioreactor
Seyyed Mohammadreza Davoodi, Saba Miri, Satinder Kaur Brar, and Richard Martel
Université du Québec, Institut de la Recherche Scientifique – Centre Eau Terre Environnement (INRS-ÉTÉ),Québec, Québec, Canada
Seyyed Mohammadreza Davoodi, Saba Miri, Satinder Kaur Brar
York University, Lassonde School of Engineering, Department of Civil Engineering, Toronto, Ontario, Canada
Rosa Galvez-Cloutier
Université Laval, Département de Genie Civil, Québec, Québec, Canada

12:00 End of Day – Fin du jour
Nutrient-enriched Biochar as Adsorption and Bioremediation Agent for Coastal Oil Spills: A New Valorization Pathway for the Fisheries and Forestry By-products
Marie-Ève Lamarre and Karine Lemarchand
Université du Québec à Rimouski - Institut des sciences de la mer (UQAR-ISMÉR), Rimouski, Québec, Canada
Richard Saint-Louis
L'Université du Québec à Rimouski (UQAR), Rimouski, Québec, Canada
Papa Niokhor Diouf
SEREX, Amqui Québec, Canada

Influence of Natural and Forced Air Entrainment on PM Emissions and Burning Behavior of Diesel Fire Whirls
Hamed Farmahini Farahani, Chris D. Nelson, and Ali S. Rangwala
Worcester Polytechnic Institute, Worcester, Massachusetts, USA
Sriram Bharath Hariharan and Michael J. Gollner
University of California, Berkeley, California, USA
Elaine S. Oran
Texas A&M University, College Station, Texas, USA
* with paper/avec article

Ultrasonic Techniques to Detect and Monitor Oil Spills
Anand Prakash, Kanu Raigan, and E.A. Alshaafi
University of Western Ontario, Department of Chemical and Biochemical Engineering, London, Ontario, Canada
* with paper/avec article

Environment and Climate Change Canada Oil Spill Research: A Program to Bring Five Decades of Publications into the Public Domain
Patrick G. Lambert, Natalie C. Jones, Callum Blaney, Carl E. Brown, Benjamin G. Fieldhouse, Michael Goldthorp, Bruce P. Hollebone, and Sonia Laforest
Environment and Climate Change Canada, Emergencies Science and Technology Section, Ottawa, ON, Canada
Merv Fingas
Spill Science, Edmonton, Alberta, Canada
Gary Sergy
S3 Environmental, Inc., Edmonton, Alberta, Canada
* with paper/avec article

Investigation into the Geometry and Distribution of Oil Inclusions in Sea Ice Using Non-destructive X-ray Microtomography and its Implications for Remote Sensing and Mitigation Potential
Durell S. Desmond, Marcos Lemes, Madison L. Harasyn, Amirbahador Mansoori, Diana Saltymakova, M. Christopher Fuller, Søren Rysgaard, David G. Barber, Dustin Isleifson, and Gary A. Stern
University of Manitoba, Winnipeg, Manitoba, Canada
Odile Crabeck
University of East Anglia, Norwich, United Kingdom
M. Christopher Fuller
University of Calgary, Calgary, Alberta, Canada
Søren Rysgaard
Aarhus University, Aarhus, Denmark

Assessing the Impact of Temperature and Salinity on the Acute Toxicity of Individual Polycyclic Aromatic Compounds to Artemia franciscana Nauplii Using a Passive Dosing System
Danielle Philibert and Benjamin de Jourdan
Huntsman Marine Science Center, St. Andrews, New Brunswick, Canada
Posters – Affiches

Comparative Assessment of Conventional Marine Spill Response Capable Oil/Water Separation Technologies
Ethan J. Matchinski, Bo Liu, and Bing Chen
Memorial University, Northern Region Persistent Pollution Control (NRPOP) Laboratory, St. John’s, Newfoundland, Canada

