



# Acceptable Risk Dilemma for Sites with Federal and/or Provincial Jurisdiction

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## Introduction

- Federal Guidelines vs. Provincial Standards
- Site Specific Human Health Risk Assessment
  - Exposure Point Concentrations
  - Hazard Quotients
  - Acceptable Risk
- Discussion Points



## Federal Guidelines vs. Provincial Standards

- BC MOE standards based on CSST Protocols 1996
- Federal Guidelines based on CCME
- Human Health Differences
  - Body weight (BC 13 kg, CCME 16.5 kg Toddler)
  - Inhalation rate (BC 5 m<sup>3</sup>/d, CCME 9.3 m<sup>3</sup>/d Toddler)
  - Exposure time for dermal contact and soil ingestion (BC 8/24 hr, CCME 16/24 hr)
- OTHERS???? ECOLOGICAL????



# Comparing CCME vs CSR Using Site Data

- The site is Residential Land Use with N=22
- Three metals elevated As, Cd, Pb

<b>COPC in Metals</b>	<b>CCME Soil Guideline (mg/kg)</b>	<b>BC CSR Standard (mg/kg)</b>	<b># Exceeding CCME</b>	<b># Exceeding CSR</b>	<b>Relative Percent Difference</b>
<b>As</b>	12	15	15	19	21%
<b>Cd</b>	10	3	14	10	28%
<b>Pb</b>	140	250	1	1	-



## Site Specific RA – Exposure Point Concentrations

- BC – Compare to the 90<sup>th</sup> percentile or and 95 UCLM (maximum if data is  $N < 10$ )
- Federal SSRA –Arithmetic average or 95% confidence interval of arithmetic average
- PQRA - Maximum



## Site Specific RA – Exposure Point Concentration

Exposure point concentrations used in risk assessment

COPC	Federal RA Framework (Mean)	Provincial (90 <sup>th</sup> percentile)	PQRA (Maximum)	RPD of maximum vs. mean
As	83.9	107.6	113	25%
Cd	21	27.4	31	32%
Pb	178.8	256.2	321	44%



## Site Specific RA – Protection Goals

- Protection goals non carcinogens
  - Federal:  $HQ \leq 0.2$
  - BC:  $HQ \leq 1$
- Protection goals carcinogens
  - Federal:  $1 \times 10^{-5}$
  - BC:  $1 \times 10^{-5}$
- Amortization of carcinogens
  - Federal SSRA 30 yrs over life expectancy 70 years
  - Federal PQRA minimum of 30 yrs over life expectancy 70 years
  - Provincial t30 yrs of over life expectancy 70 years (Not policy)
  - What about shorter exposure such as const worker are we being overprotective (New federal guidance pending)



# Risk Assessment – Unacceptable Risks

Carcinogens - Composite Receptor (Arsenic)

Non Carcinogens - Toddler Receptor (Cadmium and Lead)

**BOLD – Unacceptable Risk**

COPC	Federal SSRA Soil Ingestion	Provincial Soil Ingestion	Federal SSRA Dermal	Provincial Soil Dermal
As	<b>ILCR = 3.6 x 10<sup>-4</sup></b>	<b>ILCR = 9.9 x 10<sup>-5</sup></b>	<b>ILCR = 4.9 x 10<sup>-5</sup></b>	ILCR = 5.9 x 10 <sup>-6</sup>
Cd	<b>HQ = 0.6</b>	HQ = 0.1	HQ = 0.012	HQ = 0.004
Pb	<b>HQ = 0.35</b>	HQ = 0.2	HQ = 0.001	HQ = 0.007



## DOES THIS MATTER????

- Impacts for Federal custodians who seek a Provincial instrument when divesting?
- Does this variability have an overall impact when assessing risks or is there so much variability already?
- What about ECO RA?????