

CLRA / ESANS Atlantic Reclamation Conference 2008 – Bios & Abstracts

DAY 1 - MONDAY 9:15 KEYNOTE:

BIO: Patrick Willits is the executive director of the Trust for Land Restoration (TLR), a non-profit, NGO land trust that specializes in helping communities clean up and restore damaged lands. TLR takes a business-based, non-confrontational approach to all its work, and is the only such conservation organization focusing on AML reclamation in Colorado, and one of a very few in all of the United States. Pat has worked in the non-profit land conservation sector for 18 years. From 1990 to 1999 he served as the Southwest Colorado Program Director for the Nature Conservancy. He helped found the Trust for Land Restoration in 1999 and became its executive director in 2000. Also in 2000, Pat was elected Mayor of Ridgway Colorado, and continues to hold that position. Ridgway is an incorporated municipality of 850 people in a county of 4,000, and will be the subject of one of the case studies presented. He has a degree in Political Science from San Diego State University.

ABSTRACT:

The Watershed Approach to AML Cleanup: Success Stories from Colorado

Patrick Willits, Executive Director, Trust for Land Restoration, Colorado USA

Reclaiming and restoring abandoned mined land is an emerging issue of increased importance throughout North America, including Atlantic Canada. Great strides have been made in the last 40 years to hold industry accountable to Best Standards and Practices for operating and closing modern mining developments, but such is clearly not the case for the vast majority of mine sites closed or abandoned before the 1970s. That society has not made significant progress toward cleaning up AML sites on any large scale, with some exceptions, is due to the enormity and complexity of the problem, and the fact that economic incentive and positive cost-to-benefit ratios are perceived to be lacking. But fortunately that perception is starting to shift, as concerns for water quality improvement intensify, and appreciation for Brownfields redevelopment and reuse concepts increase.

In Colorado, eight diverse communities, ranging in population size from 900 to 100,000, are taking the reclamation and cleanup of AML into their own hands, and are beginning to have notable successes on a local level. The styles, demographics, economics, and substance of each of these eight Colorado communities vary, as do the circumstances and reclamation needs of each site. Still there are similarities in the underlying foundation of each of the Colorado success stories, in that each is committed to an inclusive, collaborative, stakeholder-driven decision-making process, informed by the best available science. Though the location, geography, geology and political circumstances differ, there may be lessons learned from the current Colorado experiment that are relevant, practical and worth considering for those living and working in Atlantic Canada who seek to jump-start abandoned mined land cleanup in their own communities.

MONDAY 10:15 SESSION

BIO: Kendra Cahill has worked with GEMTEC Limited since moving to New Brunswick in early 2005. She has worked in government and with other agencies and universities on a variety of projects related to environmental assessment and management in New Brunswick, Ontario and Nunavut. Ms. Cahill has a Bachelor of Science degree in Environmental Science and a Masters in Biology. In recent years, Ms. Cahill's work has focused on wetland delineations, environmental impact assessments and ecological risk assessments.

BIO: Debby Peck is a Botanist and owner of D. Peck Botanical. In this role, Ms. Peck has provided expertise in vascular plants and their habitats to projects involving land use management, environmental impact assessment, rare vascular plant surveys, wetland delineation, wetland functional assessment and mitigation. She has a Masters degree in Plant Science and has taught Plant Taxonomy, Economic Botany and Plant Propagation courses in the Biology Department at the University of New Brunswick. She has also taught at the UNB Faculty of Education where she is currently completing her PhD in science education.

ABSTRACT:

Wetlands in the NB Coal Mine Expansion Project

Kendra Cahill, Gemtec Ltd., Fredericton, NB

Debby Peck, Debby Peck Botanical, Island View, NB

This presentation will deal with the requirements of the New Brunswick Wetland Conservation Policy as they relate to the NB Coal Mine Expansion Project at Albright's Corner. Matters concerning wetland delineation, functional assessment and mitigation, for project area wetlands, will be discussed.

MONDAY 10:40 SESSION

BIO: Sheldon Downe has been employed as the Environmental Officer within the Department of National Defence since 1995. He is currently the lead of the environmental unit for the Land Force Atlantic Area. Mr. Downe was educated at Acadia University with a B.Sc. with a specialization in geology. Mr. Downe has worked as a consultant in the site assessment and remediation fields for 13 years. More recently he has been working in more unique fields such as trials with energetics, green targets and land reclamation. Mr. Downe's expertise has changed as the demands and issues arising from current past military training become better understood.

ABSTRACT:

Wetland Creation in Severely Altered Landscapes of a Military Training Base

Sheldon Downe, National Defence Canada, Gagetown, New Brunswick

An ill conceived plan from the early 1990's to provide an additional military training area has resulted in over 7000 hectares of federally owned land cleared of vegetation and grubbed leaving organic matter in windrows at Canadian Forces Base Gagetown, New Brunswick, Canada. As a result of this land clearing, wetlands were impacted directly through loss of primary features and buffers; and indirectly through sedimentation loading. Currently, the cleared land is not used for military training as planned; provides little habitat and is the origin of sedimentation with every rainfall event. The objectives of this project were, and continue to be, to create wetland area, restore function to existing wetland features and to reduce the volume of sediment entering watercourses until areas can be stabilized. Pre-construction planning began in 2005 with site selection, design and scheduling. The wetlands were designed to be low maintenance and were constructed primarily using local materials with the addition of filter fabric and rock for spillways, and grass seed to stabilize banks. Post construction requirements are for ecological and structural monitoring, and are likely to include periodic cleaning of spillways and removal of sediment from the wetlands based on the stability of the up gradient landscape (stabilization and re-vegetation of the cleared land are concurrent projects). On-going monitoring relates to water quality, waterfowl use, and colonization (amphibians and vegetation). Since 2005, 15 hectares of wetland area have been created and the volume of sediment entering watercourses has decreased. This method of wetland construction has environmental benefits, is cost effective and promotes partnering between government and non-government organizations. Currently wetlands at CFB Gagetown are managed under the CFB Gagetown Wetland Management Plan, which in addition to the creation and monitoring components includes an inventory, the use of cyberstakes, and approvals system.

MONDAY 11:05 SESSION

BIO: Elizabeth Kennedy has over 7 years of consulting experience in the areas of environmental, water supply and watershed hydrogeology, with a particular emphasis on wetland assessment, restoration and creation. Elizabeth graduated from the Wetlands Research Centre at the University of Waterloo after completing a master's degree in hydrogeology, focusing on restored and created wetland design. In her current role at Jacques Whitford in Dartmouth, Elizabeth provides a range of expertise including aquifer protection planning, wetland hydrological and biogeochemical functional assessment, mitigation planning, and wetland creation and restoration. Clients include individual property owners, developers, all levels of government, mines and quarries, as well as private commercial and industry. Elizabeth works closely with a team of ecologists, geotechnical engineers, and soil scientists to produce innovative and scientifically based wetland restoration and creation plans to maintain, enhance or replace the valuable goods, services and functions provided by threatened and impacted wetlands across North America as well as internationally.

