

500 Consumers Road  
North York, ON M2J 1P8  
P.O. Box 650  
Scarborough, ON  
M1K 5E3

**Lesley Austin**  
Regulatory Coordinator, Regulatory Affairs  
Tel 416-495-6505  
Fax 416-495-6072  
Email: Lesley.Austin@enbridge.com



May 16, 2012

**VIA RESS, EMAIL and COURIER**

Ms Kirsten Walli  
Board Secretary  
Ontario Energy Board  
2300 Yonge Street, Suite 2700  
Toronto, Ontario, M4P 1E4

Dear Ms Walli:

**Re: Enbridge Gas Distribution Inc. ("Enbridge") – Application Updates  
Renewable Natural Gas Program Application ("Application")  
Ontario Energy Board ("Board") File Number EB-2011-0242 / EB-2011-0283**

Please find enclosed Enbridge's update for the Renewable Natural Gas proceedings. The Table of Contents has been updated to include the most recent additions to the proceeding. Also enclosed are the Curricula Vitae which were sent electronically on April 25, 2012, and are now filed as Exhibit A, Tab 3, Schedules 1 to 5.

This submission has been filed through the Board's Regulatory Electronic Submission System ("RESS"), and two hard copies are being sent to the Board as directed. Enbridge's filing for this proceeding can be found on the Enbridge website at: [www.enbridgegas.com/ratecase](http://www.enbridgegas.com/ratecase).

If you have any questions, please contact the undersigned.

Sincerely,

*[Original signed by]*

Lesley Austin  
Regulatory Coordinator, Regulatory Affairs

cc: Mr. F. Cass, Aird & Berlis LLP (via email and courier)  
All Interested Parties EB-2011-0242 (via email)

## TABLE OF CONTENTS

### A – GENERAL

<u>Exhibit</u>	<u>Tab</u>	<u>Schedule</u>	<u>Description</u>
<u>A</u>	1	1	Table of Contents
	2	1	Application
	3	1	Enbridge Gas Distribution Inc. Curricula Vitae
		2	Union Gas Limited Curricula Vitae
		3	Ipsos Reid Curriculum Vitae
		4	Alberta Innovate Curriculum Vitae
		5	Electrigaz Curriculum Vitae

### B – COMMON EVIDENCE

<u>Exhibit</u>	<u>Tab</u>	<u>Appendix</u>	<u>Description</u>
<u>B</u>	1		Evidence
		1	Alberta Innovates Report
		2	Letters of Support
		3	Ipsos Reid Survey
		4	Electrigaz Biogas Plant Costing Report
		5	Electrigaz RNG Program Pricing Report

### C – ENBRIDGE SPECIFIC EVIDENCE

<u>Exhibit</u>	<u>Tab</u>	<u>Schedule</u>	<u>Contents</u>
<u>C</u>	1	1	RNG Supply Volume and Bill Impact
		2	RNG Producer Operating and Maintenance Charge
		3	RNG Illustrative Project – Source Separated Organics

TABLE OF CONTENTS

I – INTERROGATORIES

<u>Exhibit</u>	<u>Tab</u>	<u>Schedule</u>	<u>Contents</u>
<u>I</u>	1	1 – 14	Board Staff
	2	1 – 9	Agri-Energy Producers' Association of Ontario
	3	1 – 7	Building Owners and Managers Association, Toronto
	4	1 – 9	Bullfrog Power Inc.
	5	1 – 20	Consumers Council of Canada
<u>IE</u>	5	21 – 35	Consumers Council of Canada (Enbridge specific)
<u>IU</u>	5	21 – 32	Consumers Council of Canada (Union specific)
<u>I</u>	6	1 – 10	Canadian Manufacturers & Exporters
	7	1 – 10, and 12	Direct Energy
<u>IE</u>	7	11	Direct Energy (Enbridge specific)
<u>I</u>	8	1 – 12	Federation of Rental-Housing Providers of Ontario
	9	1 – 4	Green Energy Coalition
	10	1 – 3	Just Energy
	11	1 – 22	London Property Management Association
	<u>IE</u>	11	23 – 26
<u>IU</u>	11	23 – 30	London Property Management Association (Union specific)
<u>I</u>	12	1	Pollution Probe
	13	1 – 17	School Energy Coalition
	14	1 – 16	Shell Energy North America (Canada) Inc.

TABLE OF CONTENTS

I – INTERROGATORIES

<u>Exhibit</u>	<u>Tab</u>	<u>Schedule</u>	<u>Contents</u>
<u>I</u>	15	1 – 13	Vulnerable Energy Consumers Coalition
<u>IE</u>	15	14 – 16	Vulnerable Energy Consumers Coalition (Enbridge specific)
<u>IU</u>	15	17 – 18	Vulnerable Energy Consumers Coalition (Union specific)

J – UNDERTAKING RESPONSES

<u>Exhibit</u>	<u>Tab</u>	<u>Schedule</u>	<u>Contents</u>
<u>J</u>	1	1	Transcript Volume 2, page 30.
		2	Transcript Volume 2, page 113.
		3	Transcript Volume 2, page 132.
		4	Transcript Volume 2, page 156.
	2	1	Transcript Volume 3, page 15.
		2	Transcript Volume 3, page 27.
		3	Transcript Volume 3, page 33.
		4	Transcript Volume 3, page 43.
		5	Transcript Volume 3, page 103.
		6	Transcript Volume 3, page 108.
	3	1	Transcript Volume 4, page 136, page 161.
		2	Transcript Volume 4, page 159.
	4	1	Transcript Volume 5, page 23.
		2	Transcript Volume 5, page 60.

## TABLE OF CONTENTS

### J – UNDERTAKING RESPONSES

<u>Exhibit</u>	<u>Tab</u>	<u>Schedule</u>	<u>Contents</u>
<u>J</u>	4	3	Transcript Volume 5, page 92.
		4	Transcript Volume 5, page 98.
		5	Transcript Volume 5, page 99.
		6	Transcript Volume 5, page 100.
		7	Transcript Volume 5, page 102.
		8	Transcript Volume 5, page 106.
		9	Transcript Volume 5, page 111.
		10	Transcript Volume 5, page 115.
		11	Transcript Volume 5, page 125.

### K – MISCELLANEOUS EXHIBITS

<u>Exhibit</u>	<u>Tab</u>	<u>Schedule</u>	<u>Contents</u>
<u>KP</u>	1	1	Materials Relied on by Enbridge Gas Distribution Inc. For Submission on January 12, 2012.
		2	Written Submissions of Canadian Manufacturers & Exporters (“CME”) on the Process Issue
		3	GEC Submission on the need for a phased hearing
		4	Just Energy Letter of Comment
		5	SEC Written Submission on Process Issue
		6	Union Gas Limited Submission on Process
		7	Comments on behalf of Vulnerable Energy Consumers Coalition

TABLE OF CONTENTS

K – MISCELLANEOUS EXHIBITS

<u>Exhibit</u>	<u>Tab</u>	<u>Schedule</u>	<u>Contents</u>
<u>K</u>	1	1	Applicants' Submission of Updated Evidence
		2	Pollution Probe Cross-Examination Reference Book
		3	GEC cross-examination exhibit
	2	1	Cross-Examination Compendium of the School Energy Coalition
		2	London Property Management Association Cross-Examination Compendium
		3	Curriculum Vitae – Salim A. Abboud
		4	Curriculum Vitae – Eric Camirand
	3	1	<i>Electricity Sector – Renewable Energy Initiatives</i> , Ministry of Energy , Chapter 3, Section 3.03.
		2	<i>A Sensible Strategy for Renewable Electrical Energy in North America</i> , Studies in Energy Policy, April 2012.
		3	
	4	1	Materials Relied Upon by Enbridge Gas Distribution Inc. for Argument in Chief (in addition to Exhibit KP1.1).

