



Mackenzie Valley Environmental Impact Review Board

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To: Distribution list of EA0607- Fax:
002: Tamerlane Pine Point

CC:

Subject: Attendance of Review Board Expert Advisor Bruce Halbert at October 16 Public
Hearing

Please see attached resume for the Review Board's expert advisor on water issues, Bruce Halbert of SENES Consultants, who will be attending the October 16 Public Hearing in Fort Resolution on the Review Board's behalf. Mr. Halbert will not be giving a formal presentation, but will be allowed to question parties as the Review Board's expert advisor, and may in turn be questioned on evidence provided by the expert advisory team in the form of Technical Comments placed on the public registry.

Contact me with any questions or requests for material.

Regards,

A handwritten signature in black ink, appearing to read "Alistair MacDonald".

Alistair MacDonald

Environmental Assessment Officer

Mackenzie Valley Environmental Impact Review Board

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BRUCE E. HALBERT, M.Sc.

Secretary-Treasurer, Director of Aquatic Environment Studies

EDUCATION

M.Sc., Environmental Health Engineering, 1970,
University of Texas at Austin
B.A.Sc., Civil Engineering, 1968, University of
Waterloo

EXPERIENCE

1980 to date - SENES Consultants Limited

Founding partner with project responsibilities for management and co-ordination of acid mine drainage and mine waste geochemical modelling studies, aquatic environment monitoring investigations, environmental pathways modelling studies, environmental impact assessments, risk assessments, sanitary engineering studies and research projects.

Acid Mine Drainage - Project director in the development of the reactive acid tailings assessment program (RATAP), a comprehensive model of the processes controlling acid generation and metal leaching in sulphidic mine tailings. Lead researcher in an assessment of the role of bacteria in the oxidation of pyritic tailings, environmental factors controlling the rate of oxidation and the applicability of tailings management technologies in limiting acid generation.

Senior investigator in the evaluation of acid generation sources from base metal, gold and uranium mining operations in Newfoundland, Ontario and Saskatchewan including field and laboratory investigations of pyrite, ammonia, cyanide, cyanate and thiocyanate oxidation rates. Lead researcher in field investigations and laboratory static and kinetic testing of mine wastes in Saskatchewan and the Kyrgyz Republic.

Environmental Assessment - Technical specialist on the preparation of Environmental Impact Statements for major uranium mining projects in northern Saskatchewan (Cigar Lake, Dominique Janine, McClean Lake, Midwest Project, Rabbit Lake). Responsible for pathways modelling of chemical and radionuclide releases to the aquatic ecosystems and assessing effects on the receiving environments.

Project manager on several investigations designed to assess environmental conditions at the decommissioned Beaverlodge uranium mine in northern Saskatchewan including geochemical modelling and pathways assessments of the effects of tailings disposed in the Fulton Creek watershed on downstream water and sediment quality and on aquatic and terrestrial species.

Project specialist in the preparation of Environmental Study Reports on several municipal sewage treatment projects in Ontario (Angus, Bala, Haliburton, Port

McNicoll, MacTier, Stayner, Thornbury, Wasaga Beach, Uxbridge). Responsible for characterization of baseline water quality and river low flow conditions and assessment of impacts on receiving water quality and the trophic status as a result from anticipated future growth.

Project director on an investigation into the effects of nuclear generating station emissions and pulp and paper mill discharges on water quality and water use in the Great Lakes.

Environmental Modelling - Co-ordinator of a multi-disciplinary team in the development of the uranium tailings assessment program (UTAP), a probabilistic assessment code for predicting acid generation and metal and radionuclide leaching from sulphidic uranium mine tailings and effects on the receiving environment. Technical specialist in the development of a probabilistic pathways model (INTAKE) for estimation of human and ecological intakes (doses) and risks from exposure to natural and anthropogenic sources of numerous organic and inorganic substances.

Project director on numerous environmental pathways modelling assessments for proposed uranium mine developments in Saskatchewan and base metal, gold and uranium mine decommissioning projects in the Northwest Territories, Nunavut, Ontario, Saskatchewan, Yukon and the Kyrgyz Republic.

Environmental Monitoring - Technical specialist on several environmental baseline studies including: a long-term investigation of the effects of acidic precipitation on a forested watershed (ON); an intensive one-year study to characterize tailings and the surrounding environs at a uranium tailings disposal site (ON); a two-phase study on the distribution of naturally-occurring radionuclides in freshwater benthos and their environment (ON and SK); pre-operational baseline monitoring investigations at the site of a new uranium refinery in northern Ontario, a beryllium and rare earth deposit in the NWT and several proposed large scale landfill sites in southern and northern Ontario; post closure monitoring at uranium mine sites in northern Saskatchewan and the NWT; and, river system studies of the effects of municipal sewage treatment plant discharges at several locations in southern Ontario.

