July 1988 – December 1993 **Concordia University College** Edmonton, Canada
Associate Professor of Biology and Environmental Science

- Developed and delivered lectures and laboratories in introductory and senior level university courses in biology, zoology and environmental science.
- Maintained liaison with government, industry and the public on environmental (health) issues.
- Counselled students on performance and career selection.
- Coordinated the development of an environmental science program.
- Served on various committees related to the development of the overall college curriculum.
- Coordinated the development of the Public Health Inspector upgrading program.

Sept. 1989 – May 1990 **Grant MacEwan Community College** Edmonton, Canada
Instructor (part-time)

- Delivered occupational toxicology course to students registered in Occupational Health Nursing Program

Jan 1988-1994 **The Banff Centre for Management** Banff, Canada
Faculty Member

- Assisted in the development and delivery of courses on industrial and hazardous waste management and environmental risk management.

1980 - 1984 **Occupational Hygiene Branch, Alberta Workers' Health, Safety and Compensation** Edmonton, Canada
Manager, Inhalation Toxicology Program

- Directed and administered all aspects of the Program including budget control, staff hiring and supervision and evaluation of program effectiveness.
- Developed and implemented an experimental inhalation toxicology program in Vegreville, Alberta.
- Undertook research on occupational health hazards (both laboratory and literature based).
- Identified priority areas requiring research and then developed detailed protocols for research projects.
- Interpreted results of studies and prepared technical reports.
- Provided technical advice to Division professionals, the Branch Director, Executive Director, Managing Director, the Minister, internal/external working groups and committees on all aspects of toxicology.
- Assisted in the development and management of the Occupational Hygiene Branch.
- Liased with other government departments in the development of environmental health standards and the resolution of environmental health problems.

1975 - 1976 **Environment Conservation Authority** Edmonton, Canada
Research Officer

- Responsible for multi-disciplinary scientific work that entailed the writing of reports and information papers for public distribution.
- Conducted critical literature reviews on topics of public concern.
- Conducted on-site investigations of environmental complaints and prepared reports and recommendations to resolve complaints.
- Prepared analyses and reports of scientific and other committee meetings, including assisting in the coordination of meetings involving several government departments.
- Assisted in the preparation and conducting of public hearings on a variety of environmental issues.

1966 - 1968 **Geography Department, University of Calgary** Calgary, Canada
Meteorological Technician

- Responsible for the complete operation of the campus weather station.
- Maintained all equipment, recorded daily meteorological observations, and undertook weekly visits to a network of portable weather stations.
- Organized field trips and supervised students.
- Provided technical information to the faculty, students and the public.

Professional Credentials

2002 Re-certification: Diplomate of the American Board of Toxicology (DABT)

1998 Re-certification: Diplomate of the American Board of Toxicology (DABT)
1995 Professional Biologist (P.Biol.), Alberta Society of Professional Biologists
1993 Diplomate of the American Board of Toxicology (DABT)
1983 Ph.D. (Toxicology), University of Rochester School of Medicine and Dentistry, Rochester, New York, USA
1981 M.S. (Toxicology), University of Rochester School of Medicine and Dentistry, Rochester, New York, USA
1975 M.Sc. (Molecular and Developmental Biology) University of Calgary, Calgary, Alberta, Canada
1973 B.Sc. (Biology), University of Calgary Calgary, Alberta, Canada

Continuing Education

2003 American Academy of Allergy, Asthma and Immunology 60th Anniversary Annual Meeting – Denver, Colorado
2003 Society of Toxicology – 42th Annual Meeting Salt Lake City, Utah
2002 Introduction to Moisture Intrusion, Mold, and Assessment. AMEC Seminar, Calgary, AB
2002 WHMIS recertification (December)
2002 Two-Stepping Through Toxicogenomics: A Basic Primer. Society of Toxicology 41st Annual Meeting, Nashville, TN.
2002 Application of Microsystems and Nanotechnology to the Life Sciences. National Research Council, Banff, AB.

Continuing Education

2001	GLP's for Study Directors and QA Monitoring (Edmonton, AB.)
2001	Microbial Investigation. NSF International 2nd Annual Indoor Health Conference, Miami, FL
2001	Strategic Coach Management Development Series – Year 2
2000	Strategic Coach Management Development Series (Year 1 -Vancouver, B.C.)
2000	Metal Exposure and Toxicity of the Respiratory Tract. Society of Toxicology, 39th Annual Meeting, Philadelphia, PA.
2000	Environmental Epidemiology and Toxicology: The Interface and the Interactions. Society of Toxicology, 39th Annual Meeting, Philadelphia, PA.
1998	GLP's for Study Directors (Reno, Nevada)
1997	Introduction to GLP's (Edmonton, AB)
	Molecular Toxicology
1996	Short course at Society of Environmental Toxicology and Chemisty (SETAC) World Congress, Vancouver, B.C
1995	Methods to Detect Sublethal Mechanisms of Toxicity
1995	Human Health Studies for Environmental Risk Management. 1995 Sponsors' Course, Eco-Research Chair, University of Alberta, Edmonton, AB.
1994	Fundamentals of Health Risk Assessment for Environmental Risk Management. 1994 Sponsors' Course, Eco-Research Chair, University of Alberta, Edmonton, AB.
1994	WHMIS Train-the-Trainer course. HATSCAN Inc., Edmonton, AB.
1994	Canadian Environmental Protection Act (CEPA) Workshop on New Substances Notification, Calgary, AB.
1993	Computerized Information to Support Risk Assessment, SETAC, Houston, USA
1993	Ecological Impact, Risk Assessments, and Cleanup Decisions at Hazardous Waste Sites, SETAC, Houston, TX, USA.
1993	Powerful Presentation Skills, Rockhurst College, Kansas, USA.
1993	Project Management, Rockhurst College, Kansas, USA.
1992	Mid-America Toxicology Course, Kansas City, Missouri.
1992	Case Studies in Risk Assessment: Emphasis on Exposure. Society of Toxicology 31st Annual Meeting, Seattle, Washington.
1992	Toxicity of Halogenated Hydrocarbons. Society of Toxicology 31st Annual Meeting, Seattle, Washington.
1990	"Office Ergonomics", Alberta Occupational Health & Safety, Edmonton, Alberta.
1989	Industrial and Hazardous Waste Management, The Banff Center of Management, Banff, Alberta.
1988	Site Specific Monitoring for Air Toxics, Air Pollution Control Association, Raleigh, N.C., USA
1984	Respiratory Pathology of Laboratory Animals, Harvard Medical School, Boston, Massachusetts, USA.
1978	Industrial Toxicology Certificate, Wayne State University, Detroit, Michigan, USA