Chemical Characterization of Oil Spills in the Marine Environment: Progress from the Petroleum Environmental Research Laboratory
Nasima Chorfa, Ashish Sarker, Kasia Polcwiartek, Nolan Snyder, Gary Stern, and Feiyue Wang
University of Manitoba, Department of Environment and Geography, and Centre for Earth Observation Science (CEOS), Winnipeg, Manitoba, Canada

The Dynamics of Oil in the Region of the Camamu-Almada Basin (Brazil)
Luciana F. Tessarolo, Fernando Túlio Camilo Barreto, and Valdir Innocentini,
National Institute for Space Research, São José dos Campos, São Paulo, Brazil
Iury Angelo Gonçalves
Federal University of Espírito Santo, São Mateus, Espírito Santo, Brazil

Exposure to the Water-soluble Fraction of Oil: Biomarker Response and Body Burden in Arctic Gammarid Amphipods - A Study Compilation
Frederike Keitel-Gröner, Renée K. Bechmann, and Thierry Baussant
NORCE Norwegian Research Centre
Environmental Department, Marine Ecology Group
Randaberg, Rogaland, Norway
* with paper/avec article

Methods for Predicting Partitioning and Fate of Petroleum Hydrocarbons and Heterocyclic Compounds in a Sea Ice Environment
Durell S. Desmond, Georg Schreckenbach, James D. Xidos, Diana Saltymakova, Dustin Isleifson,
David G. Barber, and Gary A. Stern
University of Manitoba, Winnipeg, Manitoba, Canada

Effects of Climate on Changes in the Density and Viscosity of Diluted Bitumen Weathered on Sea Water
Thomas King, Patrick Toole, Brian Robinson, Scott Ryan, and Kenneth Lee
Fisheries and Ocean Canada, Bedford Institute of Oceanography, Dartmouth, Nova Scotia, Canada
Michel Boufadel
New Jersey Institute of Technology, Center for Natural Resources Development and Protection, Department of Civil and Environmental Engineering, Newark, New Jersey, USA
Haoshuai Li
Ocean University of China, Key Laboratory of Marine Chemistry Theory and Technology, Qingdao, China
Jason Clyburne
Saint Mary’s University, Departments of Chemistry and Environmental Science, Halifax, Nova Scotia, Canada

Evaluating Sediment Toxicity Associated with Diluted-Bitumen (Dilbit) and Conventional Crude Spills through the Use of Pilot-scale Spill Tanks
W. Tyler Mehler and Greg Goss
University of Alberta, Biological Sciences, Edmonton, Alberta, Canada
Qin Xin and Heather D. Dettman
Natural Resources Canada, CanmetENERGY, Devon, Alberta, Canada

Evaluating Bioaccumulation and Toxicity of Hydraulic Fracturing Flowback and Produced Water (FPW) in the Aquatic Invertebrate, Lumbriculus variegatus
W. Tyler Mehler and Greg Goss
University of Alberta, Biological Sciences, Edmonton, Alberta, Canada
Posters – Affiches

New Methods to More Accurately Quantify Hydrocarbon Contamination from Natural Background
Lisa A. Neville and T. Warner
AGAT Laboratories, Calgary, Alberta, Canada
Lisa A. Neville
Brock University, St. Catherines, Ontario, Canada

Cover Photo:
SS Arrow (Photo: Government of Canada)

Photo de la couverture :
SS Arrow (Photographie : Gouvernement du Canada)

See you next year!
We hope you will join us from June 7 to 9, 2022 at the Chateau Lacombe Hotel in Edmonton, Alberta for the 44th AMOP Technical Seminar on Environmental Contamination and Response.