ABSTRACT:

Site Selection and Hydrologic Models for Wetland Creation and Restoration

Elizabeth Kennedy, M.Sc., P.Geo, Wetland Hydrogeologist, Jacques Whitford, Dartmouth

When wetland alterations are determined to be unavoidable, project proponents face huge challenges in identifying suitable opportunities to fulfill compensation obligations. Restoration and/or rehabilitation of existing wetlands on site (or in the same watershed) is the preferred option in terms of cost, schedules and resulting functions and values. However, restoration/rehabilitation is not always an option, particularly in watersheds where wetlands are currently undisturbed or in dense urban areas where remaining wetland areas are small or the cost of land insurmountable. In these cases, wetland creation may be preferred, especially where projects result in significant changes to watershed hydrology and topography or where the functions provided by wetlands are in particular need.

The selection of a site for wetland compensation determines the ultimate feasibility, cost, type, functions and value of the resulting project. Some of the considerations in site selection include (i) compensation area requirements; (ii) compensation goals; (iii) prioritizations between replacing wetland function, type, or community preference; (iv) land ownership and value; (v) prioritization between on-site, in watershed or out of watershed compensation; and (vi) hydrology. In most cases, hydrology is the most important factor in wetland restoration and creation, and therefore the most important consideration in site selection. Several models of wetland creation and restoration have been tested throughout the years, having drawbacks and benefits based on individual compensation goals. Having an understanding the various models and their characteristics facilitates the site selection process.

MONDAY 11:30 SESSION

BIO: Dan Hemsworth is a Hydrogeologist and Contaminated Sites Specialist and has been with the Department of Environment and involved with contaminated sites for 20+ years. An active member as the Departments representative on the Atlantic PIRI Committee and Chair of the Regulators Sub-Committee, working to harmonize approaches and processes to address issues of mutual concern on remediation of Brownfield sites in the Atlantic Provinces. Working together with the other members of the Atlantic PIRI Committee, issues related to Atlantic Risk Based Corrective Action, Brownfields redevelopment and regulations dealing with contamination in Nova Scotia and the Atlantic Provinces have been a priority for Dan and the Department.

BIO: Michel Poirier is from northern New Brunswick and in 1998, received his bachelor degree in Civil Engineering from the Université de Moncton. In 2002, Michel obtained his professional engineer designation which has facilitated his management of hundreds of contaminated sites with the New Brunswick Department of Environment for the past 8 years. Michel was an environmental inspector in the Bathurst regional office for 3 years and since 2003, is a remediation engineer with the Department's central office in Fredericton. He is an active member of the Atlantic PIRI Committee working to harmonize Atlantic RBCA within the Atlantic Provinces. He is also working closely with his peers to advance the remediation program and to implement a brownfields redevelopment strategy in New Brunswick.

ABSTRACT:

PIRI and Land Reclamation in Atlantic Canada

Dan Hemsworth, Hydrogeologist/Contaminated Site Specialist, Pollution Prevention Branch, Environmental and Natural Areas Management, Nova Scotia Department of Environment, Halifax NS

Michel Poirier, Remediation Engineer, NB Environment, Stewardship Branch, Fredericton, NB

Harmonization enables Atlantic Canada to move forward successfully and effectively with contaminated site management. It is the underlying vision and objective that drives Atlantic PIRI, and the development and continuous improvement of Atlantic RBCA. Through discussion with their peers and leaders in industry, regulators in Atlantic Canada harmonize their approaches, reducing uncertainties for both the regulators and the public, and facilitating contaminated site remediation and Brownfield redevelopment in the region.

MONDAY 12:45 SESSION

BIO: Daniel Khan grew up in Dartmouth and received a Bach. of Engineering degree in Mining from the Technical University of Nova Scotia (now Dalhousie). Dan's first experience in the mining industry began while working as an engineering student at the underground Evans Coal Mine located at St. Rose, Inverness County. Since graduating, about half of his professional career has been spent at surface mines and in mineral processing plants in the province. He has had roles in engineering services, plant operations and quality assurance at mines and manufacturing plants within the province. Dan has also worked for both the federal and provincial governments in environmental and resource management roles. Dan is currently employed as a Program and Development Officer by the Mineral Development and Policy Section at the Department of Natural Resources in Halifax.

ABSTRACT:

An Initiative to Enhance Surface Coal Mine Reclamation –Status Report

Daniel Kahn, P.Eng, Program and Development Officer, Nova Scotia Department of Natural Resources, Halifax, NS

On April 27, 2006, the Nova Scotia Minister of Natural Resources announced the Surface Coal Mine Reclamation Enhancement Initiative, through which a scientific research program would investigate how surface coal mine reclamation projects can be developed to support land-use strategies in Nova Scotia communities. The Minister noted that qualified individuals will be invited to sit on a committee representing industry, academia, government, research organizations and public interest groups. The committee's mandate included site selections for the study, a review of scientific literature, ecological studies, recommendations for test vegetation plots, planting and monitoring of test plots, public consultation and an action plan for re-integrating mine sites into the local environment.

Over the past three (3) years, work has been accomplished through a collaborative effort of a number of organizations and interested residents. In 2006-07 preliminary site assessments were made on nine (9) former surface mine sites and the committee established parameters for research required to evaluate past reclamation efforts in Cape Breton County. In 2007-08, comprehensive vegetation surveys began and test plots were established to evaluate the ecological response to a variety of vegetation amendments. In 2008-09, an innovative trial using “buckwheat” as a green-manure to increase organic matter was initiated and soil amendments applied to accelerate naturally regenerated growth on a previously reclaimed mine site.

To date, the committee has come to the conclusion that previously mined lands will eventually return to Acadian Forest ecology. The question of how long it will take for various sites to return to a mature or climax forest condition is not certain and will require additional surveys at sites reclaimed several decades ago to help improve predictions. The committee has also found that other jurisdictions in North America have recently gone through a similar evaluation of surface coal mine reclamation methods and the resulting vegetation/ecology. The results of studies in other jurisdictions indicate that the common restoration objective of developing a stable, non-eroding grassland cover, may, in fact, delay the subsequent succession of trees and other local plant species.

MONDAY 1:10 SESSION

BIO: **Andy Small** is a Geotechnical Engineer based in Fredericton, NB and working with AMEC. He graduated from UNB in 1985 with a Civil Engineering degree, completed his Master's in Geotechnical Engineering at the University of Alberta in 1989, and between 1989 and 1999 worked in Western Canada and Ontario. He moved to Fredericton in 1999.

Andy specializes in embankment dams and mine closure. As part of his mine closure experience, he has been involved with a number of land reclamation projects in Eastern Canada.

