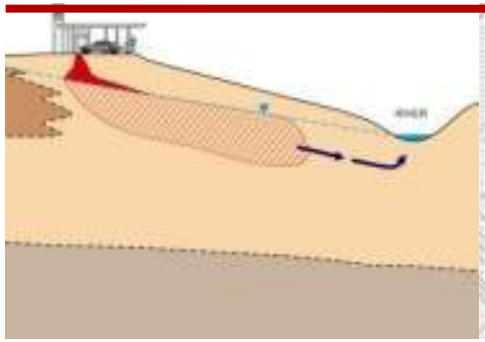
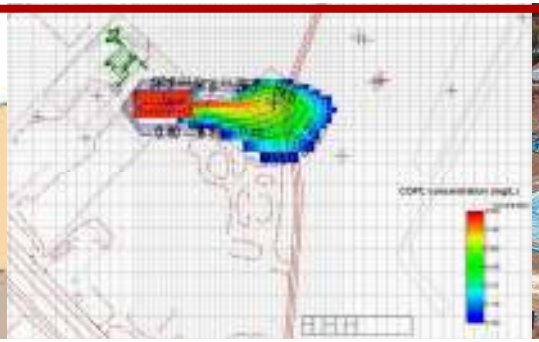
The role of assessment criteria in risk assessment

SiLC Annual Forum 29 April 2015

firth consultants
environmental risk assessment

Assessment criteria

- Typically, risk based contaminant concentrations in soil, groundwater or soil gas/vapour for comparison with measured concentrations to assess risk

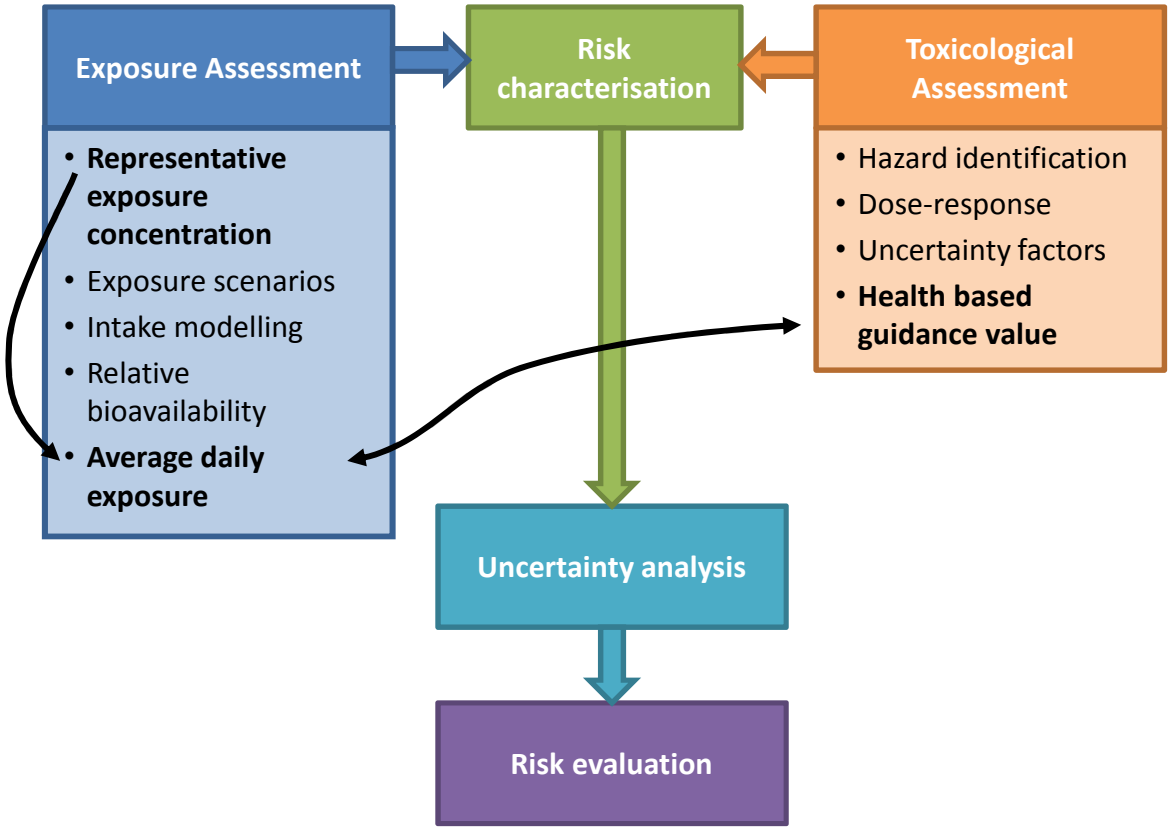
➢ Generic assessment criteria (GQRA)