À l'année prochaine !
Nous espérons vous revoir du 7 au 9 juin 2022 à l'Hôtel Château Lacombe à Edmonton (Alberta) à l'occasion du 44e Colloque technique de l’AMOP – Contamination de l’environnement et intervention.
About the AMOP Technical Seminar

Environment and Climate Change Canada began the Arctic and Marine Oilspill Program (AMOP) in March 1978 to improve the knowledge base and technology for cleaning up Arctic and marine oil spills. The AMOP Technical Seminar soon evolved into an international technical forum about oil spills in any environment as well as other spill-related topics. In 1983, the first Technical Seminar on Chemical Spills (TSCS) was held in conjunction with the AMOP Seminar and this eventually grew to include counterterrorism issues as a reflection of current priorities. In 1999, the Technical Seminar for Phytoremediation/Biotechnology Solutions for Spills (PHYTO) was added. This seminar changed to Biotechnology Solutions for Spills (BIOS) and then to Biological Solutions for Site Remediation, Restoration, and Rehabilitation (BIOSOLR3). To remain at the forefront of the dynamic field of spill response, in 2008 all three Seminars were amalgamated under the name AMOP Technical Seminar on Environmental Contamination and Response.

The Proceedings of the AMOP Technical Seminar on Environmental Contamination and Response have evolved into a unique collection of papers on environmental topics related to oil and chemical spills. A downloadable bibliography is available Bibliography 1978-2018 and provided to participants at the technical seminar. Access to individual papers from AMOP Technical Seminar proceedings can be obtained directly from the author(s), by written request to Emergencies Science and Technology Section (ESTS) or by contacting ECCC Library Services [ec.bibliotheque-library.ec@canada.ca] for more information or searching the Federal Science Library catalogue.

All papers that appear in the Proceedings are included annually in Elsevier's abstract and reference databases SCOPUS and Compendex. SCOPUS is the world's largest abstract and citation database of peer-reviewed literature, while Compendex is one of the most comprehensive engineering literature databases available to engineers.

About the Emergencies Science and Technology Section

The AMOP Technical Seminar on Environmental Contamination and Response is organized annually by the Emergencies Science and Technology Section (ESTS) of Environment and Climate Change Canada. Staff at ESTS’s Centre of Excellence located in Ottawa, Ontario carry out research and development on a variety of topics related to environmental emergencies caused by spilled hazardous materials. For more than 35 years, the Section has run an ongoing national program of research and development (R&D) on:

- properties, behaviour, detection, measurement, and effects of spilled hazardous materials with a focus on conventional and non-conventional petroleum products;
- modelling and remote sensing of spilled hazardous materials;
- spill countermeasures: evaluation, effectiveness, effects, and environmental benefits of mechanical and chemical treating agents; and
- shoreline impact and restoration: utilization of the Shoreline Cleanup Assessment Technique (SCAT).

A unique feature of the R&D is that results are applied to actual spill incidents, providing assistance to spill responders and conversely, feedback to the researchers on the direction of their work. R&D priorities are set and assessed by committees of representatives from all levels of government as well as international government agencies. Technology transfer is an important component of the program and the group provides operational guides, manuals, and training as well as some aspects of contingency planning.

Most of the section's projects are conducted in partnership with other government departments, agencies, and industry and cover a wide spectrum of issues related to spills. They include laboratory and field investigation in terrestrial, freshwater, and marine environments.

For additional information, please contact:
Emergencies Science and Technology Section
Environment and Climate Change Canada
335 River Road
Ottawa, Ontario, Canada K1A 0H3
Telephone: 613-998-9622
Fax: 613-991-9485
Email: ec.colloquetechniqueamop-amoptechnicalseminar.ec@canada.ca
À propos du Colloque technique de l'AMOP

Environnement et Changement climatique Canada a démarré le Programme de lutte contre les déversements d'hydrocarbures en mer et dans l'Arctique (AMOP) en mars 1978 afin d'améliorer les connaissances et les techniques en lien avec la lutte contre les déversements de pétrole dans des milieux marins et arctiques. Le Colloque technique de l'AMOP s'est rapidement transformé en un forum technique international sur les déversements d'hydrocarbures dans tout type d'environnement mais aussi sur d'autres types de déversements. En 1983, le premier Colloque technique sur les déversements de produits chimiques (TSOCS) s'est tenu en parallèle du Colloque de l'AMOP pour ensuite englober les questions de lutte anti-terroriste qui font partie des priorités actuelles. En 1999, le Colloque technique de phytoémédiation (PHYTO)/Solutions en biotechnologie lors de déversements fut ajouté. Ce colloque a évolué pour s'intituler Solutions biotechnologiques lors de déversements (BIOS) puis Solutions biologiques de dépollution, de restauration et de réhabilitation des sites (BIOSOLR3). En 2008, afin de demeurer à l'avant-garde de la lutte contre les déversements, les trois colloques ont été regroupés sous un seul nom : Colloque technique de l'AMOP – Contamination de l'environnement et intervention.