Professional Affiliations

- Society of Toxicology (Canada)
- Society for Risk Analysis
- Air and Waste Management Association
- Canadian Occupational Health Association
- Canadian Federation of Biological Sciences
- American Industrial Hygiene Association (Alberta Chapter)
- Canadian Public Health Association/International Health Association
- Society of Environmental Toxicology and Chemistry
- International Society of Exposure Analysis
- American Chemical Society
- American College of Toxicology
- American Board of Toxicology
- National Environmental Health Association
- American Academy of Allergy, Asthma and Immunology
- American Association of Pharmaceutical Scientists

Major Professional Appointments

- Adjunct Professor, Department of Public Health Sciences, Faculty of Medicine, University of Alberta (1990 - present).
- Adjunct Professor, Department of Biology and Environmental Sciences, Concordia College (1994 - present).
- External Advisor, American Institute of Biological Sciences/NASA Research Program (1994, 1995).
- Director, Air & Waste Management Association (CPANS - 1994-96).
- Member, Department of Environmental Health Advisory Committee, Concordia College (1995-1996).
- Chairman, President's Advisory Committee on the Environment, Concordia College (1991-1993).
- Member, Professional Development Committee, Environmental Health Services, Alberta Health (1988-1990).
- Director, Environmental Science Program, Concordia College (1990-1993).
- Chairman, Environmental Health Advisory Committee, *Concordia* College (1988-1993).
- Chairman, Education Policies Committee, Concordia College (1987-1988).
- Member, Science Advisory Committee, Environment Council of Alberta (1986-1990).
- Member, Alberta Environment Minister's Hazardous Chemicals Advisory and Appeals Committees (1985-1993).
- Member, Shelter vs Evacuation Committee on H_2S, Alberta Energy Resources Conservation Board (1987-1990).

Major Professional Appointments

- Member, Scientific Advisory Board for the Sour Gas Hazard Assessment Project, ERCB (1987-1990).
- Honorary Research Assistant Professor, Division of Pulmonary Medicine, University of Alberta (1985-1988).
- Chairman, Human Health Committee, Government-Industry Acid Deposition Research Program (1984-1985).
- Project Manager, Southwest Alberta Medical Diagnostic Review Project, Government-Industry Acid Deposition Research Program (1984-1986).
- Member H_2S/SO_2 Toxicity Review Committee, Alberta Social Services and Community Health (1984-1985).
- Chairman, Core Committee on H_2S Research, Alberta Provincial Board of Health (1982-1984)
- External Advisor, Occupational Heritage Grant Fund (1984-1987).
- Member, Toxicology Group, Alberta Environmental Centre (1980-1984).
- Member, Occupational Hygiene Branch Management Committee (1980-1984).
- Co-Chairman, Alberta Risk Assessment Committee (1982).
- Member, Environmental Surveillance Committee, Alberta Member, Occupational Health Services Regulations Committee (1982-1984)
- Alberta Occupational Health and Safety Division (1982-1984).
- External Advisor, British Columbia Health Care Research Foundation (1980-1986).
- Member, Alberta Petroleum Industry-Government Environment Committee: Subcommittee on Human and Animal Health (1980-1981)
- Member, Associate Committee on Scientific Criteria for Environmental Quality Subcommittee on Air, National Research Council of Canada (1980-1981)