ABSTRACT:

Coniaurum: From Breach to Rehabilitation

Andy Small, P.Eng, AMEC Earth & Environmental, Fredericton, NB

This paper documents the work done to rehabilitate the Coniaurum Tailings Management Area in Timmins, Ontario. Coniaurum Mine operated between 1913 and 1961 and produced 1.1 million ounces of gold from approximately 4.5 million tons of ore. The 58 ha site consists of two tailings areas (Upper and Lower Tailings Areas), and perimeter and internal containment dams. In 1988, ERG mined out the western portion of the Upper Tailings Area to reclaim gold from the tailings, leaving steep cut slopes that were 5 to 6 m high. Some water was ponded in the excavated areas, but there was no substantial tailings pond on either the Upper or Lower Tailings Areas. The tailings are non-acid generating, but the tailings areas had experienced extensive erosion with large and deep gullies, washouts and dam breaches. The wind and water erosion had caused some off-site impacts. Goldcorp Canada Ltd. - Porcupine Gold Mines (PGM) acquired the facility in 2002 and began rehabilitation planning and activities.

In 2005, PGM with engineering assistance from AMEC, initiated a major construction program as part of the rehabilitation. The rehabilitation work included regrading, landscaping and erosion protection of the entire site, development of runoff channels and discharge facilities and stabilization of the dams. The work was completed in 2008. This paper presents the design concepts and the approach utilized for closure from 2005 through to 2008. At the end of the works, the site will be considered closed with only modest inspections required to ensure that the erosion protection and drainage measures are effective.

MONDAY 1:35 SESSION

BIO: Paul White, P.Eng, Vice-President Engineering, Nova Construction Company Ltd./Pioneer Coal Ltd.

BIO: Mike Mattie, P.Eng, Project Engineer, Nova Construction Company Ltd.

ABSTRACT:

Land Reclamation of Former Mining Sites in Pictou County, Nova Scotia

Paul White & Michael Mattie, Pioneer Coal Limited, Antigonish, NS

- Stellarton Pit Mine, MacGregor Ave, Stellarton NS
- Drummond Mine, Westville NS
- Thorburn Mine, Thorburn NS

MONDAY 2:00 SESSION

BIO: **Tony Bowron** has been working on coastal wetland monitoring and restoration projects in Nova Scotia since 1998. He has worked for both governmental and non-governmental organizations, is chair of BoBEP's Salt Marsh and Restricted Tidal Systems Working Group and is a member of the Gulf of Maine Council's Subcommittee on Habitat Restoration. Tony has worked on fish habitat restoration projects, design of habitat compensation projects, and the development of ecological monitoring programs and community-based stewardship initiatives. He is co-founder and President of CBWES Inc., a Halifax-based environmental consulting company with a focus on projects relating to the monitoring and restoration of coastal and estuarine habitats.

ABSTRACT:

Rapid Recolonization of Halophytic Vegetation Following Restoration of an Upper Bay of Fundy Salt Marsh

Tony M. Bowron, Coastal Wetland Ecologist, Director, President, CBWES Inc., Halifax, Nova Scotia

Since 2005, efforts have been made to compensate for the historical loss of salt marsh habitat in the Bay of Fundy through salt marsh restoration activities. This paper focuses on the restoration of 12 hectares of former salt marsh habitat which had been dyked in 1990 to be used as a freshwater impoundment. The dyke was breached in 2005 in 5 – 100m sections and the water control structure removed. Digital elevation models, hydrology, sediment characteristics including accretion and vegetation composition between the restoration site and a local reference marsh were examined both pre- and post-restoration. Plant species richness doubled at the restoration site in the year following restoration of tidal flow, with no corresponding increase at the reference site. NMDS ordination shows that in higher elevation parts of the restoration site, pre-restoration dominant species were a mix of upland, brackish, and freshwater marsh species; post-restoration there were few remnants of this assemblage but high marsh species such as *Spartina patens* and other halophytes were dominant. Lower elevations had submerged aquatic species pre-restoration, but these were rapidly replaced by *Spartina alterniflora* post-restoration. These changes are discussed with reference to sediment accretion and the frequency and depth of inundation.

MONDAY 2:25 SESSION

BIO: **Michael Parker** is the President and Senior Biologist of East Coast Aquatics Inc, a biological consulting firm located in Bridgetown, Nova Scotia. He established East Coast Aquatics nearly nine years ago after moving back to Nova Scotia from British Columbia where he had been delivering the Watershed Restoration Program on behalf of the British Columbia Ministry of Environment in the Cariboo Region. Mike specializes in the assessment and restoration of aquatic habitats to address such issues as fish passage, slope stabilization, river restoration, and wetland alteration.

Today he will talk about the rapidly changing requirements regarding development in and around wetlands within Nova Scotia, and some of the challenges in satisfying the new Nova Scotia policies regarding wetland designation and alteration.

ABSTRACT:

Development around Wetlands in Nova Scotia, Assessment and Design

Michael Parker, President/Senior Biologist, East Coast Aquatics, Bridgetown, NS

In March 2006 the Province of Nova Scotia released an Operational Bulletin Respecting Alteration of Wetlands and a Wetlands Designation Policy that significantly has altered the requirements associated with altering wetlands through development activities. It is now necessary to professionally delineate wetlands by assessing the hydrology, soils, and vegetation. It is also necessary to then evaluate and report on the ecology of the site, and quantify the area of impact from the alteration. Finally, prior to any approval, a full detailed compensation plan must be developed that outlines how an area of wetland will be restored, created, enhanced, or preserved. The goal is to ensure no net loss of wetland habitat, and generally a ratio of 3+ m² compensation:1 m² altered is anticipated. There is no minimum area to which this policy applies, and therefore, even the smallest wetlands fall under this program. For example, a short driveway across a wet area will now need a Wetland Alteration Approval. Road routing for forestry companies and real estate developers will need further planning to avoid wetlands, and the approval and compensation requirements, where possible. If the area to be disturbed exceeds 2 ha an Environmental Assessment is required.

The new policy needs to be a significant consideration for developers as there are seasonal restrictions to carrying out the necessary assessments, there is likely going to be a requirement by 2009 to hire a "certified" delineator, and compensation plans will require actual on the ground wetland design projects to be completed prior to submission of an Alteration Approval.

Wetlands design is likely going to be one of the most significant challenges posed by the changes as appropriate sites must be found, and design that addresses the hydrological, botanical, and soil requirements for wetland formation must be completed. Finally, once an approval is received, a developer then has to ensure not only that their project that is requiring the wetland alteration gets completed, but they must also ensure that the compensation project gets built or implemented.

MONDAY 3:05 SESSION

BIO: Michele Coleman is currently the Manager of Environmental Services for NB Coal Limited in Minto, New Brunswick. She is a Professional Engineer and Professional Geologist with degrees in chemical engineering and geological sciences. This background gives her unique perspectives that she has brought to her work in the petroleum and mining industries for over 25 years. This has been especially true in the wide range of issues which she has managed for NB Coal Limited over the last 17 years, which include; acid mine drainage, water quality, reclamation/ restoration, auditing, regulation, permitting and communication of environmental issues. Michele has authored or co-authored 13 papers which have been presented at conferences or published in journals, pre and has collaborated on workshops, field trips, guest lectures, field schools, senior theses and research projects between NB Coal Limited and the University of New Brunswick through the departments of geology, engineering, forestry, biology and kinesiology. Michele has been a member of the Canadian Land Reclamation Association since 2001 and a Director on the Atlantic Branch of the CLRA since 2005.