Les comptes rendus des quatre dernières décennies du Colloque technique de l'AMOP - Contamination de l'environnement et intervention offrent maintenant une collection unique d’articles sur des sujets environnementaux relatifs aux déversements de produits pétroliers et de produits chimiques. Un exemplaire téléchargeable de la bibliographie des différents colloques techniques est disponible Bibliographie 1978-2018, et une version sera remise aux participants du colloque de cette année. Il est possible d'avoir accès aux articles cités dans les comptes rendus en communiquant avec l'auteur, en envoyant une demande par écrit à la Section des urgences - Science et technologie (SUST), en communiquant avec les Services de bibliothèque d’ECCC [ec.bibliothèque-library.ec@canada.ca] pour obtenir davantage de renseignements ou encore en faisant une recherche dans le catalogue de la Bibliothèque scientifique fédérale.

Tous les articles contenus dans les Procédures sont ajoutés annuellement à la base de documents des abstraits et références SCOPUS et Compendex d’Elsevier. SCOPUS est la plus grande base de document au monde pour ce qui est des résumés et des citations littéraires révisés par des pairs, tandis que Compendex est la base de document littéraire sur l'ingénierie la plus complète disponible pour les ingénieurs.

À propos de la Section des urgences - Science et technologie

Colloque technique de l'AMOP – Contamination de l'environnement et intervention est organisé chaque année par la Section des urgences - Science et technologie (SUST) d'Environnement et Changement climatique Canada. Le personnel du Centre d'excellence de la SUST, situé à Ottawa (Ontario), poursuit des travaux en recherche et développement dans le domaine des urgences environnementales causées par des déversements de produits dangereux. Depuis plus de 35 ans, la SUST continue de diriger un programme national de recherche et développement sur :

- les propriétés, le comportement, la détection, la mesure et les effets notament des produits pétroliers conventionnels et non conventionnels;
- la modélisation et la télédétection des déversements de produits dangereux;
- l'intervention en cas de déversement : évaluation, efficacité, effets et avantages environnementaux de techniques de restauration mécaniques et chimiques et
- Les incidents sur le littoral et la restauration : utilisation de la Technique d'évaluation pour la restauration des rives (TERR).

La particularité des résultats de ce programme de recherche et développement est qu’ils sont appliqués à des déversements réels et permettent de faciliter le travail des équipes d'intervention. En échange, les informations venant des intervenants permettent aux chercheurs de mieux orienter leurs travaux. Les priorités de recherche sont définies et évaluées par des comités de représentants de tous les niveaux de gouvernement et d'organismes gouvernementaux internationaux. Le transfert de technologie est un élément important du programme. La SUST produit des guides opérationnels et des manuels. Elle offre aussi de la formation et contribue dans une certaine mesure à la planification des mesures d'urgence.

La plupart des projets de la section se déroulent en partenariat avec d'autres ministères et organismes du gouvernement, ainsi qu'avec l'industrie, et englobent une vaste gamme de sujets relatifs aux déversements. Ils comprennent des études en laboratoire et sur le terrain, dans des milieux terrestres, en eau douce et en mer.

Pour de plus amples renseignements, veuillez contacter :
Section des urgences – Science et technologie
Environnement et Changement climatique Canada
335, chemin River
Ottawa (Ontario) Canada K1A 0H3
Téléphone : 613-998-9622 Fax : 613-991-9485
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# Sessions at a Glance

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