Publications

Journals/Books

- Browder, L.W., R.E. Rogers and S. Caswell. 1973. Analysis of transcription in Rana pipiens oocytes during in vitro culture. J. Cell Biol. 59:68a.
- Rogers, R.E. and L.W. Browder. 1975. Transcription in Rana pipiens oocytes during in vitro culture. Can. J. Genetics and Cytol. 17:456.
- Rogers, R.E. and L.W. Browder. 1975. Transcription in Rana pipiens lampbrush oocytes during in vitro culture. J. Cell Biol. 368a.
- Rogers, R.E. and L.W. Browder. 1977. Characterization of RNA synthesis in cultured lampbrush-stage Rana pipiens oocytes. Devel. Biol. 55:148-158.
- Rogers, R.E. and L.W. Browder. 1977. Morphological observations on cultured lampbrush-stage Rana pipiens oocytes. Devel. Biol. 55:135-147.
- Rogers, R.E. and J. Ferin. 1981. Effect of hydrogen sulfide on bacterial inactivation in the rat lung. Arch. Environ. Health 36(5): 261-264.
- Rogers, R.E. 1988. The Lodgepole Sour Gas Blowout. In: Information Needs for Risk Management. Eds. C.D. Fowle, A. Grima and R. Munn. Environmental Monograph No. 8. Institute for Environmental Studies, University of Toronto, Toronto, Canada. pp. 205-221.
- Fedorak, P.M. and R.E. Rogers. 1991. Assessment of the potential health risks associated with the dissemination of microorganisms from a landfill site. Waste Management and Research 9:537-563.
- Rogers, R.E. 1991. Indoor Air Quality: One Community's Perspective. Second Wind 2(2):8-9
- Kindzierski, W.D., R.E. Rogers and N.J. Low. 1993. Health Effects Associated with Wastewater Treatment, Disposal, and Reuse. Water Environment Research 65: 599-605.
- Burdick, J., L. Melenka, and R.E. Rogers. 1999. Evaluation of Human Respiratory Irritation Following Simulated Residential *Exposure to a* Benzyl Benzoate Carpet Powder (BBCP). Presented at the American Lung Association/American Thoracic Society 1999 International Conference

Theses

- Rogers, R.E. 1975. Synthesis in Rana pipiens oocytes. M.Sc. Thesis, Dept. of Biology, University of Calgary, Calgary, Alberta.
- Rogers, R.E. 1981. Effect of Hydrogen Sulfide on Bacterial Inactivation in the Lung. M.S. Thesis, Toxicology Training Program, University of Rochester, Rochester, N.Y., U.S.A.
- Rogers, R.E. 1982. Effect of Hydrogen Sulfide on Bacterial Inactivation in the Rat Lung. Ph.D. Thesis, Toxicology Training Program, University of Rochester, Rochester, N.Y., U.S.A. .Sc. Thesis, Dept. of Biology, University of Calgary, Calgary, Alberta.

Reports

- Rogers, R.E. 1975. Carsland/Cominco Chemical Fertilizer Project. Report and Recommendations. Alberta Environment Conservation Authority. pp. 87.
- Rogers, R.E. 1976. Commercial Supersonic Air Transportation in Alberta: A Preliminary Analysis of Environmental Impact Information. Alberta Environment Conservation Authority. pp. 65.
- Rogers, R.E. 1976. Hydrogen Sulfide: A Bibliography of Its Health Effects, Formation, Distribution and Control. Alberta Environment Conservation Authority. pp. 20.
- Rogers, R.E. 1977. Biocides and Birds. Alberta Environment Conservation Authority. pp. 70.
- Rogers, R.E., D. Johnston, D. Chisholm and D. Stokes. 1984. A Report on the Human Health Workshop. Alberta Government-Industry acid Deposition Research Program. Volume 1. Researching Acid Deposition: Workshop Proposals.
- Rogers, R.E. 1988. Report of the Ad Hoc Committee on H_2S Toxicity. Alberta Health Report. pp. 65.
- Rogers, R.E. 1989. Report of the Federal-Provincial Committee on Ambient Air Quality. National Ambient Air Quality Objectives for Total Reduced Sulphur Compounds. Environment Canada. pp. 75.

Presented Papers Published in Proceedings

- Rogers, R.E. 1982. Hydrogen sulfide in the lung: in vivo and in vitro effects. In: Proceedings of INRS Symposium on Guidelines for Industrial Toxicology Research. Nancy, France. September 27-29, 1982.
- Rogers, R.E. 1982. Design features for hazard control in an inhalation toxicology laboratory. In: Proceedings of the Second Annual Conference, Canadian Association of Biosafety Specialists. April, 1982.
- Rogers, R.E. 1985. Toxicological issues in indoor air quality. In: Indoor Air Quality Symposium Proceedings. University of Calgary. April, 1985.
- Rogers, R.E. 1988. Indoor air quality: The risks of modern living. In: Proceedings of the Haztech Canada Conference. Edmonton, Alberta. October, 1988.
- Soskolne, C., Flowerdew, G., Berkel, J., Gabos, S., King, M., Rogers, R. and S.E. Hrudey. Acute leukemia and drinking water source, Edmonton, Alberta, Canada: 1979 - 1989. International Epidemiological Association, September 26-29, 1993. Sydney, Australia.
- Soskolne, C., Flowerdew, G., Berkel, J., Gabos, S., King, M., Rogers, R. and S.E. Hrudey. Acute leukemia and drinking water source, Edmonton, Alberta, Canada: 1979 - 1989. International Society for Environmental Epidemiology, August 15-18, 1993. Stockhom, Sweden.