ABSTRACT:

Exploring the use of native willows (*Salix*) and pitch pine for site restoration

Michele Coleman, Manager of Environmental Services, NB Coal Limited, Minto, NB

Several native woody plant species – primarily willows (*Salix* species), and to a lesser extent pitch pine (*Pinus rigida*) – have been tested for ecological restoration on coal mine sites in New Brunswick. An extensive scientific literature exists on the use of willows for site reclamation, effluent treatment, erosion control, and remediation purposes in Europe and Russia. However, in eastern North America we have not used willows to a great extent for such applications; yet North America has a rich natural resource in native willow species that could be used for ecological restoration. Canada has 76 native willow species, representing almost 30% of our native woody plant species diversity. Willows are adapted over a wide range of site types across every corner of the country from valley bottoms to mountain tops, and from the arctic to our southern border. Natural populations of seven of the more promising native willows have been surveyed across central and eastern Canada and field tests have been established to assess rooting ability (e.g., to facilitate ease and cost effectiveness of vegetative propagation), growth rates (e.g., biomass yields and productivity for use as industrial feedstock), adaptive ranges with respect to site characteristics, and various aspects of biomass quality. Recently, increased interest in willows has been based on their potential use as a fast-growing source of woody biomass for emerging energy, chemicals, and pharmaceutical industries and as a replacement for fossil fuels. However, willows have tremendous, yet largely unexploited, potential for site reclamation, particularly in riparian zones where water quality, erosion prevention, and habitat quality are primary issues of environmental concern. We will present results related to restoration activities on coal mine sites, and discuss the potential for using native willows and pitch pine to restore degraded sites.

MONDAY 3:20 PANEL

Dr. John Brazner has just started as the new Wetland/Water Specialist in the Environmental Assessment Branch at Nova Scotia Environment in Halifax. He is working on the development of a "no-net-loss" policy for wetlands and helping to incorporate wetland concerns into the Water Strategy being developed at NSE. John worked most recently on a number of projects with the Department of Fisheries and Oceans including Atlantic Salmon and Striped Bass Population Assessments, Recovery Potential Assessments for Atlantic salmon, loggerhead turtles and mako sharks and has also been working on a collaboration with the USGS monitoring the effects of climate change on coastal wetlands in New England, Nova Scotia and New Brunswick. Before moving to Nova Scotia in 2004, he worked for almost 20 years a Research Fish and Wetland Biologist with the U.S. Environmental Protection Agency on Lake Superior studying the effects of human activities on Great Lakes coastal wetlands and tributary streams. John received his Ph.D. from the Center for Limnology at the University of Wisconsin - Madison in 1994 and spends much of his free time these days trying to get lost in the backlands near Herring Cove, Nova Scotia.

Tracey Barbrick is here from Nova Scotia Environment. While she is currently a Senior Environmental Policy Analyst, Tracey also has 7 years experience as an inspector/enforcement officer and a frontline manager involved in the regulation of wetlands. Tracey has an Environmental Technology Diploma from Holland College, a Biology degree from St. Francis Xavier University, and is currently completing a Masters in Public Administration. Tracey has worked in both municipal and provincial government as well private sector and feels that her combined experience provides her with a practical perspective on the protection of the wetland resource.

Kathleen Johnson... (....)

Randy Milton manages the wetlands and coastal habitats program for the Nova Scotia Department of Natural Resources, having received a BSc and MSc from Mount Allison and Acadia University respectively. His career has focused on wetlands and waterbird management in Canada and abroad, and since 1992 has been with DNR's Wildlife Division. Randy is currently a member of the international Plan Committee stewarding the North American Waterfowl Management Plan. He is a member of Canada's current and past Delegations to the Ramsar Convention on Wetlands; has undertaken work with Ramsar's Scientific and Technical Review Panel on the wise use of wetlands, wetland inventory, and global action plan for peatlands; a contributing author to the Millennium Ecosystem Assessment (MA); and a team member authoring the MA wetlands and water synthesis for the Ramsar Convention.

Dr. Bob Pett works in the Environmental Services Section of NS Transportation and Infrastructure Renewal, at the head office in Halifax. He is responsible for environmental aspects of highway planning, construction and maintenance, and leads Department activities related to fish habitat, wetland and salt marsh restoration, and water quality and noise studies. Lately, Dr. Bob has been involved with invasive plant issues and a newly-formed *NS Invasive Species Working Group*. Dr. Bob got his Ph.D. in Oceanography from Dalhousie University in 1989 and his career has focused on freshwater and marine sciences and environmental management across Canada and abroad.

Deanne Meadus is the Manager of Conservation Programs for Ducks Unlimited Canada- Atlantic. Based in Amherst, she has been overseeing a wide range of habitat conservation initiatives, including wetland restoration, land securement and infrastructure maintenance across Atlantic Canada since 2004. For five years previous, Deanne worked in Ontario, managing the forestry department for Credit Valley

Conservation Authority. Deanne received her B.Sc.Env. in aquatic biology from Guelph University and a M.Sc.F. (forestry) from University of Toronto. Traveling, hiking, fly fishing and camping are some of her favourite pastimes.

Elizabeth Kennedy has over 7 years of consulting experience in the areas of environmental, water supply and watershed hydrogeology, with a particular emphasis on wetland assessment, restoration and creation. Elizabeth graduated from the Wetlands Research Centre at the University of Waterloo after completing a master's degree in hydrogeology, focusing on restored and created wetland design. In her current role at Jacques Whitford in Dartmouth, Elizabeth provides a range of expertise including aquifer protection planning, wetland hydrological and biogeochemical functional assessment, mitigation planning, and wetland creation and restoration. Clients include individual property owners, developers, all levels of government, mines and quarries, as well as private commercial and industry. Elizabeth works closely with a team of ecologists, geotechnical engineers, and soil scientists to produce innovative and scientifically based wetland restoration and creation plans to maintain, enhance or replace the valuable goods, services and functions provided by threatened and impacted wetlands across North America as well as internationally.

DAY 2 - TUESDAY 9:15 KEYNOTE:

BIO: Gary Campbell is a resources planner with 25 years of project management experience with the Province of Nova Scotia, where he is responsible for ensuring that private contractors deliver services in accordance with contractual obligations. His activities include major Federal-Provincial initiatives ranging from the provincial chair of the \$200 million Canada-Nova Scotia Offshore Development Fund to his present role as President of Nova Scotia Lands Inc. and the provincial lead on the \$400 million Federal-Provincial Sydney Tar Ponds and Coke Ovens Remediation Agreement. He is also President of Harbourside Commercial Park, the crown corporation established to redevelop the former Sydney Steel site.

BIO: Craig Chandler is an environmental engineer with over 14 years of experience in environmental assessment and auditing, and institutional and industrial reclamation projects. Since 2001, Craig has been the SLR project manager for the environmental decommissioning of the former Sydney Steel Corporation facility in Sydney, Nova Scotia. In this role, Craig works closely with the site management team to identify and address environmental issues related to the disposal of structures, assessment of soil and groundwater, and the remediation and reuse of lands. This work includes the preparation of detailed work plans, selection of environmental contractors, implementation of remedial measures, and development of Environmental Management Plans. Craig is pleased to be continuing as Project Manager as SLR Consulting assists NS Lands with the reclamation of other former SYSCO properties.

