Acute Toxicity SCTL Issues

- Need for and prevalence of separate guidelines?
- Present list: Ba, Cu, CN^-, F^-, Ni, Phenol, V (*cadmium evaluated, default SCTL protective of acute tox*)
- Proposed revision has only Ba, Cu, F^-, Phenol
- Soil Ingestion Rate (IR): 10 grams/event (*50x default*)
- Review of tox values to be used
- Bioavailability: Assumes 100%

Need / Prevalence

- Extreme outlier (*pica*) behavior recognized, but acute harm implausible, undemonstrated
- Several based primarily on transient GI effects (Cu, Ni, V)
- Regulation of GW, SW does not single out extreme outliers
- FL sites can be driven by acute tox values (e.g., Ba)
- Other states/federal/international guidance; 3 of 26 states responding to UF use the acute basis
  - CA *(groundwater only; soil levels do not)*
  - MN *(Ba, Cu, CN-, F-, Phenol)*
  - NY *(As, Ba, Cd, Cu, CN-, Ni, Naph, Penta, Phenol) cites FL*
  - USEPA *(RSLs do not address acute exposure)*
  - Canada *(CN- only)*

List of Chemicals 1

Chemical	Acute 2015 (mg/kg)	Acute 2005 (mg/kg)	2005 Chronic (mg/kg)	Notes
Barium	340	120	5,800	RfD (IRIS) increase from 0.07 to 0.2
Copper	150	150	3,300	
Cyanide	8.9 * (~50)	34	1,700	RfD (IRIS) decrease from 0.02 to 0.0006 (*NOTE: cannot duplicate 8.9 mg/kg*)
Fluoride	840	840	5,200	
Nickel	1.7 * (1,600)	340	1,600	2015 based on carc (oral CSF from CalEPA); 2002 IRIS RfD
Phenol	500	500	18,500	
Vanadium	5 * (~400)	67	550	RfD decrease from 0.007 (HEAST) to 0.00007 (PPRTV); but RfD for V in RSLs is 0.005 based on IRIS for V_2O_5
** 2015 proposed SCTLs not based on acute calculation*				

List of Chemicals 2

- CN^- and phenol have reasonable acute basis in tox
- Tox of Ba, Cu, F^-, Ni, V lacks good foundation
- Endpoints for some are ambiguous, transient, reversible; there should be real hazard potential
- Same substances present in dietary, commercial products at similar or higher levels
  - Barium in brazil nuts (3,000-4,000 ppm) and cultivated plants (lima beans, cabbage, soy beans; up to 1,500 ppm)
  - Copper in beef liver (mean of 123 ppm), clams (up to 171 ppm), and oysters (up to 600 ppm)
  - Cyanide in cassava root up to 1,500 ppm

Ingestion Rate

- 10 gram, single soil ingestion event is present assumption
  - Historical support as infrequent acute exposure
  - More indicative of extreme pica or geophagy
- Frequency of events is often cited but weakly supported (e.g., 33% may ingest 10 g 1-2 times/year)
- Calabrese et al. (1997) cites 200 mg/day protects 95% of children; 2011 EFH concurs
- Others use 1 to 5 gram range for pica recommendation (2011 EFH, 2008 Child EFH, CalEPA 2012, literature)
- Recommend 3 g/event (midpoint 1 to 5 g/event range)
- Ingestion rate recommended at 1 g/event, based on EFH

Toxicological Guidance

- RfD_{acute} values developed by UF from human studies; mostly drinking water exposure
- RfD_{acute} for some substances set very close to acceptable dietary recommendations
- Large soil bolus alone may cause adverse GI effects
- Existing dose/response from nonsoil exposures
- Effects for several substances based on transient GI

Bioavailability

- Chemical-specific info available, but default is 100%
- Limited or no literature for most chemicals
- Other default recommendations exist (*e.g., 50% MADEP*)
- Single acute exposures beg a question: Are there no reports of acute effect because toxins are unavailable?

Options/Recommendations

- Discontinue development of default SCTLs based on acute toxicity considerations
- Reduce the acute chemicals to Phenol and CN^- only
- Consider site-specific approach for acute considerations
- Reduce acute ingestion rate to 1 g/event (*per 2011 EFH*)