Presented Papers Published in Proceedings

- Fell, L.A., Osimitz, T.G., Griesemer, J.S, DeProspo, J.R, Singer, S.S, Carlson, D, Whitmyre, G.K, Driver, J.H, Pandian, M.D, Ginevan, M.E., Rogers, R.E, Tang, L.W. S.C. Johnson & Son, Inc., AgrEvo Environmental Health, AgrEvo USA Company, McLaughlin Gormley King Company, risksciences.com, LLC, and Toxcon Health Sciences Research Centre, Canada. Use of Indoor Residential Exposure Monitoring Data to Validate Indoor Residential Exposure Models. In: Procedings of SRA, 1999.
- Rogers, R.E. Environmental Quality Guidelines: Do They Really Protect Human Health? 1999. Proceedings of the 26th Annual Aquatic Toxicity Workshop, Edmonton, AB.
- Ratliffe, W., M.Heise, M. Clendenan, and R. Rogers. 1999. Human Health Risk Assessment of a Tetrachloroethylene Contaminated Site. Proceedings of the 26th Annual Aquatic Toxicity Workshop, Edmonton, AB.
- Rogers, R.E., W. K. Kindzierski, M. Mostrom and N. Prasad. 2001. Use of Clinical Studies for Improved Risk Characterization of Consumer Products. In: Proceedings of the 2nd International Conference on Indoor Air Health, Miami, FL
- Rogers, R.E. 2001. Exposure Characterization: Airborne and Surface Deposition Levels of Selected Fragrance Ingredients. In: Proceedings of the Research Institute for Fragrance Materials Regional Information Exchange, Tenafly, New Jersey
- Rogers, R.E. 2002. Characterization of Potential Human Exposure to Fragrances During Residential Consumer Product Use. In: Proceedings of the Research Institute for Fragrance Materials Regional Information Exchange, Munich, Germany
- Rogers, R.E , Ibach, R., Jeng C-J, Prasad, N., Burdick J. 2003. Evaluation Of Acute Respiratory Effects In Healthy Adults Following Controlled Environmental Exposures To Fragranced Incense Sticks. Society of Toxicology Annual Meeting, Salt Lake City, Utah
- Rogers, R.E., Isola D.A, Jeng C-J, Dews P., Myshaniuk A., and Smith, L.W. 2003. Characterization of Potential Human Exposure to Fragrances During Residential Consumer Product Use American Academy of Allergy, Asthma & Immunology Denver, Colorado

Films

- Rogers, R.E. 1975. RNA Synthesis in Rana pipiens Oocytes During in vitro Culture. (35mm audio-video presentation).

Invited Talks

(not a complete list)

- Alberta Thoracic Society. "Effects of Hydrogen Sulfide on Pulmonary Bacterial Inactivation in Rats." Presented at the annual meeting in Red Deer, October,1983.
- Canadian Occupational Health Association. "Current Issues in Indoor Air Quality."
- Presented at the annual meeting in Edmonton, 1984.
- National Workshop on Risk-Benefit Analysis. Ottawa, 1985.
- Sixth Annual I.P.A.C. Regional Conference. "How to Survive Your Sick Building." Edmonton, October, 1986.
- American Industrial Hygiene Association (Alberta Chapter). "Toxicology and Industrial Hygiene." Presented at the annual meeting, Calgary,1986.
- Technical University of Nova Scotia Workshop on Indoor Air Quality. "Effects of indoor air quality on human health and comfort." Edmonton, March, 1988.
- Canadian Water Resources Association. "The Potential for Environmental Health Impact Assessments in Alberta." Edmonton, October, 1990.
- University of Alberta Faculty of Extension (Public Lecture Series). "Environmental Issues: What Can We Learn from Science?" Edmonton, March, 1991.
- Dioxins/Furans: Real Problem or Media Hype. Presented at the Alberta Public Health Association Annual Meeting. Grande Prairie, May, 1991.
- Insight Educational Services. "Environmental Science: A Primer for Lawyers and Business Executives". Calgary, May,1991.
- The Role of Public Health Impact Assessment in Solid Waste Management. Presented at CPANS "Landfills: What's the Problem?" Specialty Conference, Edmonton, November, 1991.
- Specific Workplace Hazards. Presented at EnviroAction'92. Alberta Health Care Association, Calgary, March,1992.
- Environmental Health Education and Risk Management: Are We Doing Our Job? Presented at the CPANS/ Air & Waste Management Annual Meeting. Calgary, May,1992
- Stewardship of the Environment: Are We Doing Our Job? Presented to Concordia
- Lutheran Seminary, Edmonton, November, 1992.
- The Role of Industrial Hygienists in Human Health Risk Assessment. Presented to the AIHA-Alberta Chapter. Edmonton, November, 1992

Invited Talks

- Current Trends in Health Risk Assessment. Presented to the Air &Waste Management Association (Alberta Chapter). Edmonton, February, 1994.
- The Case of the Invisible Man. Presented to the Canadian Bar Association (Environmental Law Section). Edmonton, February, 1994
- Industrial Hygiene and the Case of the Missing Elephant Presented to the AIHA-Alberta Chapter, March,1994
- Indoor Air Quality and the Hypersusceptible Individual. Presented to 47th Annual Meeting Canadian Cardiovascular Society, October, 1994
- Risk Management, Risk Assessment and Hydrogeology. Presented to Local Chapter, International Association of Hydrogeologists, November, 1994
- QC Issues for Laboratory Data Used in Risk Assessment. Presented to Western Enviro-Agricultural Laboratory Association, April, 1995
- Hydrogeologists' Role in Risk Assessment. Keynote address presented at International Association of Hydrogeologists Solutions '95 Annual Conference, June, 1995

Toxcon Projects

(not a complete list)

Since 1995, Toxcon has conducted numerous health/ecological risk assessments and exposure assessments on both contaminated sites and consumer products. The list of projects is too long to present here.

