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## 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.

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- 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

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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

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- 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.

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(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.

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- 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.
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- 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.

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- 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.
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- 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.
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- 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.
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- 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.
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- 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.
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- 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.
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- 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.

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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.