ABSTRACT:

Reclamation and Redevelopment of Former SYSCO Properties

Gary Campbell, President, Nova Scotia Lands Inc.

Craig Chandler, M.Sc, P.Eng, Senior Project Manager, SLR Consulting (Canada) Ltd.

In 2000, the provincially-owned Sydney Steel Corporation plant was permanently closed after 100 years of steel making. Demolition and asset liquidation of the plant began in July 2001 and was completed in 2007. In early 2007, a new crown corporation (Nova Scotia Lands Inc.) assumed responsibility for the reclamation of the site. Over 60 structures were demolished and removed from the site, resulting in the need to manage thousands of tonnes of debris and hazardous materials. Soil and groundwater testing programs were commenced in 2003 and completed in 2007. As the testing is completed, remediation is carried out as required, and environmental management plans are developed for incorporation into the future use of the property.

Included in the remediation program is a large-scale reclamation project at the former Sydney Steel Plant. Solidification/stabilization (S/S) is being used to treat approximately 130,000 T of industrial fill contaminated with fuel oil and coal tar. The project represents the first time that S/S technology has been employed at a large-scale in Atlantic Canada.

SLR Consulting has served as the Environmental Management Consultant for the environmental decommissioning and redevelopment of the former Sydney Steel Corporation plant. This illustrated talk will describe the processes that were developed to decommission the site. While the processes follow standard, internationally-recognized methods, specific aspects of the work are unique, employing human and industrial resources that are part of the rich legacy of industry in Cape Breton.

Redevelopment of the site is continuing with the construction of new arterial roads, water and sewer through the site, as well as recreational areas that enhances the property in its new role as the Harbourside Business Park.

In addition to the main plant site, NS Lands has taken responsibility for the reclamation of properties formerly owned by SYSCO and its subsidiaries. NS Lands will ensure that an appropriate level of environmental due diligence is undertaken. The properties, which include former coal mine sites, limestone quarries, and other industrial sites, may then be divested or transferred to other government entities for stewardship or development.

TUESDAY 10:15 SESSION

BIO: Tom Windeyer has forty years experience in aquatic and terrestrial environmental studies, assessment of contaminated sites, environmental remediation, economic feasibility studies and environmental impact assessments. His experience includes large multi-disciplined assessment projects in various regions of Canada as well as Egypt and the Philippines. He holds a B.A in Economics (“the dismal science”) from the University of Western Ontario. Tom has extensive experience in contaminated site remediation, environmental issues related to property transactions and Brownfield Development. He has been involved in a large number of site remediation programs associated with property transactions and restoration in Halifax and other areas of Atlantic Canada. His responsibilities have included: the development of project specifications, project management, site specific health and safety plans, hazardous materials management and the preparation of site condition documents and regulatory compliance. He has participated in international environmental programs including: Environmental Impact Assessments and Socio-economic Impact Assessments of port infrastructure development and dredging at eight major ports in the Philippines on behalf of the World Bank and Environmental Impact Assessment and Socio-economic Evaluation of an Engineered Wetland to address contamination of Lake Manzala in Egypt on behalf of the United Nations Development Program (UNDP) and Global Environmental Fund (GEF). Tom has extensive experience in the use and application of provincial and federal environmental acts and regulations pertaining to soil, sediment, air and water quality in marine and freshwater environments.

ABSTRACT:

A Nova Scotia Brownfield Development—The Kentville Futures Site, Town Of Kentville, Nova Scotia

Tom Windeyer, B.A., Stantec Consulting Limited.

Environmental Solutions and Stantec (formerly Neill and Gunter (Nova Scotia) Limited (NGNS)) were commissioned by the Town of Kentville to review the environmental issues associated with the former CP Rail Yard and to remediate the site to a level that would provide long- term commercial development opportunities for the Town.

Studies conducted by both CP Rail and the Town identified environmental concerns on the property that were in keeping with the use that has been made of the property for the past one hundred years, that being a railway maintenance, locomotive repair and marshalling yard. The objective of the project was to remove foundations and other physical structures which were known to exist on the property and to identify and remove buried materials, structures and mobile contaminants which would be considered either physical or environmental obstacles to development. Overall the goal was to remove uncertainties related to the environmental condition of the property. As part of site preparation strategy, where possible, there was a conscious effort to recycle or reuse materials recovered during the work.

This remediation strategy was not intended to bring the site into full compliance with environmental guidelines as those guidelines depend on the type of development considered. A final comprehensive sampling and analysis program was conducted to fully document the site conditions following the site work so that a developer could make an informed decision on development potential and price.

The property has been sold for development and the land sale has provided the Town of Kentville with a revenue neutral project. The new development will also provide local employment opportunities with long term tax revenues from what was formerly derelict land.

TUESDAY 10:40 SESSION

BIO: Dr. Mark King specializes in the behaviour and remediation of contaminants in groundwater. He has worked in groundwater research and consulting for 22 years and started Groundwater Insight Inc. in 1996. Within GWI, he has provided expert technical services on more than 100 projects across North America. GWI works for public and private sector clients throughout North America and provides the following services in contaminant hydrogeology: 1) quality control for large investigations and cleanups, 2) technical project management, and 3) hands-on interpretation and modelling of site data.

ABSTRACT:

Hydrogeology Aspects of Brownfield Restoration

Dr. Mark King, Groundwater Insight Inc., Halifax, NS

Subsurface occurrences of coal tar pools and dissolved phase plumes are present at a former coke ovens site in New Jersey. The site is large, open, and accessible, and just a few kilometers from Manhattan. Consequently, the land is valuable and a good candidate for re-development. One of the largest Brownfield remediation plans in the State of New Jersey was implemented to: 1) stop the discharge of coal tar and contaminated groundwater to the adjacent Hackensack River and 2) limit the potential for direct exposure to soil. As part of the remediation, 2.5 million cubic yards of stabilized dredge sediments from the Port of New York / New Jersey were placed over the site. In addition, a mile long double containment wall (sheet pile and bentonite slurry) was installed along the river shoreline. Groundwater modelling was conducted to evaluate a unique, but critical, site issue: the production of groundwater due to consolidation from the large mass of dredged sediments. There was concern that this large temporary influx to the groundwater system could interfere with the hydraulic isolation concept, and move the contaminant plumes off-site. Modelling analysis indicated that consolidation would be complete before off-site plume migration occurred. Follow-up monitoring has confirmed this prediction. The site is now being re-developed as a staging area and rail yard for the new Trans-Hudson Express Subway Tunnel into Manhattan, scheduled to come on-line by 2016.

TUESDAY 11:05 SESSION

BIO: Marc Dunning is a Professional Engineer and lawyer with the Halifax law firm of Wickwire Holm. He practices in the areas of environmental law, professional liability, construction law, occupational health and safety and general litigation. Marc's experience with brownfields comes from the perspective of both an environmental consultant and a lawyer, having worked for several years with an environmental consulting firm before practicing law. He also sits on the Board of Directors of the Environmental Services Association Nova Scotia, lectures in environmental law at Dalhousie Law School and is a regular contributing author for the Environmental Policy & Law journal.