- Negative impacts of jet aircraft emissions on northern Alberta houses (1995).
- Potential impacts associated with potable water consumption in northern Alberta (1995).
- Health risks associated with sulfinol degradation products from major sour gas plant in Alberta (1995). Health risks associated with a proposed metals recycling operation in Manitoba (1995).
- Human Health Risk Assessment for CNR's Edmonton City Yard Site, Edmonton (1995).
- Health risks/toxicological hazards associated with agricultural crops contaminated by hydrocarbons (1995).
- Health risk assessment of railway site being developed for commercial/residential activities (1995).
- Toxicological review of a carbon monoxide death (1995).
- Toxicological assessment of a picloram accidental spraying incident (1995).
- Potential Health Risks Associated with a Proposed Piggery operation in Ponoka, Alberta, (1995).
- Occupational Health and Safety, Public Health Risks of the Canada Creosote, Calgary site. (1994-95).

Toxcon Projects

- Toxicological Investigation of Occupational Health Problems at a Coal Mine site.
- Health Risks Associated with an Abandoned Gas Well Site Destined for Residential Development. Residential Land Developer (1994-95).
- Asbestos Health Risks at Theological College, Edmonton (1994-95).
- Toxicity Testing of Plant Growth Hormone for Entry into Europe (1994-95).
- Dioxin/Furan Contamination of Municipal Wastewater Sludge. (1995).
- Health Risks Associated with Inks Used in Dental Acrylics. (1994).
- Health Risks Associated with A Leaking UST and its Impact on Sale of Property. (1994).
- Health Risks Associated with An Abandoned Well-drilling Site in Red Deer, AB. (1994).
- Risk Assessment of Hydrocarbon-contaminated Drinking Water. (1994).
- Chemistry and Toxicology of Dioxins/Furans. Specialty Course for various Pulp and Paper Industries Ltd. (1994)
- CEPA Schedule XIV Testing of Bacterial Strains Used in Bioremediation.(1994).
- Businesses Development Services. (1994).
- Health Risks Associated with Fugitive Airborne Emissions From a Petrochemical Plant. (1994-95).
- Health Risks Associated with Airborne Emissions From A Proposed OSB Plant. (1994-95).
- Health/Environmental Risks of Thimet (1993).
- Indoor Air Quality Assessment Millshaven Mall, Sherwood Park. (1993).
- Indoor Air Quality Assessment. Concordia College (1993).
- Health Risks From Underground Storage Tanks. (1993 -1995)
- Health Risks Associated with Landfarming Municipal Wastewater Sludge(1993).
- Critical Assessment of Federal Environmental Health Program Structure (1992-93).
- Rossdale Water Intake Health Risk Assessment Study. (1991-93).
- Aurum Landfill Public Health Impact Assessment. (1990).
- Risk Assessment of Wood Preservative Sites. (1990-92).
- Environmental Hazard Assessment and Protection Plan of Local Satellite Community (1990-91).
- Toxicological Validation of Complex Hydrocarbon Material Safety Data Sheets. (1990). Suffield Defense Establishment - Toxics Disposal Project. (1990).

Toxcon Projects

- Drayton Valley Indoor Air Quality Investigation: Impacts of an OSB Plant Operation. (1989-90).
- Sour Gas Hazard Assessment Project. (1987-1990).
- Alberta-Pacific Forest Industries Ltd. Pulp Mill Proposal Review.(1989-90).
- Training of Alberta Environment's Pollution Emergency Response Team (1990)
- Indoor Air Quality Course for Alberta Public Health Inspectors. (1989).
- Asbestos Abatement Project. (1989).
- Alberta Health, Environmental Health Services (1986-89). Provision of ongoing toxicological expertise on a number of projects.
- Establishment of Safe Levels of Exposure for Airborne Emissions. (1988
- Guidelines for Action Following Acute H2S Exposure. (1988).
- National Ambient Air Quality Objectives for Reduced Sulphur Compounds.(1987-88).
- Yellowhead Educational Consortium - toxicology course for Crown Zellerbach employees. (1987).
- City of Edmonton Drinking Water Supply. Steve Hrudey and Associates Ltd. (1986)
- Southwest Alberta Medical Diagnostic Review Project. Acid Deposition Research Program (1984-1986).

Zelt Professional Services Inc.
Box 1469
Okotoks, Alberta, CANADA T1S 1B4

t.403.995.2122
f.403.995.2122

Brian W. Zelt

Brian Zelt is a professional engineer with a Ph.D. in mechanical engineering in air dispersion modeling and the time series analysis of concentrations fluctuations. He has strong academic fundamentals in turbulence, dispersion, probability distributions of concentration fluctuations, numerical analysis, time series analysis and digital filtering, meteorology, climate, heat transfer, thermodynamics, boundary layer theory and of random processes which form a valuable background to his assessment of data sets and problem solving.

He has more than twelve years of industrial applied experience in the fields of air quality modelling, surface water quality modelling, exposure assessment, environmental and human health risk assessment, report writing and project management. He also has strong computing skills and has developed many private and public applications in DOS, Windows and Unix in Basic, Fortran, C/C^{++} and assembler. He has also developed specialty applications in VisualBasic for Access database and Excel spreadsheet including: environmental inspection and management systems, water quality dispersion model, project management, air quality windrose graphics. His technical background is combined with graphics art background in the development of intuitive and user-friendly interfaces to his programs.

