

PRESENTATIONS AND RECOMMENDATIONS FROM THE WORKSHOP ON THE ROLE OF GEOCHEMICAL DATA IN ENVIRONMENTAL AND HUMAN HEALTH RISK ASSESSMENT, HALIFAX, 2010

EXECUTIVE SUMMARY

It is recognized that knowledge of geochemistry is an important component of environmental and human health risk assessments. Although much geochemical information needed to better inform risk assessments exists already, these data are not well represented in many of these assessments. As a step towards improving practice in this area, Health Canada and Environment Canada sponsored a workshop on the role of geochemical data in ecological and human health risk assessments. The Workshop was presented by scientists from the Geological Survey of Canada with recognized expertise in bedrock and surficial sediment geochemistry. The Workshop was by invitation and included federal and provincial representatives and members of the environmental consulting community.

The Workshop covered the following topics:

- Use of geochemical data in risk assessments – a consultant's view
- Causes of variation in geochemical data – natural spatial (horizontal and vertical) and analytical controls
- Field sampling and analytical protocols
- Estimating background geochemical composition
- Case studies involving geochemical data
- Discussion of priorities for improving practice and identifying gaps in existing data.

One aim of the Workshop was to develop a strategy for improving the guidelines for risk assessments by promoting more rigorous use of geochemical information. More specifically, the focus was on the application of existing geochemical data and on the needs for new types of data and developing tools for their application. Information and ideas from the presentations and discussions are gathered here in a final document. The document includes the Workshop proceedings and also contains lists of recommendations for making updates to existing guidelines, where appropriate.

For the purposes of this Workshop, geochemical information was restricted to the chemical elements associated with inorganic substances. The focus was on As, Cd, Cu, Ni, Pb, and Zn, in particular. Issues related to organic substances were not considered. There were presentations on a series of topics relevant to risk assessment, followed by discussions and recommendations for improving practice. The discussions were guided to ensure that Workshop participants were familiar with the concern and also the

guideline. Case studies were used to reinforce the concepts. There was also a session dedicated to identifying knowledge gaps and making plans for moving forward.

The Workshop was held in the Radisson Hotel in Halifax, Nova Scotia, on March 17th and 18th, 2010. Additional introductory information on the Workshop is provided in the directory entitled "Start Here" and also in 01_INTRODUCTION directory. This Open File provides a record of the presentations and other documents associated with the Workshop.

The contents of Geological Survey of Canada Open File 6645 are organized into 10 directories, representing introductory materials (e.g. agenda and abstracts) and the 9 sessions and areas of subject matter covered at the Workshop. The directories related to the 9 sessions contain pdf files of the presentations. The contents and an explanation of the 10 directories are presented in the table below.

ACKNOWLEDGMENTS

The editors and contributors thank Louise White and others at Health Canada and Rita Morz and others at Environment Canada for sponsoring and providing support for the Halifax Workshop. Thank you also to Martin McCurdy for reviewing the documents in this release.

CONTENTS OF OPEN FILE 6645

Note: Some titles of presentations listed below may differ from those listed in the Workshop agenda in the file entitled "01_1_Introduction_Agenda_Other" on account of late-stage changes.

Directory	File	Author(s)	Title or Explanation
01_Introduction			Background Information on the Workshop
01_Introduction	01_1_Introduction_Agenda_Other	Inez M. Kettles and Andrew N. Rencz, Natural Resources Canada - Geological Survey of Canada	Booklet from Workshop with agenda, participant list, abstracts and background information on soils and surficial materials
01_Introduction	01_2_Introduction_Notes	Gerry McCormick, Environment Canada	Notes from Workshop discussions
01_Introduction	01_3_Introduction_Content		List of contributions in Open File

02_Recommendations			Recommendations for Methodology for Acquiring and Analyzing Soil Geochemical Data
02_Recommendations	02_1_Recommendations	Andrew N. Rencz, Robert. G. Garrett, Eric C. Grunsky, I.M. Kettles, R.A. Klassen, and Rick J. McNeil, Natural Resources Canada - Geological Survey of Canada	Recommendations and guidelines for acquiring and analyzing soil geochemical data to estimate the range of background concentrations for risk assessments
03_Perspectives			Partner Perspectives on the Role of Geochemical Data
03_Perspectives	03_1_Mroz_Perspective	Rita Mroz, Environment Canada	Federal Contaminated Sites Action Plan (FCSAP) - Ecological risk assessment and background soils data
03_Perspectives	03_2_Longpre_Perspective	Darcy Longpre, Health Canada	Health Canada perspective: The role of geochemical data in CCME soil quality guidelines and human health risk assessment
03_Perspectives	03_3_Bonvalot_Perspective	Yvette Bonvalot, Health Canada	CCME Soil Quality Guidelines and Health Canada perspectives - Estimated Daily Intakes (EDIs)
03_Perspectives	03_4_Rae_Perspective	David A. Rae, Amec	Role of geochemical data in ecological and human health risk assessment - A consultant's perspective
04_Geochemical Landscapes			Information on Geological Setting and Spatial Variation in Soil Geochemistry
04_Geochemical Landscapes	04_1_Klassen_Landscapes	Rodney A. Klassen, Natural Resources Canada - Geological Survey of Canada	Geoscience in ecological and human health risk assessment
04_Geochemical Landscapes	04_2_Goodwin_Landscapes	Terry A. Goodwin, Nova Scotia Department of Natural Resources	Geology of the Maritime Provinces
04_Geochemical Landscapes	04_3_Grunsky_Landscapes	Eric C. Grunsky and Rick J. McNeil, Natural Resources Canada - Geological Survey of Canada	Geochemical Landscapes - Aspects of horizontal and vertical variation