CURRICULUM VITAE OF  
JACKIE E. COLLIER

Experience: Enbridge Gas Distribution Inc.

Manager, Rate Design  
2003

Manager, Rate Research  
2000

Senior Rate Research Analyst  
1996

Centra Gas Ontario Inc.

Manager, Rate Design  
1995

Supervisor, Cost of Service Studies  
1990

Education: Bachelor of Business Management  
Ryerson Polytechnical Institute, 1988

Appearances: (Ontario Energy Board)

EB-2011-0277

EB-2010-0146

EB-2009-0172

EB-2009-0055

EB-2008-0219

EB-2008-0106

EB-2006-0034

EB-2005-0001

RP-2003-0203

RP-2003-0048

RP-2002-0133

RP-2001-0032

RP-2000-0040

EBRO 489

EBRO 474-B, 483,484

EBRO 474-A

EBRO 474

EBRO 471

(Régie de l'énergie/Régie du gaz naturel)

R-3758-2011

R-3724-2010

R-3692-2009

R-3665-2008

R-3637-2007

R-3621-2006

R-2587-2005

R-3537-2004

R-3464-2001

R-3446-2000

CURRICULUM VITAE OF  
JAMES GRANT

- Experience: Enbridge Gas Distribution Inc.  
  
Senior Market Research Consultant  
2006  
  
Benchmarks Research  
  
President  
2001  
  
Fidelity Investments  
  
Research Director  
1999  
  
Standard Life Assurance Company  
  
Manager, Marketing Research  
1988  
  
Bank of Montreal  
  
Marketing Research Coordinator  
1983  
  
Ogilvy & Mather Co. Ltd.  
  
Research Associate  
1979  
  
Royal Insurance  
  
Marketing Research Supervisor  
1973
- Education: Bachelor of Commerce  
Concordia University, 1971
- Memberships: Marketing Intelligence and Research Association,  
Certified Marketing Research Professional



CURRICULUM VITAE OF  
TREVOR MACLEAN

Experience: Enbridge Gas Distribution Inc.  
  
Director, Business & Market Development  
2008  
  
Enbridge Gas New Brunswick  
  
Manager, Distribution Operations  
2006  
  
Manager, Sales & Marketing  
2004  
  
RLG International  
  
Consultant  
2000  
  
825929 Alberta Ltd  
  
Consultant  
1997  
  
ISM (IBM Global Services)  
  
Director, Systems Integration  
1995  
  
Manager Operations, Systems Integration  
1994  
  
National Defence/Canadian Forces  
  
Military Officer  
1986

Education: Master of Business Administration  
Queen's University, 1995  
  
Bachelor of Arts (Special)  
University of Alberta, 1986

CURRICULUM VITAE OF  
OWEN SCHNEIDER

Experience: Enbridge Gas Distribution Inc.

Manager, New Ventures, 2009

Enbridge Inc.

Manager, Power Generation and Business Development, 2006

Senior Advisor, Business Development, 2004

Advisor, Business and Financial Analysis, 2001

Senior Analyst, Business and Financial Analysis, 2000

Enbridge Consumers Gas

Financial Analyst, Financial and Economic Studies, 1997

Chemque, Inc.

Project Coordinator, 1995

Stalko Metals Corporation

Project Coordinator, 1993

Education: Masters of Business Administration  
Dalhousie University, 1993

Bachelor of Arts  
University of Toronto, 1991

Appearances: (Ontario Energy Board)  
RP-2001-0014

CURRICULUM VITAE OF  
DONALD R. SMALL

- Experience: Enbridge Gas Distribution Inc.
- Manager, Gas Costs and Budget  
2010
  - Manager, Gas Cost Knowledge Centre  
2003
  - Manager, Gas Costs and Budget  
1989
  - Co-ordinator, Gas Costs  
1984
  - Financial Statement Accountant  
1980
  - Chief Clerk, Financial Statements  
1979
  - Advanced Accounting Trainee  
1978
- Education: Business Administration Diploma  
Ryerson Polytechnical Institute, 1978
- Appearances: (Ontario Energy Board)
- EB-2011-0277
  - EB-2010-0146
  - EB-2009-0172
  - EB-2009-0055
  - EB-2008-0219
  - EB-2008-0106
  - EB-2006-0034
  - EB-2005-0001
  - RP-2003-0203
  - RP-2003-0048
  - RP-2002-0133
  - RP-2001-0032
  - RP-2000-0040
  - RP-1999-0001
  - EBRO 497
  - EBRO 495
  - EBRO 492
  - EBRO 490
  - EBRO 487
  - EBRO 485
  - EBRO 479
  - EBRO 473
  - EBRO 465

**Statement of Qualifications  
Mary Evers**

**Experience:**

**Union Gas Limited**

Manager, Gas Supply  
2011

Team Lead, Gas Management Services  
2009

Manager, Billing and Operational Support  
2000

Team Lead, Fulfilment Support Services  
1999

Coordinator, Rate Case Administration, Regulatory  
1997

Regulatory Accounting Analyst  
1995

**Education:**

Various Management and Accounting Courses,  
University of Windsor

**Appearances:**

None

**Statement of Qualifications  
Barbara Gardiner**

**Experience:**

**Union Gas Limited**

Manager, Market Research & Analysis  
1999

Administrator, Regulatory Planning & Research  
1998

Coordinator, Regulatory Planning & Research  
1997

**Education:**

Bachelor of Arts (Honours Economics), University of Western  
Ontario  
1979

Masters of Arts (Economics), University of Toronto  
1983

**Memberships:**

Marketing Research and Intelligence Association

**Appearances:**

**(Ontario Energy Board)**  
**(as Barbara Marshall)**  
E.B.R.O. 491  
E.B.R.O. 488

**Statement of Qualifications  
Bryan Goulden**

**Experience:**

**Union Gas Limited**

Manager, Market Development  
2010

Manager, Utilization Technology and Deployment  
2007

Manager, Regulatory Applications  
2002

Manager, Integrated Supply Planning  
1999

Manager, Delivery Services Development  
1997

Manager, Technology Marketing  
1995

Manager, NGV Operations  
1993

Manager, Industrial Sales Support  
1987

Contract Gas Sales Engineer  
1984

Coordinantor Contract Administration  
1983

Gas Supply Analyst  
1982

**Education:**

Bachelor of Applied Science (Mechanical Engineering), University  
of Waterloo  
1982