Dr. Zelt has three principle areas of application in his consulting practice: air quality, water quality and risk assessment:

- Air quality experience includes: modelling using Alberta Environment or USEPA dispersion models for environmental impact assessments (EIA) for Oil Sands, oil and gas, pulp and paper, landfill, fugitive dust and hazardous/toxic gas applications; EIA management; EIA air quality report writing; peer review; fugitive dust dispersion modelling; greenhouse gas estimates; training and presentations. Dr. Zelt's strong academic fundamentals are also applied to the estimation of air quality emissions, an important aspect of the air quality modelling, which includes monitoring data assessment, thermodynamics and estimation techniques.

- Surface water quality modelling experience includes: development of methodology and computer programs to determine mixing zones; combined seepage, stream and river mixing; municipal mixing zone assessment; EIA surface water quality modelling; probabilistic and stochastic assessments, and sediment transport.

- Risk assessment experience includes the above air quality and water quality modelling in the application of exposure estimates to: bioaccumulation; bioconcentration; aquatic health; terrestrial wildlife health; human health; probabilistic (@Risk, Crystal Ball, and code developed personally) assessments; and expert testimony. Applications range: from ice loading of the Confederation Bridge; decision analysis; contaminated sites including super fund sites; Oil Sands landscape impacts on wildlife and human health; oil and gas developments on human health; and to fugitive dust exposures.

Brian W. Zelt

Education

PhD, Mechanical Engineering, University of Alberta, 1992
BSc, Mechanical Engineering, University of Alberta, 1984

Affiliations

Professional Engineer, Association of Professional Engineers, Geologists and Geophysicists of Alberta (APEGGA)
Air and Waste Management Association (AWMA)
Canadian Prairie and Northern Section of AWMA

Awards

Gilpin Award for Research Excellence
Alberta Oil Sands Technology and Research Authority Scholarship
Gulf Canada Ltd. Graduate Scholarship
NSERC Undergraduate Summer Research Award
Dean's Research Award

Experience

2002- **Zelt Professional Services Inc.** **Calgary, Alberta**
President
Air quality modelling and assessment; exposure modelling; risk assessment; computer programming; probabilistic model formulation; communication of technical information, business graphics and presentation development.

1998-2001 **E2 Environmental Alliance Inc.** **Calgary, Alberta**
Director, Air Quality Services
Air quality modelling and assessment; human and ecological risk assessment; surface water quality modelling; probabilistic model formulation; statistical analysis, time series analysis; Windows C++ computer programming.

1993-1998 **Golder Associates Ltd.** **Calgary, Alberta**
Ecological and Human Health Risk Assessment, Exposure Modelling Specialist
Water quality modelling; atmospheric dispersion modelling; risk assessment; environmental noise modelling; probabilistic model formulation; statistical analysis; time series analysis; computer programming; industrial graphics art;

1992 **Spicer Corp.** (contract) **Kitchener, Ontario**
Design/Program user interface for retail version of graphics software

1992 **Toxcon Consulting Ltd** (contract) **Edmonton, Alberta**
Health risk assessment modelling for Edmonton Water Treatment plant

1992 **University of Alberta** (contract) **Edmonton, Alberta**
Developed a three-dimensional flexible linkage robot simulation program

1990 **Toxcon Consulting Ltd** (contract) **Edmonton, Alberta**
Toxic gas dispersion modelling for new landfill

SAGD / FORT MCMURRAY OIL SANDS / OTHER RELEVANT EXPERIENCE

AIR QUALITY

Peer Review,
Shell-Jackpine EIA, Inuvialuat Environmental — **Alberta, Canada**

Critical review of the air quality section of the Shell-Jackpine Mine EIA in Fort McMurray Oil Sands region for Inuvialuat Environmental Group on behalf of the MCFN First Nations.

Peer Review,
CNRL-Horizon EIA, Inuvialuat Environmental — **Alberta, Canada**

Critical review of the air quality section of the CNRL-Horizon Mine EIA in Fort McMurray Oil Sands region for Inuvialuat Environmental Group on behalf of the MCFN First Nations.

NOx/Ozone Environmental Review
TransCanada/Environment Canada — **Alberta, Canada**

Literature review of environmental effects of NOx and Ozone in relation to strategies for NOx controls for gas turbines. Review of impacts from Selective Catalytic Reduction (SRC). Review of: ozone monitoring in Alberta; ozone regulations in USEPA/Canada; ozone and NOx photochemistry. Technical writing/editing.

Scoping Tucker Project, Air Quality, Husky — **Alberta, Canada**

Air Quality modelling in simple and intermediate terrain using the CalPUFF model. Meteorological data review and emissions inventory preparation and estimation. Model verification and preparation of report.

Orion EOR Project, Air Quality, BlackRock — **Alberta, Canada**

Air Quality modelling in simple and intermediate terrain using the CalPUFF model. Meteorological data review and emissions inventory preparation and estimation. Model verification and preparation of report.

Air Quality Modelling, Amoco — **Alberta, Canada**

An update to Wolf Lake SAGD operations resulted in a need to update the air quality modelling for Amoco's permit. SO2 and NOx modelling of steam generators, co-generation and field flares. (ISC).

EIA, Suncor Energy — **Alberta, Canada**

Management of the air quality task of the EIA for the Project Millennium oil sands mine and facilities expansion. Meteorological data set preparation and quality assurance based on site data from two meteorological towers. Emissions inventory preparation for the Millennium project and greater oil sands area. Air quality model development (ISCBE configuration and CALPUFF), calibration and use.