ABSTRACT:

Brownfields – A Legal Perspective

Marc Dunning, WickWire Holm

You could write volumes on the legal issues associated with brownfield sites. This presentation focuses on three issues that, in my experience, commonly arise in brownfield development in Atlantic Canada and have the potential to cause significant problems for owners and developers if not identified early and dealt with properly: (1) contaminated fill; (2) off-site contamination; and (3) sites involving multiple jurisdictions. Through the use of 'real world' examples, I explain these issues, the problems they can create and how those problems can be avoided and/or dealt with in a practical manner.

TUESDAY 11:30

BIO: Dr. Torgny Vigerstad is the Director for Scientific Investigations for Environmental Solutions Remediation Services. Dr. Vigerstad has a Ph.D. from the University of Rhode Island. His doctoral study in applied ecology was supported by the U.S. Atomic Energy Commission. He took postdoctoral training in human toxicology and human health risk assessment at the US National Institutes of Health, while living in Washington D.C. His business there focused on providing expert opinion for litigation and human health risk assessment in support of public policy for the US Justice Department, the US Forest Service, the US Department of the Interior, and for several private law firms.

Following his move to Nova Scotia in 1990, Dr. Vigerstad gave the first public course in Human Health Risk Assessment ever given in the Maritimes through the former DalTech adult education program and completed the first risk assessment ever published for public review as part of the attempt at developing a sewage treatment system in Halifax. He was one of the three individuals presented to the public as the senior scientific advisor to Canada Lands in the restoration and redevelopment of the former CN Moncton Rail Shops. To date, this project is the largest most successful brownfield development in the Maritimes and a project that won an award for International Brownfield Development from the US Environmental Protection Agency. He was one of two senior scientists for the clean up of the former CN property on Kempt Road, the first successful clean up and resale of a PCB contaminated property in Nova Scotia. He is currently the senior scientist on the restoration and redevelopment of the former CP Rail Yards in Kentville NS.

In addition to his work on property restoration, Dr. Vigerstad has provided litigation support and expert affidavits and testimony regarding chemical and mold exposure in hospitals, homes, and schools in Canada and the United States.

ABSTRACT:

Contaminated Sites, Spills, and Insurance

Torgny Vigerstad, Ph.D., Director for Scientific Investigations, Environmental Solutions Remedial Services

In Nova Scotia, most fuel oil or diesel spills are the responsibility of homeowners, fuel delivery companies, and trucking firms (supported by their respective insurance companies and site professionals). The framework for clean-up was developed jointly by the owners of large and potentially costly historically contaminated sites, along with their consultants and government. Due to changes in legislation in Nova Scotia and the form of legislation in other Provinces, the historical distinction between a spill and a "contaminated site" is becoming vague.

The rules and methodologies for contaminated sites remediation were developed primarily for addressing abandoned gasoline stations, railyards and other large industrial type properties with historical contamination (the common definition of a "contaminated site"). As is standard across North America, a step-wise and regimented system of historical investigation, preliminary and detailed sampling, risk assessment, clean-up, monitoring and reporting has been developing. It saves money to plan carefully and take one's time with large contaminated sites.

However, those involved in spills, especially homeowners, are seldom involved in contaminated sites. And their insurance policies do not cover contaminated sites, they cover "sudden and accidental" damage to personal property and liability arising from it. Cleaning up quickly saves money, and as long as one

responds to the spill, the risks are well defined and small. Unfortunately the “contaminated sites process” is not designed to recognize these realities. Even if one completely removes a spill, the contaminated sites process with all its attendant rules and studies can be and is still brought into effect. At the same time, the reliance on the contaminated sites process, in many cases, allows spills on public properties to be left behind because the “risk” is calculated to be low.

The cost of the remediation of spills has been escalating. In addition, the fact that the contaminated sites process may not be covered under an insurance policy can result in unnecessary adversarial relationships to develop between homeowners, insurance companies and regulators. Industries who owned and wished to decommission contaminated sites, along with their experts, approached the government to make science-based rules that are appropriate for contaminated sites. In the same way, those that can anticipate the possibility to clean up spills should be invited to develop a set of science-based rules that are appropriate for spills. This would result in reduced costs, a less adversarial relationship with regulators, and protect property owners from the stigma of being associated with a “contaminated site”.

TUESDAY 12:45 SESSION

BIO: Brad MacLean is a hydrogeochemist with 10 years experience. He holds a B.Sc. in chemistry from the University of New Brunswick and a M.Sc. in geology from the University of New Brunswick/University of Waterloo (area of specialty hydrogeochemistry). He has conducted numerous water resource evaluation and contaminated site management projects throughout Canada. His expertise includes groundwater modeling, water resource management, environmental site assessments, soil and groundwater remediation, vapour assessment, and risk assessment. In Ontario he completed a 3 dimensional chemical transport flow model to simulate the chemical weathering of a copper zinc sulphide deposit buried beneath glacial sediments in Matheson Ontario as part of his Master's Thesis.

Mr. MacLean has considerable experience in the design and application of computer models for water resource management and risk assessment applications. He has applied various vapour and groundwater modelling techniques (physical models, analytical models, numerical models and chemical models) to assess vapour migration, groundwater-surface water interaction and contaminant migration. During his involvement in Maritime groundwater water supply projects, he has used groundwater models to evaluate stream-aquifer interaction associated with wellfield development adjacent to rivers, streams and brooks. Groundwater risk assessment work primarily involves chemical fate and transport, stability and temporal analysis in concert with pumping dynamics assessment to predict the degree of risk associated with remaining petroleum impacts relative to the potential for potable water supply quality degradation.

ABSTRACT:

Petroleum Product Removal and Urban Renewal at a Former Service Station Site

Brad MacLean, Dillon Consulting

Under the Atlantic RBCA process, petroleum product removal from the subsurface is generally a regulatory prerequisite for environmental site closure in the province of Nova Scotia. Petroleum products are generally less dense than groundwater, viscous, have a high affinity for fine-grained or organic soils, and can produce potentially harmful vapours. Due to the physiochemical properties of petroleum products and their behavior in the subsurface it is often technically infeasible to completely remove petroleum products without excavating large areas for treatment or disposal offsite.

The subject site of this case study is located in the Annapolis Valley region of Nova Scotia. The region is underlain by a highly productive aquifer that consists of a generally unconfined sand and gravel overburden aquifer underlain by the generally confined Wolfville formation bedrock aquifer. The former service station had petroleum product thicknesses of several centimetres measured in monitoring wells. The station was located approximately 500 m from the nearest municipal production well, and had been undergoing active remediation with a vapour extraction system with limited product recovery for several years.

In order to achieve the remedial objectives within a shorter time frame, Dillon recommended multiphase vapour extraction with thermal enhancement via steam injection. Thermal enhancement via steam injection was selected to increase the vapour removal component of the MPVE system and decrease the viscosity (i.e. thereby increasing the mobility of the product in the silty sand) to allow for more effective liquid product removal.