Masters of Business Administration, University of Windsor  
1992

**Memberships:** Professional Engineers Ontario

**Appearances:** **(Ontario Energy Board)**

E.B.R.O. 470

E.B.R.O. 476-01

E.B.R.O. 476-03

E.B.O. 169-II

**Statement of Qualifications  
Ed Seward**

**Experience:**            **Union Gas Limited**

Manager, Market Opportunity Development  
2009

Manager, Strategic Accounts  
2005

Manager, Channel Marketing  
1999

Manager, Dealer Services  
1995

Supervisor, Delivery Services  
1990

Commercial & Industrial Account Manager  
1987

Residential Inside Sales Representative  
1986

**Education:**            Honours Bachelor of Arts (Political Science)  
University of Western Ontario  
1981

**Memberships:**        No professional memberships

**Appearances:**        **(Ontario Energy Board)**

No appearances



**Statement of Qualifications  
Greg Tetreault**

**Experience:**

**Union Gas Limited**

Manager, Rates and Pricing  
2008

Manager, Gas Management Services  
2005

Team Lead, Gas Management Services  
2001

Nominations Specialist, Gas Management Services  
1999

Business Analyst, Industrial Marketing and Sales  
1998

**Education:**

Honours Bachelor of Commerce, Finance, University of Windsor  
1998

Bachelor of Arts, Geography, University of Windsor  
1995

**Memberships:**

None

**Appearances:**

**(Ontario Energy Board)**

EB-2011-0038  
EB-2010-0039  
EB-2008-0411  
EB-2008-0106

**CURRICULUM VITAE OF**  
**SANDRA GUIRY**

- Experience: Ipsos Reid Corporation, Public Affairs Division
- Vice President and Manager (Toronto)  
2011-Present
- Vice-President  
2007-2011
- Associate Vice-President  
2004-2007
- Senior Research Manager/Research Manager/Associate  
2000-2004
- Education: Master of Arts, Political Science, Specialization in Empirical  
Theory and Methodology, York University, Toronto, Ontario, 1999
- Bachelor of Arts (High Honours), Political Science  
Carleton University, Ottawa, Ontario, 1997
- Memberships: Marketing Research and Intelligence Association (MRIA)
- Presentations: Presenter, Tenant Satisfaction Survey, Board of Directors Meeting,  
Toronto Community Housing Corporation, 2012
- Invited Speaker, 2<sup>nd</sup> Corporate Reputation Conference, Federated  
Press Series "Measuring Corporate Reputation" September 2011  
Toronto, Ontario
- Presenter, Global Perception Audit, Executive Committee, Xstrata  
Nickel, 2011
- Speaker, Institute of Co-operative Leadership "Leveraging Innovation,  
Identity and Integrity", Canadian Co-operative Association, 2011,  
Toronto Ontario
- Speaker, Corporate Reputation Management, Mearie Group Risk  
Management Conference, 2010, Muskoka, Ontario
- Presenter, Global Perception Audit, Executive Committee, Xstrata  
Nickel, 2010

Presenter, Licensure Uptake Survey, Council Meeting, Professional Engineers Ontario, 2008

Panelist, Conference Board of Canada's Roundtable: "Measuring Customer Trust", September, 2007

Presenter, "Managing Your Corporate Reputation" Ipsos Knowledge Summit, May 10, 2007

Presenter, GTTA Foundational Research Survey, Board of Directors Meeting, Metrolinx, November 2007

Presenter, Library Survey, Board of Directors Meeting, Burlington Public Library, March 2007

Presenter, Quality of Services Survey, Council Meeting, City of Burlington, 2007

Presenter, Community Survey, Town Hall (Council Meeting), Town of Caledon, 2007

Presenter/Speaker, Canadian Society of Association Executives: "W5: The Who, What, Where, When and Why of Market Research", May 10, 2005

Projects:

Sandra advises clients on the design, execution and analysis of survey-based market research. She is active in all types of market research methodologies and specializes in public opinion, reputation, issues management, and stakeholder satisfaction research.

Sandra's clients include large and small organizations in the private and public sectors seeking public opinion survey research to support decision-making including municipalities, various Ministries and agencies of the provincial government and not-for-profit organizations.

Sandra is considered an internal expert on corporate reputation research and issues management and is the Canadian lead for the Ipsos Global Reputation Centre. In her role, Sandra consults with clients around the world on corporate reputation and risk management. Sandra has worked on corporate reputation and crisis management campaigns for top international companies including Coca-Cola, Xstrata Nickel, Ford Motor Company of Canada, Wal-Mart, Scotiabank and Vale Inco. Sandra has put this experience to work as a leading voice in developing the Ipsos present value approach to reputation. She has published several articles and white papers on the topic of corporate reputation and has been a speaker at various conferences on the topic of reputation.

Sandra is also considered an internal expert on advanced statistical analyses such as multivariate regression, factor analysis, segmentation, disaggregate discrete choice, and various forms of perceptual mapping.

In addition to her client responsibilities, Sandra manages a team of eight junior, intermediate and senior researchers and is responsible over \$8 million in annual revenue. Since 2006 Sandra has been coach and mentor in Ipsos Reid's Gold program for junior researchers.

CURRICULUM VITAE

SALIM A. ABOUD

Education

- B.Sc. Honors Biophysics and Chemistry, 1974  
University of Western Ontario  
London, Ontario
- M.Sc. Biological Sciences, 1978  
Concordia University  
Montreal, Quebec
- Ph.D. Soil Chemistry, 1987  
University of Guelph  
Guelph, Ontario

Employment History

- 1974-1976 Concordia University  
Montreal, Quebec  
- Research and Teaching Assistant
- 1976-1980 Montreal Children`s Hospital  
Montreal, Quebec  
- Research Assistant and Computer Consultant
- 1980-1983 University of Guelph  
Guelph, Ontario  
- Research and Teaching Assistant
- 1984-Current Alberta Research Council now Alberta Innovate – Technology Futures  
Edmonton, Alberta  
- Soil Chemist, Geochemist  
- Group Leader, Solid Waste Management  
- Manager, Soils Analytical Laboratory
- 1987- 2004 University of Alberta  
Edmonton, Alberta  
- Adjunct Professor of Soil Chemistry

Areas of Experience

- 30+ years of experience in management of various organic and inorganic wastes from municipal, industrial and agricultural sectors.
- Teaching of several University and extension courses (Canadian and International) in solid waste management and environmental chemistry.
- Production of Renewable Natural Gas from Wastes
- Design and operation of pilot methane oxidation technology plants for landfill GHG emission mitigation.
- Composter design for pilot scale facility.
- Compost chemistry, quality and analytical procedures
- Chemical and physical characterization of composts and their feed-stocks.
- Development of a method to measure compost respiration and maturity.
- Pilot scale composting of municipal solid waste and sewage sludge.
- Design and commissioning of pilot scale trickling biofilter for odour treatment.
- Biofiltration of emissions from compost and wastewater treatment facilities.
- Characterization and remediation of contaminated soils and geological materials in temperate and tropical regions.
- Characterization, land treatment and land-spreading of industrial sludges from the pulp and paper, oil and gas extraction, petrochemical, chemical and refining sectors.

- Development of analytical procedures for heavy metals in soils, plants and wastes.
- Disposal of produced waters generated by heavy oil extraction plants.
- Interaction and fate of inorganic and organic pollutants (e.g. heavy metals, soil sterilents and phenolic compounds) with soils and subsurface rocks.
- The extraction, characterization and metal reactions of humic and fulvic materials from soil, aquatic and waste materials.
- The effects of acid and acid forming emissions on soil properties, and the computer modelling of these soil effects.
- The fate of oil condensates in soils after well blowouts and the reclamation of these contaminated soils.
- Sewage sludge disposal on soils.
- Heavy metal reactions with soils.
- Chemical speciation of soil solutions and other aqueous media.
- Extraction and Spectroscopic investigations (NMR, IR, ESR) of soil organic matter and humic materials in aquatic systems.

#### Publications and Presentations

- Abboud, Salim. 2010. The potential for producing Renewable Natural Gas from Canadian wastes – a presentation at the Canadian Gas association Renewable Gas Workshop, Vancouver, BC.
- Abboud, Salim. 2010. The Edmonton Waste Management Centre of Excellence (EWMCE) – an integration of public and private activities in solid waste management. A presentation at the REINNOVA Sessions, Innovation and Research applied to Waste Management, Catalunya, Spain.
- Abboud, Salim and Wanyu Chen. 2010. Pilot scale demonstration of methane oxidation technology at the Barriere and Lower Nicola landfills in the Thompson Nicola Regional District. A report prepared for the TNRD.
- Abboud, Salim and Shahrzad Rahbar. 2010. Potential for producing renewable natural gas from Canadian wastes. Proceedings of the Venice 2010 Third International Symposium on Energy from Biomass and Waste. Venice, Italy.
- Abboud, Salim; Kevin Aschim; Brennan Bagdan; Partha Sarkar; Hongqi Yuan; Brent Scorfield; Christian Felske; Shahrzad Rahbar and Louis Marmen. 2010. Potential production of methane from Canadian wastes. A joint report of the Alberta Research Council and Canadian Gas Association.
- Abboud, Salim. 2009. Results, Opportunities, Limitations of Methane Oxidation Technology in Western Canada. Presented at the 2009 SWANA NW Regional Symposium.
- Yu, Shouhai, D.M. McCartney, W. Chen, L. Zhou and S. Abboud. 2008. Trace metal mass transfer during thermophilic composting. Presented at the Annual Compost Council of Canada Conference.
- Abboud, Salim and Shahrzad Rahbar. 2008. Canadian Waste offers new source of Renewable Natural Gas. Canadian Natural Gas: Spring Edition.
- Abboud, Salim and Shahrzad Rahbar. 2008. The potential for Producing Renewable Natural Gas from Canadian Wastes. Presented at the International Gas Research Conference, Paris.
- Abboud, Salim. 2008. Renewable Natural Gas. Presented at the Canadian Gas Association Clean Energy Solutions Workshop, Vancouver.
- Abboud, Salim and Shahrzad Rahbar. 2008. Waste to Gas - The Acceptable Biofuel. BC Oil and Gas Report.