Wolf Lake Heavy Oil EIA — **Northeastern Alberta, Canada**

Air quality dispersion modelling using Alberta Environment and U.S. EPA dispersion models was used in this EIA amendment to determine air quality impacts as a result of the increased emissions for the Wolf Lake and Primrose operations. Plant site steam generators, processing equipment and field flares were included in the assessment of SO_2, NO_x and VOC concentrations. Greenhouse gas calculations and ozone precursor concentrations for ozone generation potential were included in the assessment for the EIA and AEUB approval.

Primrose Commercial Development — **Northeastern Alberta, Canada**

The Primrose Commercial Development is the first expansion phase from the pilot study of the steam injection oil sands recovery project by Amoco. Air dispersion of slightly sour gas from 33 flared annulus gas oil production well stacks was performed using the Alberta Environment *SEEC* model for SO_2. NO_2 dispersion calculations were performed for the commercial development steam generators and existing plant operation equipment using the Alberta Environment *SEEC* model.

Long-Term Monitoring — **Western Saskatchewan, Canada**

Long-term air quality management including the assessment of air quality monitoring results, and preparation of regular reports of static and continuous monitoring results to the provincial government.

Lochend Sour Gas Well Modelling,
City of Calgary — **Alberta., Canada**

Modelling of combusted and uncombusted H2S and SO2 from the proposed Lochend sour gas well near Calgary. A detailed investigation of dense gas effects using the SLAB model was prepared. A far field model using neutrally buoyant gas was prepared using the ISC model.

Maxhamish Air Quality Permit, Salmo — **Ft. Liard, B.C., Canada**

Air quality modelling in simple and complex terrain for the Maxhamish Gas plant in northern B.C. Emissions, modelling and report were prepared for the B.C. permit to operate. (ISC)

Lubicon Lake, Sorrel Environmental — **Alberta, Canada**

As a part of the Lubicon Lake lands claim process, the settlement (village) at Lubicon Lake will be moved. The air quality impacted by sources within 20km was modelled using the ISC model in complex terrain. Emission estimates included plant, battery and fugitives from well-heads.

Air Quality Modelling ,
Weldwood Canada — **Alberta, Canada**

Dispersion modelling using the ISC model in complex terrain for Weldwood Canada, Hinton mill for their license renewal. A review and detailed comparison of monitoring air quality data and meteorological data was completed in preparation for modelling.

RISK ASSESSMENT

Human Health Risk Assessment, BlackRock — **Alberta, Canada**

Screening level human health risk assessment for BlackRock Ventures Inc. for a SAGD heavy oil project in northeastern Alberta. The assessment examined reasonable maximum exposures to industrial emissions in the Cold Lake area. Literature review and qualitative mutlipathway exposure for effects of PAHs and acid deposition.

Performance Assessment — **Alberta, Canada**

Project management of the performance assessment of the closure plan for Syncrude. Wildlife, vegetation, forestry, soils and water resources impacts were modelled and predicted through a GIS based framework. A flexible closure planning protocol was developed to co-ordinate and direct closure planning based on company goals and policies and environmental risk.

Ecological / Human Health Risk Assessment — **Alberta, Canada**

An on-site, off-site and regional analysis of exposure for an ecological and human health risk assessment. The ecological analysis was performed probabilistically and examined the risks based on observed and predicted concentrations in waterbodies, soils and vegetation. The exposure assessment model included contaminant flows from the on-site landforms, through wetlands, rivers and seepage discharges to the Athabasca River. A river dispersion model was created to predict dilution zones and exposure concentrations for various release configurations. Risks to ecological subpopulation receptors were determined through a probabilistic risk assessment. Risks to humans were assessed based on on-site and off-site impact exposure scenarios.

Preliminary Risk Assessment of Seepage Water Discharges — **Alberta, Canada**

Preliminary risk assessment of the seepage water discharges from fine tailings sites was analyzed probabilistically. The exposure model was developed probabilistically using C++ code and examined aquatic biota, fish tissue and osprey as receptor endpoints.

End-Cap Lake Water Quality — **Alberta, Canada**

The potential effects on aquatic biota and plant and fish tissue concentrations were determined in a risk assessment framework for Syncrude Canada Ltd. Assisted in the assessment by performing probabilistic fate and exposure model calculations to determine water quality concentrations and plant and fish tissue concentrations.

Performance Assessment — **Alberta, Canada**

Performance assessment investigating three land reclamation scenarios using generic landscapes for Syncrude and Suncor. Surface water quality and seepage water was modelled for each of the three landscapes and exposure calculations were performed to assess potential off-site impacts. The assessment was performed probabilistically using steady state seasonal modelling and Monte Carlo time series transient modelling. Code was developed in C++ to do the calculations with greater efficiency and speed than typical spreadsheet assessments.

WATER QUALITY

EIA, Suncor Energy — **Alberta, Canada**

Development of the water quality model and technical manager of the water quality modelling in the Athabasca River oil sands area for the EIA for the Project Millennium oil sands mine and facilities expansion.

EIA, Shell Canada — **Alberta, Canada**

Development of the water quality model and technical manager of the water quality modelling in the Athabasca River oil sands area for the EIA for the Lease 13 oil sands mine and facilities application.

