CCME Offers New Contaminated Site Characterization Guidance

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The Canadian Council of Ministers of the Environment recently published an updated *Guidance Manual for Environmental Site Characterization in four volumes*. These four new volumes replace the National Contaminated Sites Remediation Program's 1993 *Guidance Manual on Sampling, Analysis, and Data Management for Contaminated Sites* and 1994 *Subsurface Assessment Handbook for Contaminated Sites*.[1] This updated guidance will be instructive to environmental site assessors across Canada. It may well be worth your time to size up if your site characterization procedures and protocols meet or exceed this latest guidance from CCME.

The new guidance manual provides a consistent approach to collecting, handling, storing, analyzing and interpreting samples from complex environmental systems for environmental and human health risk assessments at contaminated sites. A central theme within the volumes is data quality. The CCME recommends practices and procedures designed to result in representative data of known quality.

Volume 1 is a Guidance Manual, that sets out site characterization processes and methods for conducting environmental and human health risk assessments. The Guidance Manual includes an overview of steps for comprehensively planning and conducting site investigations,[2] as well as key elements of quality assurance and quality control.[3] It also describes how to develop a "conceptual site model",[4] which is a visual and written representation of how the site's biological, chemical and physical processes relate to each other, to human receptors and to environmental receptors. Finally, the Guidance Manual provides characterization guidance for soil,[5] groundwater,[6] soil vapour,[7] indoor air,[8] surface water,[9] sediments[10] and biological tissue.[11] The characterization guidance chapters provide specific site investigation, sample analysis, data interpretation and data quality considerations for each sample type.

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1 Canadian Council of Ministers of the Environment, "Guidance Manual for Environmental Site Characterization in Support of Environmental and Human Health Risk Assessment, Volume 1: Guidance Manual," (2016), online: Canadian Council of Ministers of the Environment <http://www.ccme.ca/en/files/Resources/csm/Volume%201-Guidance%20Manual-Environmental%20Site%20Characterization_e%20PN%201551.pdf>, at i.

2 *Ibid*, at 6.

3 *Ibid*, at 25.

4 *Ibid*, at 32.

5 *Ibid*, at 76.

6 *Ibid*, at 110.

7 *Ibid*, at 145.

8 *Ibid*, at 193.

9 *Ibid*, at 220.

10 *Ibid*, at 249.

11 *Ibid*, at 289.

Volume 2 provides 4 checklists for site assessors and samplers.[12] These checklists are designed to help assessors and samplers compile and organize site data, identify potential data gaps, and evaluate assessment completeness. The checklists included are:

- Summary of site conditions and review[13]
- Review of environmental site characterization report[14]
- Review of environmental site characterization report – supplemental information for soil vapour studies,[15] and
- Soil vapour intrusion conceptual site model.[16]

Volume 3 sets out suggested field operating procedures.[17] These procedures offer additional sampling guidance with a higher level of detail than Volume 1. There are 17 operating procedures:

- #1: Borehole Drilling and Installation of Groundwater Monitoring Wells (in overburden)[18]
- #2: Soil Sampling[19]
- #3: Low-Flow Groundwater Sampling[20]
- #4: Soil Gas Probe Installation[21]
- #5: Soil Gas Sampling[22]
- #6: Soil Gas Probe Leak Tests[23]
- #7: Collection of In Situ Water Quality Measurements[24]
- #8: Near Surface Water Discrete Samples by Direct Dip[25]
- #9: Surface Water Discrete Samples with Mechanical Collection Devices[26]
- #10: Collection of Surface and Subsurface Sediment Discrete Samples[27]
- #11: Collection of Sediment Core Samples[28]

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12 Canadian Council of Ministers of the Environment, "Guidance Manual for Environmental Site Characterization in Support of Environmental and Human Health Risk Assessment, Volume 2: Checklists," (2016), online: Canadian Council of Ministers of the Environment <http://www.ccme.ca/en/files/Resources/csm/Volume%202-Checklists-Environmental%20Site%20Characterization_e%20PN%201553.pdf>.

13 *Ibid*, at 1.

14 *Ibid*, at 10.

15 *Ibid*, at 32.

16 *Ibid*, at 35.

17 Canadian Council of Ministers of the Environment, "Guidance Manual for Environmental Site Characterization in Support of Environmental and Human Health Risk Assessment, Volume 3: Suggested Operating Procedures," (2016), online: Canadian Council of Ministers of the Environment <http://www.ccme.ca/files/Volume%203-Suggested%20Operating%20Procedures-Environmental%20Site%20Characterization_e%20PN%201555.pdf>.

18 *Ibid*.

19 *Ibid*.

20 *Ibid*.

21 *Ibid*.

22 *Ibid*.

23 *Ibid*.

24 *Ibid*.

25 *Ibid*.

26 *Ibid*.

27 *Ibid*.

- #12: Collection of Pore Water Samples[29]
- #13: Plant Sampling[30]
- #14: Terrestrial Invertebrate Sampling[31]
- #15: Benthic Invertebrate Collection and Processing[32]
- #16: Fish Sampling[33], and
- #17: Small Mammal Sampling.[34]

Each suggested operating procedure includes a scope, a discussion about when, why and how the procedure should be followed, recommendations for sample collection, storage and documentation, and essential information, equipment, forms or plans. Most procedures include a sampling checklist.

Volume 4 is a compendium of analysis methods[35] required by numerous organizations, including the United States Environmental Protection Agency, the Ontario Ministry of the Environment and Climate Change, the United States Geological Survey, Environment and Climate Change Canada and the Canadian Council of Ministers of the Environment. These methods include sample handling and storage requirements, reporting suggestions, analytical methods, and method-specific quality control and quality assurance procedures. These methods aim to ensure suitable samples are sent to laboratories. Once those samples are received, following the methods ought to produce trustworthy site characterization results upon which informed decisions can be made.

The methods included in Volume 4 only address chemical and microbiological sample analysis. Volume 4 recommends that parties interested in biological testing methods go to the following Environment and Climate Change Canada site: http://www.ec.gc.ca/faunescience-wildlifescience/default.asp?lang=En&n=0BB80E7B-1.

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28 *Ibid*.
29 *Ibid*.
30 *Ibid*.
31 *Ibid*.
32 *Ibid*.
33 *Ibid*.
34 *Ibid*.
35 Canadian Council of Ministers of the Environment, "Guidance Manual for Environmental Site Characterization in Support of Environmental and Human Health Risk Assessment, Volume 4: Analytical," (2016), online: Canadian Council of Ministers of the Environment <http://www.ccme.ca/en/files/Resources/csm/Volume%204-Analytical%20Methods-Environmental%20Site%20Characterization_e%20PN%201557.pdf>.