

**How does the Contaminated Sites
Division of HC Use Geochemical data?**

Applications of Geochem data

- Determining Estimated (background) daily intake
- CCME Soil Quality Guidelines
- Screening of federal contaminated sites

Estimated Daily Intake

- $$EDI = \{([C_{air}] \times IR_{air}) + ([C_{H_2O}] \times IR_{H_2O}) + (\sum [C_{foodi}] \times IR_{foodi}) + ([C_{soil}] \times IR_{soil})\} / BW$$

CCME Soil Quality Guidelines

- Threshold elements

- $SQG_{HH} = \frac{(TDI-EDI) \times SAF \times BW}{[(AF_G \times SIR) + (AF_S \times SR) + (AF_L \times IRS) \times ET_2] \times ET_1}$

+ BSC

- Non-threshold elements

- $SQG_{HH} = \frac{RSD \times BW}{[(AF_G \times SIR) + (AF_S \times SR) + (AF_L \times IRS) \times ET]}$

+ BSC

Screening of federal contaminated sites

- *“Before a site is considered contaminated, on-site concentrations of contaminants, particularly natural elements, should also be compared to data from local or regional surveys of background soil quality and groundwater quality (and surface water quality if relevant) in uncontaminated areas, if data are available. On-site contamination would be considered to be consistent with background where the maximum measured concentration of a COPC is less than or equal to a representative background concentration for that element/contaminant (i.e. a representative statistic, generally not the maximum).” (HC, 2004)*

Screening of federal contaminated sites

Example – Arsenic in soils from Yellowknife and elsewhere in the NWT

- The 'national' background soil concentration = 10 mg/kg, while the CCME health-based soil quality guideline for As is 12 mg/kg (CCME, 1999)
- Yellowknife:
 - *“The naturally-occurring concentrations of arsenic ranged from 7 ppm to 1,560 ppm, with an arithmetic average of 153 ppm and a median value of 39 ppm. The 90th percentile concentration from the data presented by Kerr (2001) is 320 ppm.”*
 - *“The arsenic content in soils overlaying the Agricola Lake geologic formation ranged from 2 ppm to 890 ppm with an arithmetic average of 73 ppm and a median value of 25 ppm. Arsenic soil concentrations reported by Cameron and Durham (1974) were slightly lower than those reported for the Yellowknife area.”*
 - *Source: RSSI, 2002*

Spatial variability of As soil concentration across Canada