International Institutional Strengthening Projects - Environmental monitoring specialist on a project funded by the Asian Development Bank to strengthen institutions engaged in environmental protection in Uzbekistan. Responsible for assessing current environmental conditions, environmental monitoring systems and their capacity, and identifying primary environmental concerns and requirements to strengthen monitoring capabilities.

Technical specialist on aquatic ecosystem issues pertaining to monitoring the effects on the environment of mining operations in the Patagonia region (five southern provinces) of Argentina. The project, funded by the World Bank, included monitoring of baseline environmental conditions and development of a multi-compartment, environmental transport pathways model.

Landfill Leachate - Technical specialist on several investigations of surface water quality impacts of municipal landfill leachate discharges. Several of these investigations included assessment of the effects of leachate on adjacent natural wetland ecosystems. Also, undertook leachate characterization and treatment investigations including the design of a Powdered Activated Carbon Treatment (PACT) system, a constructed wetland, a leachate pre-treatment system and co-treatment of landfill leachate with municipal sewage.

Mine Decommissioning - Project director on investigations of alternative concepts for decommissioning open pits and waste rock piles at the Cluff Lake, Collins Bay and McClean Lake uranium mines (SK). The implications of disposing mineralized wastes in the pits were evaluated using a pit model developed specifically for this application.

Technical specialist on closure planning for base metal mine tailings and waste rock piles in the Sudbury basin (ON). Project manager on mine flooding assessments for the Shebandowan and Winston Lake base metal mines (ON) and Eagle Point uranium mine (SK)

Mine Tailings Management - Project manager on a study to assess the applicability of underwater tailings disposal for the management of mine tailings from the Elliot Lake uranium mines. Contributor to closure studies for the Denison, Lacnor, Nordic, Quirke, Panel, Pronto, Stanleigh, and Stanrock uranium mines at Elliot Lake, Ontario.

Project manager on an investigation of tailings basin closure concepts for the Winston Lake base metal (zinc) mine (ON) including development of a tailings basin effluent discharge control strategy to minimize variations in receiving water quality and formation of meromictic conditions in downstream lakes. Geochemical modelling specialist on base metal tailings reclamation plans at Joutel (QU) and Kam Kotia (ON).

Mine Waste Rock Management - Technical specialist in the development and application of a multi-nodal geochemical model (ROCKSTAR) for assessing the dynamic behaviour of radioactive and non-radioactive contaminants in waste rock piles, coal discard dumps, open pits and underground mine workings.

Project manager on geochemical modelling assessments of waste rock piles at: base metals mines in northern Ontario (Bowell, Crean Hill, Gertrude, Whistle); a gold mine in Kyrgyz Republic (Kumtor); several uranium mines in Saskatchewan; and eight coal discard heaps in South Africa. Technical specialist on closure planning proposals for several inactive uranium mine sites in eastern Germany, including waste rock piles, heap leach piles, tailings basins, open pits and underground mines.

In each of these investigations, the proprietary model ROCKSTAR developed by SENES was applied to assess the effects on source contaminant loadings of alternative reclamation concepts.

Northern Experience - Project director on screening level HHERAs undertaken on more than 30 northern contaminated mine sites and former military properties in the NWT, NU and YK. Technical specialist on Tier 2 HHERAs of site remediation options at abandoned mine sites in the Yukon (Anvil Range) and the Northwest Territories (Colomac, Giant and Port Radium). Technical specialist on site investigations and on the development of remediation options for the Port Radium mine site. Project director on ERAs of water management alternatives at the abandoned Colomac and Tundra gold mines (NWT).

Project director and lead author on the first ever environmental audit and state-of-the-environment report for the Northwest Territories.

Risk Assessment - Project manager/director on human health and ecological risk assessments (HHERAs) for: proposed uranium mine developments at Cluff Lake, McClean Lake, Midwest and Rabbit Lake in northern Saskatchewan; decommissioning of uranium mines at Beaverlodge, Cluff Lake, Collins Bay and Gunnar in northern Saskatchewan and at Stanleigh in northern Ontario; a contaminated pulp and paper mill site in northern Ontario; and, a proposed municipal non-hazardous waste landfill in Ontario.

Project director on accidental spill risk analyses and consequence assessments of: haul truck transport of uranium ore slurry between McArthur River and Key Lake in northern Saskatchewan; and, haul truck and pipeline transport of concentrated uranium solution between McClean Lake and Rabbit Lake in northern Saskatchewan.

1970-1980 - James F. MacLaren Limited

Assistant Manager, Water Treatment and Waste Disposal Division, 1974. Manager, Municipal Treatment, 1978.

TECHNICAL PAPERS

Mr. Halbert has co-authored over 30 technical papers.