- Abboud, S.A. 2007. Cumulative changes in soil quality at Shell's Land Treatment Facility (LTF) 7 years after hydrocarbon based sludge additions. A report submitted to Shell Canada Limited.
- Daryl McCartney, Salim Abboud and Bo Ge. 2007. Achieving Acceptable Metal Levels in Municipal Solid Waste Compost. Presented at the International Solid Waste Association World Congress 2007 in Amsterdam, Netherlands.
- Abboud, Salim A. and Larry W. Turchenek. 2007. Site-Specific Critical Loads of Acid Deposition on Soils in the Edmonton 83H East Map Sheet, Alberta. Report prepared for Alberta Environmental Protection Department.
- Ge, Bo, Daryl McCartney and Salim Abboud. 2007. Achieving Acceptable Metal Levels in Municipal Solid Waste Compost. Presented at WasteCon2007, the annual SWANA conference.
- Turchenek, L. W., K. Ketilson and S. A. Abboud. 2006. Relative sensitivity and critical loads of acid deposition on soils in the Great Sand Hills land review area. Report submitted to University of Regina, Saskatchewan.
- Ge, Bo, Daryl McCartney and Salim Abboud. 2006. Trace metal sources in municipal solid waste composts. Presented at the ORBIT 2006, the 5<sup>th</sup> International conference on Biological Waste Management. Weimar, Germany.
- Abboud, Salim A. and Larry W. Turchenek. 2006. Site-Specific Critical Loads of Acid Deposition on Soils in the Edmonton 83H West Map Sheet, Alberta. Report prepared for Alberta Environmental Protection Department.
- Abboud, S.A, C. Schwartz, G. Dinwoodie, G. Byrtus and L.W. Turchenek. 2006. Trends in Soil Acidification in Alberta based on Long Term Acidification Monitoring from 1981 to 2005. Report prepared for Alberta Environmental Protection Department.
- Abboud, S.A. 2006. Changes in the Oil and Grease Fraction and Hydrophobicity of Shell's Land Treatment Facility (LTF) Soils after Additions of Biological and Hydrocarbon based Sludges. A report submitted to Shell Canada Limited.
- Abboud, S.A. 2006. Hydrophobicity of Shell's Land Treatment Facility (LTF) Soils and Changes after Organic Waste Additions (Synthesis of the 2000-2005 Results). A report submitted to Shell Canada Limited.
- Abboud, Salim. 2005. Overview of Waste Management GHG Emissions, Modelling, and Possibilities for Reduction. Presented at the Greenhouse Gases Workshop at the Edmonton Waste Management Centre of Excellence.
- Ge, Bo, Daryl McCartney and Salim Abboud. 2005. Trace Metal Sources in Mixed Municipal Solid Waste Compost Systems. Compost Council of Canada Annual Conference and Meeting, Lake Louise, Alberta.
- Abboud, Salim A., Christian Felske and Frances DeJong. 2005. Novel Biosolids Composting using Real Time Sensing and Control in a Covered Aerated Static Pile System. International Solid Waste Association Conference, Buenos Aires, Argentina.
- Whitson, I.R., S. Abboud, E.E. Prepas, and D.S. Chanasyk. 2005. Trends in dissolved phosphorus in gray Luvisolic soil profiles after forest harvest. *Can. J. Soil Sci.* 85(1):89-101.
- Abboud, Salim A. 2004. The Edmonton Waste Management Centre (EWMC) – Integration of waste management activities between the public and private sectors. Presented at the European Union Integrated Waste

Management and Life Cycle Analysis conference, Prague, Czech Republic.

Abboud, S. and F. DeJong. 2003. Biofiltration of emissions from the Gold Bar Wastewater Treatment Plant (GBWWTP). Report prepared to the GBWWTP.

Abboud, S. and A. Heidman. 2003. Biofiltration of compost emissions from the Edmonton Co-Composting Facility. Report prepared for the Edmonton Waste Management Centre of Excellence.

Abboud, S., L.W. Turchenek and L. Halsey. 2003. Critical loads of acid deposition on soils in the Athabasca oil sands region, Alberta. Report to the NO<sub>x</sub>-SO<sub>2</sub> Management Working Group, Cumulative Environmental Management Association.

Abboud, S. and B. Bennet. 2002. Sampling and analysis of odours from the Gold Bar Wastewater Treatment Plant (GBWWTP). Report prepared to the GBWWTP.

L. van Noortwyk, S. Abboud and A. Yee. 2002. Biosolids composting using aerated static piles. Final report prepared for the Edmonton Waste Management Centre of Excellence.

L. van Noortwyk, S. Abboud and A. Yee. 2002. Curing partially co-composted municipal solid wastes and biosolids. Final report prepared for the Edmonton Waste Management Centre of Excellence.

Abboud, S. and J. Schubert. 2002. The potential of waste management as a mitigative tool for greenhouse gas reductions. Invited plenary paper at the Annual Recycling Council of Alberta meetings, Kananaskis.

Abboud, S., A. Heidman, L. van Noortwyk and A. Yee. 2002. Curing Partially Co-Composted Municipal Solid Waste and Biosolids. Annual meetings of the Compost Council of Canada.

Turchenek, L. and S. Abboud. 2001. Site-specific critical loads of acid deposition on soils in the Provost-Esther area, Alberta. Report prepared for Alberta Environmental Protection. Pub. No. T/609, ISBN: 0-7785-1723-3 (Printed Edition), ISBN: 0-7785-1725-X (Online Edition), Web Site: <http://www3.gov.ab.ca/env/info/infocentre/publist.cfm>

Abboud, S. and J. Schubert. 2001. Managing Municipal Wastes: The Potential for Carbon Sinks and Emission Offsets. An invited paper at Conference Climate Change 2: Canadian Technology Development, Toronto.

Abboud, S. and D. Reid. 2001. Accelerated Decomposition Test of the Mulch Mat Product. Report prepared to Nuform Packaging Inc.

Abboud, S.A. 2001. Contaminant Fate and Transport – Course Lecture notes. University of Alberta.

Abboud, S.A. 2000. Applied Soil Contaminant Interaction – Course Lecture notes. University of Alberta.

Abboud, S.A. 2000. Management of Oilfield Wastes – Course Lecture notes. Canadian Petroleum Institute.

Abboud, S.A. 2000. Toxicity Evaluation of Muds and Cements in Drilling Operations – Course Lecture notes. Canadian Petroleum Institute.