Bow River Mixing Zone Study — **Alberta, Canada**

This assessment combined state of the art water quality simulation model development and Monte Carlo techniques to analyze the size of the mixing zone and probabilities of exceeding chronic and acute criteria in the Bow River (Alberta), because of effluent loadings from two City of Calgary municipal wastewater treatment plants. The study included statistical assessments of effluent loadings and simulated long-time series of loadings stochastically based on historical records.

WL Screen Model Development — **Alberta, Canada**

Development of the overlapping dilution zone water quality model for AEP's *WL SCREEN* screening tool for wastewater and mixing zone discharges.

Sediment Transfer Modelling — **Alberta, Canada**

Sediment resuspension modelling and programming changes to the U.S. EPA-WASP model based on laboratory empirical relationships of the resuspension of sediments in the Athabasca River.

Spill Model Development — **Alberta, Canada**

Using the Northern River Basin Study longitudinal and transverse dispersion study results, a Windows-based, user-friendly spill model was developed to predict the time of arrival and downstream water quality concentrations as a result of instantaneous spills anywhere in the Athabasca River basin. The C++ program allows the user to point and click the location of the spill and view the spill-induced water concentrations at user-specified downstream locations. The program displays a list of contacts and phone numbers of downstream users affected by the spill.

Sediment/Silt Influence Zone Modelling — **Alberta, Canada**

Sediment/silt resuspension due to bridge construction at the Suncor oil sands Steepbank Mine was modelled to predict the zone of influence for fisheries due to the construction.

Thermal Plume Dispersion Modelling — **Northern Alberta, Canada**

Analysis of an excess thermal discharge into a river examining the extent of the thermal plume in summer and the extent of ice-suppression in winter for a Suncor expansion. Analysis of the near-field initial dilution of the discharge jet using various diffuser designs and the far-field plume.

Wetlands Quality/Dispersion Modelling — **Northern Alberta, Canada**

Probabilistic formulation of a risk assessment model to examine migration and fate of PAH's and other compounds in the fine tails capping water for the Suncor/Syncrude Oils Sands wetlands reclamation plan. The probabilistic compound loading from the wet landscape model was input into a probabilistic dispersion model of the Athabasca River using the USEPA WASP4 water quality model.

COMPUTER PROGRAMMING

Commitment Tracking Database, Alliance — **Canada**

The database catalogues and tracks progress on fulfilment of environmental commitments made by Alliance during hearings and public meetings, and of conditions contained in the project approval.

Captured in the database are: the exact text of commitment, the origin of the commitment text, progress to fulfilment, and information about each commitment. Specific data collected on each commitment includes: type, topic, activities it relates to, locations it affects and completion progress. (VB-Access)

Decision Support Software, INGAA — **Alberta, Canada**

A user-friendly, risk based, decision support Windows® program (*CROSSING*) was developed. The program accepts readily available stream and biological information then calculates the impacts of stream crossing sediment emissions. The dispersion model and graphics (plotting and contouring) were refined from original code. (C++ Windows)

Project Management Software — **Alberta, Canada**

A user-friendly project management database was programmed in Excel—Visual Basic to track project costs and personnel hours charged on a weekly basis and compare the charged hours against budgeted hours. This system was used to manage the Suncor, Millennium Project EIA. (VB Excel)

Project Management Software — **Alberta, Canada**

A probabilistic project management schedule was prepared in Excel to estimate likelihood of project permit acquisition by company target dates. (@Risk Excel)

Spill Model Development — **Alberta, Canada**

Using the Northern River Basin Study longitudinal and transverse dispersion study results, a Windows-based user-friendly spill model was developed to predict the time of arrival and downstream water quality concentrations as a result of instantaneous spills anywhere in the Athabasca River basin. The C++ program allows the user to point and click the location of the spill and view the spill-induced water concentrations at user-specified downstream locations. The program displays a list of contacts and phone numbers of downstream users affected by the spill. (C++ Windows)

Model Pre/Post-Processor in Windows® — **Northern Alberta, Canada**

An MS-Windows program was developed to be a user-friendly interface for the U.S. EPA water quality modelling program WASP. WASP is a large FORTRAN-77 code and the operating configuration required 8 MB of RAM (under a DOS extender). The Windows interface program allowed the user to modify selected parameters of preconfigured WASP input files. The program ran the WASP model in a DOS window then returned to the Windows environment to postprocess the output files. Various XY-plots and contour plots were included in the postprocessor as well as observed data import and export of plotted data. (C++ Windows)

Probabilistic Risk Assessment Framework — **Northern Alberta, Canada**

Developed an object-oriented framework for probabilistic calculations. The library was incorporated into several DOS programs to analyze ecological and human health performance assessment of the Suncor/Syncrude reclamation scenarios. The framework allowed a model to be coded with standard C variables and then converted to a Monte Carlo (probabilistic) analysis with very few code changes. (C++)

Occupational Health and Safety & Alberta Public Safety Service Grants — **Edmonton, Alberta**

Model and theory development and programming of two state of the art air dispersion models (*SHELTER* and *EXPOSURE*) that run on an IBM PC computer in a user-friendly way. The project included the development of a fast DOS pop-up window environment operating in text and graphics modes, development of graphical plotting routines and development of the algorithms implementing the dispersion models. The models predict concentrations and concentration fluctuation levels downwind of sources and predict indoor and outdoor, toxicity and mortality estimates based on the gas lethality. The computer programs are used by several Alberta and Ontario government agencies and by several agencies in the U.S. and England. (C-DOS)