The MPVE system was run for 4 ½ months with approximately three times the product recovery of the previous three years of VES operation. Confirmatory monitoring has not indicated the presence of phase separated product onsite since the MPVE system was shut down.

The site was moved to regulatory closure after the completion of a groundwater fate and transport RBCA risk assessment. Upon closure the former owner constructed a park and has since given the property to the municipality.

TUESDAY 1:10 SESSION

BIO: Cameron Ells is a civil engineer, environmental consultant and entrepreneur. He founded Cameron Consulting Incorporated in 2000, and provides services to public and private sector clients in Canada and internationally. His risk management project work is in the areas of contaminated site remediation, human health risk assessment and climate change - infrastructure vulnerability.

Cameron contributed to the development of the 1996 Nova Scotia Guidelines for the Management of Contaminated Sites, was a founding member of the Atlantic PIRI Committee, and made several technical contributions to the original Atlantic RBCA decision-making tools. Cameron Consulting led the multi-disciplinary project team in preparing the 2007 Phase I Scoping Studies on climate change - infrastructure vulnerability for the Public Infrastructure Engineering Vulnerability Committee: made of representatives of several federal government departments, some provincial and municipal governments, and others, whose administration is organized through Engineers Canada (formerly the Canadian Council of Professional Engineers).

Cameron was the Steering Committee Chair for the Atlantic Climate Change 2008: Risks, Rewards and Tools for Action conference. The committee consisted of representatives from the Environmental Services Association of Nova Scotia (ESANS), Dalhousie University, Environment Canada, and the Province of Nova Scotia. In 2006 he wrote an influential discussion paper Applying Public Sector Resources to Climate Change Adaptation in Canada, and in 2008 he led a conference workshop on Incorporating Climate Change Adaptation into Design, Development and Management Decision Making.

ABSTRACT:

Complaint Procedures for Contaminated Sites Professionals: Review and Recommendations

Cameron Ells, Cameron Consulting Inc., Halifax, NS

Since 1996, the role of the "Site Professional" has been included in new contaminated site guidelines in Atlantic Canada. For many people, by many measures, the application of these guidelines and the commonly applied Atlantic RBCA technical tools have been successful. With experience, these documents have evolved and are changing. There has been minimal application of formal complaint or disciplinary procedures regarding Site Professionals. This is not necessarily an indication that all is fine. Regulators have received homeowner based, Site Professional complaints. How well are these complaint processes working? Are there practical improvements that might be done? This presentation provides:

- A hypothetical case study of a contaminated site history;
- A review of how the applicable complaint and disciplinary procedures regarding Site Professionals has been working in NS, and then in other Atlantic provinces;
- A discussion of what appears to work well, and not so well;
- Consideration of what happens in some non-Atlantic Canadian jurisdictions; and
- Provides some recommendations to regulators in their future policy development.

TUESDAY 1:35 SESSION

BIO: Rodney Fry is a Senior Engineer with Envirem Technologies Inc. providing management of business development and environmental consulting services (Aspen Environmental).

Received his Bachelor of Science in Geological Engineering (Geotechnical-Environmental Option) from the University of New Brunswick in 1987.

Working predominantly in the industrial waste management and composting field since 1997 together with Robert Kiely have grown Envirem's commercial composting business into one of the largest in Canada. Successfully developed and launched several new compost products including manufactured topsoil, organic fertilizers, dehydrated compost and compost soil amendments into markets in Canada and the US.

Rod serves on the board of the Canadian Composting Council, has enrolled Envirem as a founding member of the "Compost Quality Alliance" and obtained organic certification for several of their compost products through ProCert Canada.

Rod provides presentations on "Compost Markets and Quality" at speaking engagements, trade shows, and conference events throughout Canada and US.

ABSTRACT:

Brownfield Reclamation and Remediation/Stabilization Utilizing Compost

Rodney Fry, P.Eng., Envirem Technologies Inc.

Envirem Technologies Inc. was established in 1994 and operates eight large-scale organic residue composting facilities located geographically throughout Atlantic Canada. Several current projects have involved the use of bulk compost for environmental applications of brownfield reclamation and remediation/stabilization of impacted soils.

A summary of Envirem's "Case Studies and Pilot Projects" is presented to demonstrate the successful methods and environmental benefits of compost use in environmental applications. Providing a general overview of the specific degradation and adsorption mechanisms of the compost processes, how they support environmental reclamation objectives and a list of organic pollutants/trace-metals with past successful treatments. A brief comparison summary of some of the other traditional amendment alternatives is presented with a focus on how compost is more effective.

Case Studies for utilization of composts are presented including Constructed Wetlands, Dredge Spoils and Urban Brownfield Soil Stabilization, Soil Amendment in Land Reclamation, and Enhancement of Ex-Situ Bioremediation. A discussion of the experience of Envirem in developing project specific compost quality for the various environmental uses is also provided. Concluding with a general overview of the success and challenges of reclamation/remediation projects and how the availability of quality consistent compost supply can support the growth of this important environmental industry sector.

TUESDAY 2:00 SESSION

BIO: Shawn Duncan works for AECOM (formerly Earth Tech) and is the Regional Manager for the Environmental Services sector for Atlantic Canada, based in Halifax, NS. He has worked professionally in the environmental field throughout Canada and internationally for 18 years. His areas of specialization include project planning and management, environmental impact assessment, infrastructure planning and construction, public consultation and regulatory support. He is currently the lead reviewer and director on Environmental and Regulatory matters for the Sydney Tar Ponds Detailed Design Engineering and Construction Oversight Project.

ABSTRACT:

Solidification and Stabilization of Sydney Tar Ponds—Canada's Largest Remediation Project

Shawn Duncan, AECOM

More than 100 engineers and designers from around the world are working hard to complete the project plan that will solidify and stabilize more than 700k tonnes of coal-based wastes that have contaminated the properties for nearly 100 years.

Currently, engineers are conducting pilot-scale work in both the north and south tar ponds. The program includes testing six recipes of cement and hardening materials in the north pond, then proceeding to the south pond to test another six recipes.

The north pond, which opens to the harbour, has higher PCB concentrations and is described as having a sandy consistency. The south pond, which is the entry point for two urban brooks, has a higher PAH concentration and is described as having a silty consistency. Both ponds have elevated levels of oily contaminants.

Favourable results from the pilot-scale work are needed to gain regulatory approval so the project can proceed to full-scale treatment.

Once all permits and approvals are obtained, all sediments in the Tar Ponds site, including PCB material, will undergo Solidification/Stabilization treatment as a means of creating a structurally enhanced, low permeable mass that immobilizes contaminants. This will be done in place, using appropriate additives to reach performance requirements for permeability, leachability, and strength.

In order to carry out the work, surface water controls will be used to redirect surface water flows and outfalls away from construction areas. Temporary pumping stations will redirect the flow until permanent channels are constructed through the solidified tar ponds.

Further containment and protection will be provided by capping the treated sediments. A layered cap will be constructed using geotextiles, clay and granular fill for permanent placement. A tentative tendering schedule for these construction activities has been identified.