Murphy, S., M. Dudas, M. Gray, and S. Abboud. 2000. Surfactant-Assisted PAH Mass Transfer from Weathered



- Creosote-Contaminated Soils. In Proceedings of "Case Studies in the Remediation of Chlorinated and Recalcitrant Compounds : The Second International Conference on the Remediation of Chlorinated and Recalcitrant Compounds" Batelle Press.
- Nguyen, M., S. Abboud, J. Leonard and A. Yee. 2000. Measurement of Compost Water Content using a Thetaprobe ML2x Soil Moisture Sensor. Annual meetings of the Compost Council of Canada.
- Turchenek, L., S. Abboud and U. Dowey. 1998. Critical loads for organic (peat) soils in Alberta. Report prepared for Target Loading Subgroup, Clean Air Strategic Alliance.
- Abboud, S., W. McGill and J. Leonard. 1998. Co-composting of Edmonton's sewage sludge and municipal solid waste – Metal concentrations in MSW, sludge and their co-compost. Annual meetings of the Compost Council of Canada.
- Leonard J., R. Mu, W. McGill and S. Abboud. 1998. Measurements of some Physical Characteristics of MSW-Sewage Sludge Compost. Annual meetings of the Compost Council of Canada.
- McGill, W.B, J.J. Leonard, R.A. Janzen and S.A. Abboud. How to conserve nitrogen during industrial-scale composting. Annual meetings of the Compost Council of Canada.
- Abboud, S. and D.C. Buck. 1998. Effects of the addition of lime-based by-products from the operations of Daishowa-Marubeni International Ltd. (Peace River Pulp Division) on soil properties and crop yields. Report prepared to Daishowa-Marubeni.
- Abboud, S., W. McGill and J. Leonard. 1997. Co-composting of Edmonton's sewage sludge and municipal solid waste – Effect of water content on compost respiration. Annual meetings of the Compost Council of Canada.
- Macyk, T.M., R.L. Faight, and S.A. Abboud. 1996. Soil and sludge sampling and analysis re winter stockpiling conducted by Alberta Newsprint Company. Report prepared for ARC/FIDB/INDUSTRY Pulp and Paper Research Program. June, 1996.
- Bergman, J and S. Abboud. 1997. Extraction and Characterization of Humic Substances in Municipal Solid Waste and Sewage Sludge Co-Composts. Report prepared for the University of Hamburg.
- Pauls, R. W. , S.A. Abboud and L.W. Turchenek. 1996. Pollutant deposition impacts on lichens, mosses, wood and soil in the Athabasca Oil Sands Area. Report to Syncrude Canada Ltd., Fort McMurray, Alberta.
- Soon, Y.K., Y.P. Kalra, and S.A. Abboud. 1996. Comparison of some methods for the determination of total sulfur in plant tissues. *Commun. Soil Sci. Plant Anal.* 27:809–818.
- C.B. Powter, S.A. Abboud and W.B. McGill (eds.), 1995. *Environmental Soil Science*. Anthropogenic Chemicals and Soil Quality Criteria. Proceedings of a symposium, August 10-11, 1992, Edmonton, Alberta. Canadian Society of Soil Science,
- Jones, H., Julien, L. and S.A. Abboud. 1995. Environmental remediation of a petroleum extraction site. Proceedings of the association of professional engineers of Trinidad and Tobago (APETT) 9th annual technical conference and exhibition.
- Abboud, S.A. And T.M. Macyk. 1995 Characterization of sludge from the operations of Daishowa-Marubani International LTD Peace River Division (PRPD). Report prepared for Daishowa-Marubani International LTD.

(Peace River Division)

- Abboud, S. 1994. Feasibility of using Sherritt waste effluents for irrigation. Report prepared for Sherritt International.
- Macyk, T.M. and S.A. Abboud. 1994. Degradation of hydrocarbon based drilling wastes research. In: Proceedings of 14th World Petroleum Congress, Stavanger, Norway, May 29 to June 1, 1994.
- Abboud, S. A. And T.M. Macyk. 1994. Characterization of Lime-Based and Organic-Based Wastes from the Operations of Alberta Pacific Industries Mill (AL-PAC). Report prepared for Alberta Pacific Industries Mill (AL-PAC)
- Abboud, S. A. And T.M. Macyk. 1994. Characterization of lime-based wastes from the operations of Daishowa-Marubani International LTD. (Peace River Division). Report prepared for Daishowa-Marubani International LTD. (Peace River Division)
- Macyk, T.M., S.A. Abboud and R.L. Faught. 1994. Pulp and paper research program sludge utilization physical properties measurement annual report (April 1, 1993 to March 31, 1994). Report prepared for ARC/FIDB/INDUSTRY Pulp and Paper Research Program.
- Turchenek, L.W., R. Xie, S.A. Abboud and G.W. Lutwick. 1994. Acid deposition impacts on Alberta soils: Long term response, critical loadings, and target loadings. Section 4 in: N.C. Das, compiler, Acid Deposition Program Progress Reports (1992-93). Alberta Environmental Centre, Vegreville, AB. AECV94-R5.
- Abboud, S.A. 1993. Contaminated soils: A Canadian perspective. An invited presentation to the "Contaminated Soils" symposium at the Soil Science Society of America and American Society of Agronomy Annual Meetings, Cincinnati, OH.
- Abboud, S.A. and T.M. Macyk. 1993. Management of Drilling Wastes in Alberta – Course Lecture Notes. Alberta Research Council.
- Abboud, S.A. 1993. DWASTE, a compute program for the management of drilling wastes on land. Computer program and manual published by the Alberta Research Council.
- Abboud, S.A., R.W. Pauls and L.W. Turchenek. 1993. Pollutant deposition impacts on lichens, mosses, wood and soil in the Athabasca oil sands area.
- Warren, C.J., M.J. Dudas, S.A. Abboud. 1993. Effects of acidification on the chemical composition and layer charge of smectite from calcareous till. *Clays & Clay Minerals*. 40:731-739.
- Abboud, S.A. and D. Wallace. 1993. Characterization and assessment of cleanup of metal contaminated soils at a foundry site in B.C. A report prepared by the Alberta Research Council.
- Soon, Y.K. and S.A. Abboud. 1993. Cadmium, Chromium, Lead and Nickel. Chapter 3 in "Soil Sampling and Methods of Analysis" edited by M.R. Carter for Canadian Society of Soil Science. Lewis Publishers, Boca Raton, FL.
- Sheppard, S.C., W.G. Evenden, S.A. Abboud and M. Stephenson. 1993. A plant life-cycle bioassay for contaminated soil, with comparison to other bioassays: Mercury and zinc. *Arch. Environ. Contam. Toxicol.* 25:27-35.
- Abboud, S.A. 1993. Land treatment drilling wastes technology. Invited Presentation to the Canadian Association of Drilling Engineers Spring Drilling Conference, Calgary, Alberta.