05_Biogeochemical Variation			Background Information on Biogeochemical Variation in the Landscape
05_Biogeochemical Variation	05_1_Rencz_Biogeochemical	Andrew N. Rencz, Natural Resources Canada - Geological Survey of Canada	Biogeochemical Variation
05_Biogeochemical Variation	05_2_Kettles_Biogeochemical	Inez M. Kettles, Natural Resources Canada - Geological Survey of Canada	Note on eco-classification systems for Canada
06_Soil Sampling			Methodology for Site Selection and Field Sampling of Soils
06_Soil Sampling	06_1_McNeil_Sampling	Rick J. McNeil, Natural Resources Canada - Geological Survey of Canada	Field sampling protocols
07_Soil Sample Analysis			Methodology for the Preparation and Chemical Analysis of Soil Samples
07_Soil Sample Analysis	07_1_McNeil_Analysis	Rick J. McNeil and Robert G. Garrett, Natural Resources Canada - Geological Survey of Canada	Soil sample preparation, analytical techniques and QA/QC
07_Soil Sample Analysis	07_2_Parsons_Analysis	Michael B. Parsons, Natural Resources Canada - Geological Survey of Canada	Analytical methods used to characterize the solid phase speciation of metal(loid)s
08_Geochemical Background			Methodology for Estimating Geochemical Background
08_Geochemical Background	08_1_Garrett_Background	Robert G. Garrett and Grunsky, E.C., Natural Resources Canada - Geological Survey of Canada	Geochemical background - What it is and how it varies
09_Data Availability			Sources of Geochemical Data for Soil and Other Surficial Materials
09_Data Availability	09_1_Kettles_Data	Inez M. Kettles, Wendy A. Spirito, and Andrew N. Rencz, Natural Resources Canada - Geological Survey of Canada	Geochemical data availability via the Geoscience Data Repository

10_Case Studies			Examples of Case Studies Involving Soil data and Estimation of Geochemical Background
10_Case Studies	10_1_Woodruff_Case	Laurel G. Woodruff, United States Geological Survey	North American Geochemical Landscapes - 2010 USGS Perspective
10_Case Studies	10_2_Goodwin_Case	Terry A. Goodwin, Nova Scotia Department of Natural Resources	Arsenic in Nova Scotia
10_Case Studies	10_3_Parsons_Case	Michael B. Parsons and Megan E. Little, Geological Survey of Canada; Heather E. Jamieson and Stephen R. Walker, Queen's University; and Terry A. Goodwin Nova Scotia Department of Natural Resources	Assessing and reducing risks at the Montague and Goldenville gold districts in Nova Scotia
10_Case Studies	10_4_Garrett_Case	Robert G. Garrett, Natural Resources Canada - Geological Survey of Canada	The Tri-National (2007) Maritimes data: Some important and interesting observations
10_Case Studies	10_5_Dodd_Case	Matt Dodd, Royal Roads University	Metal bioaccessibility in Tri-National Survey soil samples
10_Case Studies	10_6_Grunsky_Case	Eric C. Grunsky, Natural Resources Canada - Geological Survey of Canada	Geochemical variability in surficial materials based on Canada-wide and New Brunswick datasets

RECOMMENDED CITATION

For Open File:

Rencz, A.N. and Kettles, I.M. (Eds.), 2011. Presentations and recommendations from the workshop on the role of geochemical data in environmental and human health risk assessment, Halifax, 2010; Geological Survey of Canada, Open File 6645, CD-ROM.

For individual presentations or other documents within Open File (example):

McNeil, R.J. and Garrett, R.G., 2011. Soil sample preparation, analytical techniques and QA/QC; *in* Presentations and recommendations from the workshop on the role of geochemical data in environmental and human health risk assessment, Halifax, 2010, A.N. Rencz and I.M. Kettles (ed.); Geological Survey of Canada, Open File 6645, CD-ROM.