Criteria derived using largely generic assumptions about the characteristics and behaviour of sources, pathways and receptors. These assumptions will be conservative in a defined range of conditions.

➢ Site specific assessment criteria (DQRA)

Derivation of assessment criteria

What is the risk of adverse health effects to the receptor?



Assessment criteria = concentration at which:

(average daily) exposure = health based guidance value

firth consultants

Available GAC for human health GQRA

- Soil GAC for chronic risks to human health
  - SGV for 10 contaminants
  - CL:AIRE/EIC/AGS GAC for 33 contaminants
  - C4SL for 6 contaminants (+ plans to deliver up to 50 more forthcoming)
  - LQM/CIEH S4UL for 89 contaminants
  - Atkins ATRISK values
  - Other in-house values
- Groundwater GAC for chronic risks to human health from vapour inhalation
  - SoBRA subgroup – due for completion this year
- Soil GAC for acute risks to human health
  - SoBRA subgroup with input from PHE – due for completion this year

All within Part 2A Category 4

Soil GAC for chronic risks to human health

	SGV (2009)	EIC GAC (2010)	C4SL (2014)	LQM/CIEH S4UL (2015)
Exposure parameters	As SR3 (2009)	As SR3 (2009)	As SR3 with some modifications: • Reduced dermal exposure frequency (resi) • Reduced soil to skin adherence factor (resi) • Updated inhalation rates (resi + comm) • Decreased produce consumption rates ("top 2 approach") POS land-uses	As SR3 with some modifications: • Reduced dermal exposure frequency (resi) • Reduced soil to skin adherence factor (resi) • Updated inhalation rates (resi + comm) POS land-uses
Health based guidance value	Minimal risk HCV	Minimal risk HCV	Low level of toxicological concern (LLTC)	Minimal risk HCV (updated)

Soil GAC for chronic risks to human health – residential land-use

(mg/kg)	SGV	S4UL	C4SL	USEPA Region 9 screening level	CCME
Arsenic	32	37	37	0.67 [a]	12
Benzene	0.33 [b]	0.37 [b]	0.87 [b]	1.2 [a]	2.1 [c]
Benzo(a)pyrene	-	1.1 [b,d] - 3.0 [b]	5.0 [b]	0.015 [a]	5.3 [e]
Cadmium	10	11	22	7	10
Chromium VI	4.3	6	21	0.3 [a]	-
Lead	450 [f]	-	200	0.3 – 400 [g]	140

a. Based on 10^{-6} excess lifetime cancer risk (not 10^{-5})
b. 6% SOM
c. Excluding ingestion of groundwater pathway
d. BaP as a surrogate marker for genotoxic PAHs
e. BaP equivalent concentration for all PAHs using total potency equivalents
f. Withdrawn
g. Depending on type of lead salt

Uncertainties in GQRA

- Conceptual site model
  - Is CSM adequately defined?
  - Are there suitable GAC available?
  - How well do GAC assumptions fit the site?
- Site measured concentrations
  - Sufficient representative sampling?
  - Sampling/lab accuracy + precision
  - Estimating representative exposure concentration
- How conservative are GAC?
  - Level of conservatism in exposure modelling
  - Likelihood and severity of adverse health effects at health based guidance value

Ideas for discussion

- Too many tools or not enough?
  - Is there an appetite/need for screening criteria describing different risk levels?
  - Do too many tools cause confusion?
- Factors that most influence risk?
  - How well the site has been characterised
  - Basis of the screening values
  - How these have been utilised
- How to keep GAC up to date?
  - Changes in toxicology