- Pawluk, S., S.A. Abboud and A.B. Gajdostik. 1993. Microstructure and humus form diversity in Alberta Chernozems. Farming for the Future Report No. 92-0022. Edmonton, Alberta.
- Turchenek, L.W., S.A. Abboud and G.W. Lutwick. 1993. Acid deposition impacts on Alberta soils: Long term response, critical loadings, and target loadings. Section 3 in: N.C. Das, compiler, Acid Deposition Program Progress Reports (1991-92). Alberta Environmental Centre, Vegreville, AB. AECV93-R8.
- Macyk, T.M., S.A. Abboud and F. Nikiforuk. 1993. Assessment of the impact of landspreading invert mud drilling wastes - characterization, greenhouse, degradation and field experiments. Prepared for Reclamation Research Technical Advisory Committee. 186 pp.  
\* Five annual reports prepared to date.
- Macyk, T.M. and S.A. Abboud. 1993. Drilling waste disposal - General Document. Alberta Conservation and Reclamation Council Report No. RRTAC 93-5. ISBN 0-7732-0889-5. 125pp.
- Abboud, S.A. 1992. Total heavy metal analysis methods: Comparison of various digestion techniques. Proceedings of the 4th annual WEALA workshop on "Heavy Metals in the Environment". Western Environmental and Agricultural Laboratory Association. Edmonton, Alberta.
- Pojasok, T., S.A. Abboud and T.M. Macyk. 1992. The degradation of three polyaromatic hydrocarbons of an invert mud drilling waste. Proceedings of the Canadian Society of Soil Science and Canadian Land Reclamation Association joint Annual Meetings, Edmonton, Alberta.
- Xie, R. and S.A. Abboud. 1992. Simultaneous degradation of chlorophenols and chlorophenoxyacetic acids in a soil. Proceedings of the Canadian Society of Soil Science and Canadian Land Reclamation Association joint Annual Meetings, Edmonton, Alberta.
- Xie, R., S.A. Abboud and T. Pojasok. 1992. Transportation of chlorinated organic waste materials in soil columns. Proceedings of the Canadian Society of Soil Science and Canadian Land Reclamation Association joint Annual Meetings, Edmonton, Alberta.
- Xie, R., S.A. Abboud and R. Faught. 1992. Changes in chemical characteristics of land treatment facility for oily waste materials. Proceedings of the Canadian Society of Soil Science and Canadian Land Reclamation Association joint Annual Meetings, Edmonton, Alberta.
- Macyk, T.M., S.A. Abboud and F.I. Nikiforuk. 1992. Alberta drilling waste sump chemistry study. Volume I: Report. Alberta Land Conservation and Reclamation Council Report No. RRTAC 92-6.
- Macyk, T.M., S.A. Abboud and F.I. Nikiforuk. 1992. Alberta drilling waste sump chemistry study. Volume II: Appendices. Alberta Land Conservation and Reclamation Council Report No. RRTAC 92-6.
- Warren, C.J., M.J. Dudas and S.A. Abboud. 1992. Effects of acidification on the chemical composition and layer charge of smectite from calcareous till. Clays and Clay Minerals 40(6):731-739.
- Turchenek, L.W., S.A. Abboud, and G. Lutwick. 1992. Acid deposition impacts on Alberta soils: Long term response, critical loadings, and target loadings.
- Macyk, T. M., S. A. Abboud, and F. Nikiforuk, 1992. Assessment of the impact of landspreading invert mud drilling wastes, "Field Experiment," unpublished report for the Reclamation Research Technical Advisory Committee, Environmental Research and Engineering Department, Alberta Research Council.

- Pojasok, T., S.A. Abboud, and T. M. Macyk, 1992. Assessment of the impact of landspreading invert mud drilling wastes, "Degradation Experiment," unpublished report for the Reclamation Research Technical Advisory Committee, Environmental Research and Engineering Department, Alberta Research Council.
- Soon, Y.K. and S.A. Abboud. 1991. A comparison of some methods for soil organic carbon determination. *Communications in Soil Science and Plant Analysis* 22(9&10):943-954.
- Macyk, T.M., S.A. Abboud, T. Pojasok, R. Xie and F. Nikiforuk, 1991. Assessment of the Impact of Landspreading Invert Muds Drilling Wastes. Unpublished Annual Report prepared by the Alberta Research Council for RRTAC.
- Soon, Y.K. and S.A. Abboud. 1990. Trace elements in agricultural soils of northwestern Alberta. *Can. J. Soil Sci.* 70:277-288.
- Abboud, S.A.; and R.L. Faught. 1989. The Use of Lime Sludge (a by-product of the heavy oil industry) for Liming of Acid Agricultural Soils in Alberta, Canada. *Proceedings of the 1989 Alberta Soils Workshop.*
- Lavigne, J.A.; and S.A. Abboud. 1989. The extraction and characterization of humic substances from oil sand sludges. A report submitted to the Oil Sand and Hydrocarbon Recovery Department, Alberta Research Council.
- Abboud, S.A.; T.M. Macyk; and D.L. Lloyd. 1989. Characterization of drilling wastes from Alberta, Canada. *Proceedings of the Conference on Prevention and Treatment of Groundwater and Soil Contamination in Petroleum Exploration and Production.* Calgary, Alberta.
- Macyk, T.M., F.I. Nikiforuk, S.A. Abboud and Z.W. Widtman. 1989. Detailed sampling, characterization and greenhouse pot trials relative to drilling wastes in Alberta. *Alberta Land Conservation and Reclamation Council Report No. RRTAC 89-6.* 228 pp.
- Macyk, T.M.; F.I. Nikiforuk; and S.A. Abboud. 1989. Impact of heavy oil drilling wastes from Alberta Canada on soils and plants. In "Drilling Wastes", edited by F.R. Engelhart, J.P. Ray, and A.H. Gillam. *Proceedings of the 1988 International Conference on Drilling Wastes.* Elsevier Applied Science Publishers Limited, London.
- Macyk, T.M., S.A. Abboud and F.I. Nikiforuk. 1989. Oil and gas reclamation research program: drilling mud disposal: characterization and greenhouse pot trial - Grande Prairie Region. Report prepared for the Land Conservation and Reclamation Council, Reclamation Research Technical Advisory Committee, Alberta Environment. 240 pp.
- Macyk, T.M., S.A. Abboud and F.I. Nikiforuk. 1988. Oil and gas reclamation research program: drilling mud disposal: characterization and greenhouse pot trial - Foothills Region. Report prepared for the Land Conservation and Reclamation Council, Reclamation Research Technical Advisory Committee, Alberta Environment. 223 pp.
- Abboud, S.A. 1988. The use of microwave digestion techniques for the total elemental analysis of soils. *Proceedings of the First International Soil Residue Analysis Workshop.* Winnipeg, Manitoba.
- Macyk, T.M., S.A. Abboud, and D.A. Lloyd. 1988. Sampling and characterization of some heavy oil drilling wastes from Alberta, Canada. In: *Proceedings of the 34th Annual CSSS/AIC Meeting - Special Session on Energy Extraction: Concerns and Issues Related to Soil Reclamation.* August 21-24, 1988, University of Calgary, Calgary, Alberta.
- Abboud, S.A.; and R.L. Faught. 1988. Land disposal of sludge from Suncor's Fort Kent Thermal Project. Volume I:

Introduction, Objectives, Materials and Methods and Chemical Constituents and Properties of Lime Sludges. Report prepared for Suncor Inc.

Abboud, S.A.; and R.L. Faught. 1988. Land disposal of sludge from Suncor's Fort Kent Thermal Project. Volume II: Leaching and Transport of Chemical Constituents in Lime Sludge Amended Soils in Laboratory Columns. Report prepared for Suncor Inc.

Abboud, S.A. 1988. Forest soil sampling and associated chemical extraction methodologies. Report prepared for the Alberta Forest Service.

Turchenek, L.W., S.A. Abboud, and N. Holowaychuk. 1988. Modelling soil response to acid deposition in Alberta. *Communications in Soil Science and Plant Analysis* 19: 805-818.

Abboud, S.A. and L.W. Turchenek. 1988. Assessment of present and future effects of acidic and acid forming substances on Alberta soils. Prepared for the Alberta Government/Industry Acid Deposition Research Program by the Alberta Research Council. 136 pp.

Abboud, S.A. and L.W. Turchenek. 1988. Assessment of present and future effects of acidic and acidifying air pollutants on Alberta soils. In: Legge, A.H. 1988. *The Present and Potential Effects of Acidic and Acidifying Air Pollutants on Alberta's Environment. Critical Point I, 1988. Final Report.* Prepared for the Acid Deposition Research Program by the Biophysics Research Group, Kananaskis Centre for Environmental Research, Calgary, Alberta. ADRP-B-17-88. 664 pp.

Abboud, S.A. and L.W. Turchenek. 1988. Acid titration and characterization of some Alberta mineral forest soils. Prepared for Research Management Division, Alberta Environment by Alberta Research Council, Edmonton. 70 pp.