TUESDAY 2:25 SESSION

BIO: Dr. Dave Risk is a young faculty member at St. Francis Xavier University (StFX) interested in applied projects, particularly with respect to carbon storage in forest soils, gas movement in the shallow subsurface, and emission measurement techniques for carbon dioxide and other gases. His interests have led to several patents, active collaborations with government and industrial research partners, and funding to support several creative researchers working on projects in the M-Cube (Methods in Measurement and Monitoring) Research Group within the Environmental Sciences Research Centre at StFX. He has a strong track record of performing R&D with industry, technology transfer and commercialization, outreach, promotion of research and environmental sciences, and building opportunities for communication.

BIO: Andrew Kendall is responsible for industry liaison and technology transfer activities at St. Francis Xavier University (StFX). He plays a key role in enhancing existing and developing new relationships with companies to pursue applied, or collaborative research with StFX faculty and students. The StFX Industry Liaison Office (ILO) has a university-wide responsibility for technology transfer and intellectual property management that involves the evaluation and transfer of StFX inventions to the private sector for the benefit of the public and the university and its researchers. Currently Andrew is moving towards commercialization of 6 patent-pending inventions at StFX and has already signed several licensing deals, with more expected in the near future. He brings a wide range of industry and government experience to the ILO, with an early start following graduation from university in oil and gas exploration as a well-site geologist. After 5 years joined the Nova Scotia government to work in land-use planning, groundwater remediation and environmental assessment. Several years followed in oil and gas regulatory affairs and environmental consulting. He has an honours B.Sc in Geology from Dalhousie University and a Diploma in Land Use Planning from the College of Geographic Sciences.

ABSTRACT:

A New Gas Emissions Measurement Technology for the Remediation Industry

Andrew Kendall, Industry Liaison Officer, St. Francis Xavier University, Antigonish, NS

Dr. Dave Risk, Earth Sciences and the Environmental Sciences Research Centre, St. Francis Xavier University, Antigonish, NS

The "TraceFlux", developed in the Environmental Sciences Research Centre (ESRC) at St. Francis Xavier University (StFX), is a measurement technology to rapidly and non-invasively measure rates of gas emission from surfaces, and to capture samples of the moving gas for further laboratory analyses. Our current measurement prototype targets environmentally harmful contaminant hydrocarbon gas emissions and can measure these emissions across foundation walls or slabs to identify hotspots of vapour movement and to validate predictions made using Risk Assessment models. It can also potentially be used for ground vapour surveys in the exploration sector where available technologies do not measure actual emission - only concentration. Unfortunately, in both remediation and exploration applications, gas concentrations may provide false hotspots where they build up in areas of high moisture or compaction due to sluggish gas transport. Actual emissions through such soils often remain unaffected and direct measurement of these emissions provides a truer indication of gas sources in the subsurface. Neither industry currently has a non-invasive surface emission detection technique such as the TraceFlux in its toolbox. Although still under development, we seek opportunities for Proof-of-Concept work to characterize the performance of the technology for its proposed uses, and future commercialization partnerships.

TUESDAY 3:05 PANEL

BIOS:

Dr. Scott MacKnight is president of OCL Group, an environmental consulting firm based in Dartmouth. He has 32+ years experience in environmental assessment and environmental management for projects throughout Atlantic Canada, in Ontario and in several foreign countries. He has been the senior scientist and manager of numerous brownfield projects, including several with significant chemical contamination. Examples include the former CN Rail Car Shops project in Moncton and several of the larger residential and commercial projects in Halifax. He most recently completed the environmental assessment for a brownfield project in Vina del Mar (Valparaiso), Chile. The Canadian properties were recently described in the Autumn/Winter 2007 issue of Canadian Reclamation.

Gordon G. Check, M.A.Sc., P.Geo., received his Honours degree in Geology from Dalhousie University in 1989 and his Masters of Applied Science degree in Groundwater Studies from the Civil Engineering Department of the Technical University of Nova Scotia (now DalTech) in 1992. Gordon has conducted geoscience research and mineral exploration across the Canadian North, as well as in Australia. He has 10 years environmental consulting experience as a project manager for a major Atlantic environmental engineering and geoscience firm. He conducted hydrogeological and water supply investigations, environmental site assessments, soil and groundwater contaminant remediation, groundwater flow and transport computer modelling and groundwater management for a wide variety of clients. Gordon acted as President for the Association of Professional Geoscientists of Nova Scotia in 2006-2007 and is currently serving as Past-President on Council for the organization. Gordon has been employed for 6 years with Nova Scotia Environment providing a wide variety of hydrogeological, geoscience and regulatory management expertise for the development, regulation, management and protection of land and water resources in the Province of Nova Scotia. He was the Project Leader responsible for amendments to the Well Construction Regulations (2007). Gordon is now the Project Leader for the development of Contaminated Sites Regulations – regulations committed to in recent provincial legislation.

Marc Dunning is a Professional Engineer and lawyer with the Halifax law firm of Wickwire Holm. He practices in the areas of environmental law, professional liability, construction law, occupational health and safety and general litigation. Marc's experience with brownfields comes from the perspective of both an environmental consultant and a lawyer, having worked for several years with an environmental consulting firm before practicing law. He also sits on the Board of Directors of the Environmental Services Association Nova Scotia, lectures in environmental law at Dalhousie Law School and is a regular contributing author for the Environmental Policy & Law journal.

Glenn Clark is an entrepreneur with 13 years experience in brownfield remediation and development. He has developed commercial and residential brownfield properties with market values up to \$65,000,000. Glenn uses innovative remediation options such as mobile soil washing and or in situ techniques etc. with the ultimate goal of cleaning sites instead of a managing or relocating contamination. His strength is seeing problems and solutions from both the development and remediation contractor's perspectives.

Pat Willits is the executive director of the Trust for Land Restoration (TLR), a non-profit, NGO land trust that specializes in helping communities clean up and restore damaged lands. TLR takes a business-based, non-confrontational approach to all its work, and is the only such conservation organization focusing on

AML reclamation in Colorado, and one of a very few in all of the United States. Pat has worked in the non-profit land conservation sector for 18 years. From 1990 to 1999 he served as the Southwest Colorado Program Director for the Nature Conservancy. He helped found the Trust for Land Restoration in 1999 and became its executive director in 2000. Also in 2000, Pat was elected Mayor of Ridgway Colorado, and continues to hold that position. Ridgway is an incorporated municipality of 850 people in a county of 4,000, and will be the subject of one of the case studies presented. He has a degree in Political Science from San Diego State University.

Michel Poirier is from northern New Brunswick and in 1998, received his bachelor degree in Civil Engineering from the Université de Moncton. In 2002, Michel obtained his professional engineer designation which has facilitated his management of hundreds of contaminated sites with the New Brunswick Department of Environment for the past 8 years. Michel was an environmental inspector in the Bathurst regional office for 3 years and since 2003, is a remediation engineer with the Department's central office in Fredericton. He is an active member of the Atlantic PIRI Committee working to harmonize Atlantic RBCA within the Atlantic Provinces. He is also working closely with his peers to advance the remediation program and to implement a brownfields redevelopment strategy in New Brunswick.