Abboud, S.A. and L.W. Turchenek. 1988. Application of a computer simulation model to determination of target loadings for acid deposition on soils. Prepared for Research Management Division, Alberta Environment by Alberta Research Council, Edmonton. 86 pp.

Singleton, G.A., L.W. Turchenek and S.A. Abboud. 1988. A modelling study of the potential effects of acid-forming emissions on selected Alberta soils. In: *Proc. of Symposium 'Energy Extraction: Concerns and Issues Related to Soil Reclamation'; Partial Proceedings of the 34th Annual Canadian Society of Soil Science/ Agricultural Institute of Canada meetings, August, 1988, Calgary, Alberta;* pp. 86-105.

Abboud, S.A. and L.W. Turchenek. 1988. Assessment of present and future effects of acidic and acidifying air pollutants on Alberta soils. In: Legge, A.H. and Krupa, S.V. 1989. *Acidic deposition: Sulfur and nitrogen oxides.* Lewis Publishers Inc., Chelsea, Michigan.

Macyk, T.M., S.A. Abboud and F.I. Nikiforuk. 1987. Oil and gas reclamation research program: drilling mud disposal: characterization and greenhouse pot trial - Cold Lake Region. Report prepared for the Land Conservation and Reclamation Council, Reclamation Research Technical Advisory Committee. Alberta Environment. 168 pp.

Abboud, S.A. 1987. Chemical forms of cadmium in municipal sewage sludge amended soils. Unpublished Ph.D. thesis, University of Guelph, Guelph, Ontario.

- Abboud, S.A. 1986. Assessment of fluid-rock interaction, as related to subsurface waste disposal, in oil sands and heavy oil areas of Alberta and adjacent areas. Phase 4. The equilibrium constants of phenol adsorption and desorption in simulated formation water-sediment systems. A report prepared for Environment Protection Service, Environment Canada.
- Abboud, S.A., and F.I. Zasadny. 1986. The feasibility of lime sludge disposal from Shell's Peace River pilot plant on local agricultural soils. A report prepared for Shell Canada.
- Abboud, S.A. 1986. Are heavy metals a problem in Alberta?. Proceedings of the 23rd Annual Alberta Soil Science Workshop.
- Zasadny, F.I., and S.A. Abboud. 1986. Analytical methods for heavy metal analysis of soils, part II (As, B, Cr, Co, Hg, Mo, Se, V). Report prepared for Alberta Environment.
- Abboud, S.A., and R.J. Fessenden. 1986. The use of lime sludge (a byproduct of the heavy oil industry) for liming of acid soils in Alberta. Canadian Land Reclamation Meetings, Vancouver, BC.
- Abboud, S.A. 1986. The effect of redox status, ionic strength, solid to liquid ratio and formation lithology on the adsorption of phenol by carbonate and sandstone formations. Soil Science Society of America Annual Meeting, New Orleans, LA.
- Lloyd, D.A., and S.A. Abboud. 1986. Petroleum drilling wastes: The potential for landspreading in Alberta. Soil Science Society of America Annual Meeting, New Orleans, LA.
- Turchenek, L.W., and S.A. Abboud. 1986. Solid state <sup>13</sup>C-NMR spectroscopy of size and density gradient fractions of a chernozemic soil. Soil Science Society of America Annual Meeting, New Orleans, LA.
- Turchenek, L.W.; S.A. Abboud; C.J. Tomas; R.J. Fessenden, and N. Holowaychuk. 1986. Effects of acid deposition on soils in Alberta. Report prepared for the Alberta Government/Industry Acid Deposition Research Program.
- Abboud, S.A. 1985. Analytical methods for heavy metal analysis of soils. Report prepared for Alberta Environment.
- Abboud, S.A. 1985. Assessment of fluid-rock interaction, as related to subsurface waste disposal, in oil sands and heavy oil areas of Alberta and adjacent areas. Phase 3, Part 2 - Phenol partitioning between sediment water phases. Report prepared for Environment Protection Service, Environment Canada.
- Abboud, S.A. and L.W. Turchenek. 1985. Characterization of peat humification by solid state CP/MAS <sup>13</sup>C-NMR spectroscopy. Soil Science Society of America Meeting, Chicago, Ill.
- Abboud, S., and T.E. Bates. 1984. Adsorption and site energy binding functions of cadmium on sewage-sludge amended soils. Soil Science Society of America Annual Meeting, Las Vegas, Nevada.
- Abboud, S., and T.E. Bates. 1984. Changes in soil organic matter after sewage-sludge additions. Canadian Society of Soil Science Annual Meeting, Banff, Alberta.
- Abboud, S., and T.E. Bates. 1984. Adsorption of Cd by sewage sludge-amended soils. Canadian Society of Soil Science Annual Meeting, Banff, Alberta.
- Abboud, S. and T.E. Bates. 1983. Chemical forms of cadmium in sludge-amended soils. Canadian Society of Soil Science, Annual Meeting, Truro, N.S.

Abboud, S. and T.E. Bates. 1983. Sequential extraction of soil cadmium after 8 years of sewage sludge amendments. Soil Science Society of America Annual Meeting, Washington, D.C.



## ***Eric Camirand, Eng. President***

10301 Chemin Ste-Marguerite, suite 7  
Trois-Rivières, Qc G9B 6M6  
819-840-3589 x112

### **EDUCATION AND MEMBERSHIPS**

---

Bachelor of Engineering, Electrical Engineering, McGill University, 1993

Renewable Energy Training, RETScreen International, National Resources Canada, 2004

Member of Quebec engineering association : *l'Ordre des ingénieurs du Québec* (OIQ # 145774)

Founding president of *Biogaz Québec*, 2008

Member of the Canadian Society of Bioengineering (CSBE, SCGAB)

Member of the *American Society of Heating, Refrigerating & Air-Conditioning Engineers*

Founding Member of Open DVD Association, 1998-2001

Chairman Open MPEG consortium, 1995-2000

Member of SWANA (Solid Waste Association of North America)

Member of Agrienergy producers' association of Ontario

### **SELECTED EXPERIENCE**

---

<b>Electrigaz Technologies Inc.</b>	<b>Trois-Rivieres, QC</b>	<b>2004 – present</b>
Engineering firm specialized in the development of biogas projects.		
<b>President</b>		

#### **Task description**

Manage all Electrigaz projects, staff and sub-contractors.

In charge of sales force and client management.

Establish business relationships with designers, equipment dealers and biogas researchers here and abroad.

Stay informed about new technology development in anaerobic digestion, biogas processing and organic waste management.

Present at conferences and workshops on technical, environmental, economical and political issues regarding the development of anaerobic digestion projects in Canada and USA.

Stay in touch with new biogas projects as well as national and international policies development on biogas.

Perform economical analysis and development of financial model for various biogas projects.

Develop sophisticated tools (spreadsheets) allowing quick evaluation of technical and economical feasibility of biogas projects.

#### **Realization**

Research and development of proprietary online software for preliminary evaluation of biogas projects.

<http://www.electrigaz.com/kefir/index.php>



*Gaz Métro Montreal, QC*

Analysis of all potential biomethane projects in Quebec. Recommendation of approach to qualify and answer potential biomethane producer concerns.

*BC Bioenergy Network, Vancouver, BC*  
Feasibility Study – Due Diligence Review: Agricultural Waste to Green Energy and fertilizer project.

*Happy Acres, Eastsound, WA*  
Preliminary design of an anaerobic digestion process for wastewater sludge and grease trap treatment.

*Zhang Project, Hebei Province, China*  
Organic waste survey and analysis for the construction of a centralized biogas plant. On site visit of waste producers and operator. Preliminary design of an anaerobic digestion plant.

*Earthreanu, Vancouver, BC*  
Analysis of organic waste material and bioenergy potential for industrial and agricultural material.

*Ashworth Farm, New-Brunswick*  
Preliminary engineering and economical analysis for a farm based anaerobic digester using manure and silage as feedstock.

*Concordia University, Montreal*  
Preliminary engineering and cost assessment of an anaerobic digester to be located downtown Montreal on the University campus.

*Guelph University, Ontario*  
Development and presentation of a course on the principles and design of anaerobic digesters.

*Centre Local de Développement Repentigny*  
Conceptual, environmental and economical analysis for the construction of a coop food waste treatment plant where biogas is being reused on site.

*British Columbia Innovation Council, Vancouver*  
Technical review and economical analysis of biogas upgrading technologies to meet natural gas pipeline specifications.

*HSF Foods, New Brunswick*  
Economical analysis and preliminary engineering of an anaerobic digester for potatoes process industry.

*BLT Farms, Ste-Catharine, Ontario*  
Technical and economical comparative study of anaerobic digestion systems for a poultry producer.

*BC Bioproducts Association, British Columbia*  
Evaluation of the potential for a biogas industry in BC and development of policy recommendations to enable its development in the Fraser Valley.

*Champêtre cheese factory, Repentigny*  
Technical and economical feasibility study for a lactoserum digester and usage possibility of biogas produced.

*Frito-Lay, North America*  
Preliminary evaluation of waste management of potatoes chips plant sludge using anaerobic digestion.

*McLeod Agronomics, New Brunswick*  
Study for the development of an ethanol pilot plant using biogas energy in the distillation process.

*Mobilogaz, Harrington*  
Design and construction of a 3 m<sup>3</sup> mobile biogas plant (10kW).

*École des énergies alternatives du Québec (EEAQ), Montreal*  
Workshop presentation on biogas technologies and possible applications.

*Messier Farm, Ham Nord*  
Technical research to convert heating system « LB White » to use raw biogas.

*SEG Engineering, Gan-Yavne, Israël*  
Preliminary evaluation and carbon financing study for a centralized biogas plant in dairy complex housing 30,000 dairy cows.

*Geonomic BT, Bangalore, India*  
Research and development of a waste treatment solution for a southern India temple housing 100 elephants.

*C3FE Corp, Maine, Etats-Unis*  
 Comparative study of various technologies for treatment of manure for a 4.5 millions chicken egg layers farm.

*Global Advisors Ltd, New Delhi, Inde*  
 Carbon financing study for 7,500 family digesters in rural India.

*Katani Ltd, Tanzanie, Afrique*  
 Research for the implementation of an R & D pilot plant for the production of bio-hydrogen from Sisal fiber plant waste.

<b>Camirand Consultant/Consulting</b> Environmental consultant.	<b>Montreal, Qc</b>	<b>2002 – 2004</b>
<b>Director</b>		

**Task description**

Market research on renewable energy and in depth understanding of the energy and waste management sectors.

*Aeolus Consulting, Vancouver. C-B*  
 Economical analysis for renewable energy projects: wind, solar, biogas and bioenergy.

Building data base and relationship with energy development promoters and renewable technology providers.

*Morgan Farm, Weir, Qc*  
 Waste management study of an organic farm: plastic combustion energy utilization, animal remains composting and anaerobic digestion of manure.

Development of financial models allowing a quick analysis of project potential.

Study, planning and project design for clients.

*CANWEA (ACÉÉ), Montreal, Qc*  
 Active member of the Quebec section of the Canadian Wind Energy Association.

**Realization**

*Wind and solar energy prototype, Montreal*  
 Design, assemble and start up of a wind-solar energy generator for marine application.

<b>Ravisent Technologies Inc.</b> Audio/video software development company.	<b>Vancouver, BC</b>	<b>2000 – 2001</b>
<b>Vice-president business development</b>		

**Task description**

General manager of Ravisent Canada.

Business plan development of the merged company (Ravisent and Cinax).

**Realization**

Project management of Ravisent software integration with Cinax Design product.

*Software integration*  
 Integration of audio/video compression software of Ravisent technologies into Cinax products.

Asian market business development of Ravisent technologies.

*MediaLock business development*

Promotion of MediaLock technologies to asian partners. Integration technique discussion.

**Cinax Design** Vancouver, BC 1994 – 2000  
Audio/video software development company.

**Founding president**

**Task description**

General manager of a team of 15 software developers producing compressed audio/video software MPEG/MP3/DVD.

Business partnership development for international markets.

In charge of market research and identification of client's needs.

Report to the company board and shareholders.

Project management, staff management and project timelines.

Financing research and promotion of the company to potential investors.

**Realization**

*iFilmStudio software development*  
Project manager of a complex interactive film making software for CD and DVD.

*iFilmEdit software development*  
Project manager of an uncompressed digital film production software.

*MediaPalette software development*  
Project manager of an audio-video format conversion software

*MediaLock software development*  
Project manager of copyrights management system for networked audio and video files distribution.

**OTHER EXPERIENCE**

---

**Petro-Canada** Montreal, Qc 1992  
**Junior engineer/software developer**

**Task description**

Perform analysis and software development to update existing database.

**Realization**

Project manager in developing a database to facilitate the maintenance team to easily access specifications of broken equipment and to locate replacement material on site.

## CONFERENCES, PUBLICATIONS, COURSES AND WORKSHOPS

---

### Courses and workshops

*Biogas training course*  
Guelph University, 2008

*Introduction to renewable energy technologies.*  
Institut des technologies agro-alimentaires (ITA) Ste-Hyacinthe, 2008

*Workshop on renewable energy and anaerobic digestion*  
Director of energy policies for Quebec ministry of agriculture  
MAPAQ, 2008

*Biogas : Introduction to biomass energy*  
École des énergies alternatives du Québec ([http://www.eeaq.ca/Ateliers\\_Cours/ateliers\\_cours.html](http://www.eeaq.ca/Ateliers_Cours/ateliers_cours.html)), 2007

*Perspectives for biogas energy in BC*  
Biogas workshop, Abbotsford, BC, 2007

*Biogas energy workshop*  
Taos, New Mexico, 2006

### Conferences and publications

*Biomethane development and operational challenges,* Canadian Gas Association Biomethane Workshop, Vancouver, November, 2010

*Biogas project development cycle,* Biogas USA, San Francisco, October 2010

*Biomethane production cost from various sources,* Biocycle, Des Moines, October 2010

*Electric cars economical analysis as a solution for renewable energy in Quebec,* Salon des technologies environnementales du Québec, Quebec, March 2010

*Mandatory biomethane mix in the Canadian natural gas network,* Growing the margins conference, London, ON, March 2010

*Technical and economical challenges of building a mobile biogas plant*  
Biocycle conference, California, 2009

*Economical viability of upgrading farm biogas to sell energy directly to consumers over the natural gas grid*  
Growing the margins, London, ON, 2008,

*Prospects of anaerobic digestion potential of organic materiel and biogas energy valorization for various Canadian markets*  
Salon TEQ, 2008, Quebec

*Anaerobic digestion technologies*  
Quebec Liberal Party congress, 2008

*Perspectives for biomethane production and resell in the Fraser Valley*  
Agricultural BC show, 2008

*Farm based biogas projects in Ontario*  
Toronto International Agricultural show 2008

*Biogas investment opportunities*  
Biofinance conference, Toronto, 2008

*On farm energy production*  
Conférence énergie à la ferme, St-Jean-Richelieu, 2008

*Economical viability of upgrading farm biogas for thermal or automotive applications*  
Biocycle conference, Wisconsin, October, 2008

*Biogas principles*  
CRAAQ, Journée sur la méthanisation, 2007

*Climat change and anaerobic digestion*  
APCAS, Air et changements climatiques, 2007

*Economical viability of biogas production from energy crops*  
Growing the margins, 2007, London, On