

Brownfield Site Cleanup and the New Maine DEP Soil Cleanup Guidelines

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April 2010



Basics

- **New guidelines covers risk posed by direct exposure to contaminated soil**
- Does not cover:
 - Indoor air contamination from soil vapors (DEP has separate guidelines)
 - Ground water (drinking water standards (MCLs) and guidelines (MEGs) already exist)
- Address only human health risks, not ecological impacts, but human health is the primary concern at Brownfield sites



Basics

- Look-up tables with cleanup levels (mg/kg or ppm) for chemicals of risk

CAS Number	Chemical	Residential	Outdoor Commercial Worker	Park User	Excavation or Construction Worker	Leaching to Groundwater	Soil Background
630-20-6	1,1,1,2-Tetrachloroethane	54	170	90	1,000	0.28	
79-34-5	1,1,2,2-Tetrachloroethane	6.8	21	11	90	0.022	

Basics

- Guidelines based on different human exposure and land use scenarios
- Exposure includes touching, eating, or inhaling the soil (don't try this at home!)
- Don't forget, these are guidelines, not laws or rules.
- Instead of just comparing chemical concentrations to tables, you can also do your own risk assessment (pricey, though).

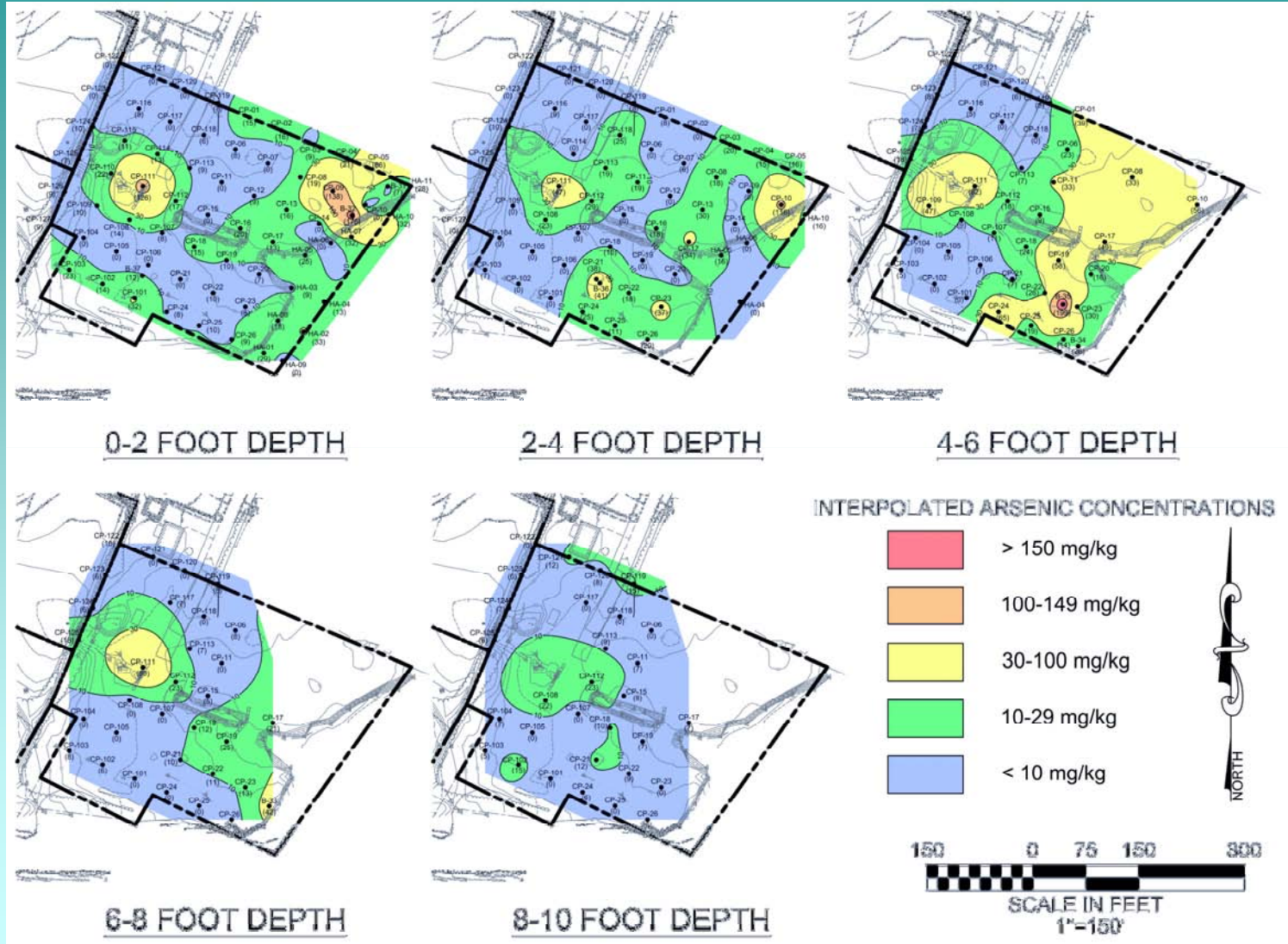
Exposure Scenarios for MERAGs

- Residential:
 - Assumes continuous exposure to children and adults over 30 years.
 - Covers daycares, eldercare and medical facilities.
- Outdoor Commercial Worker:
 - Assumes full-time workers outdoors for part of the day for 25 years.
 - Does not cover intense contact with soil (e.g., residential or excavation workers).

Exposure Scenarios for MERAGs (cont.)

- Construction/Excavation Worker:
 - Assumes exposure to soil during high intensity soil disturbance activities for 6 months.
 - Digging, trench work, backfilling, etc.
- Recreational/Park User:
 - Similar to residential scenario with 30 year duration but exposure is less intense.

Exposure Scenarios for MERAGs



Single vs. Multiple Contaminants

- Assumes higher risk for multiple contaminants

Several choices for multiple contaminant approach, starting with the conservative lookup table

	Residential	Outdoor Commercial Worker	Park User	Excavation or Construction Worker	Leaching to Groundwater
	1,1,1,2-Tetrachloroethane				
Single	540	1,700	900	9,300	0.28
Multiple	54	170	90	1,000	0.28

Ground Water Leaching

- MERAGs assume ground water leaching is a risk.
- Concern is that chemicals will get into ground water and contaminate wells
- Ground water RAGs are very low, you don't want to clean up to this guideline!
- Luckily, few Brownfield sites have ground water concerns since most are in areas with public water
- **Also, you are not responsible for contaminated ground water coming onto your Site from other properties**

Background Conditions

- Background Contaminants” means contaminants that are not due to direct releases on your property. The contaminants may be naturally occurring or man made.
- **Why do we care?**
 - Many Maine soils have naturally high arsenic levels
 - Urban settings often have measurable levels of polycyclic aromatic hydrocarbons (PAHs).
 - PAHs common from wood ash, heavy oils, asphalt, diesel exhaust, etc.
- You don't want to have to clean that up, right?

Background Conditions

- St. Germain recently sampled soil at 5 sites

Arsenic in Soil Concentrations at Maine Sites					
Site:	#1	#2	#3	#4	#5
# of Samples	13	9	23	11	8
Maximum (ppm)	10	16	17	18	11
Minimum (ppm)	5	9	9	11	6
Average (ppm)	8	12	13	14	8

- Compare to MEDEP RAGs...

	MEDEP Background Value	9
RAGS	Residential	0.14
	Outdoor Commercial Worker	0.42
	Park User	0.23
	Excavation or Construction Worker	4.2

Background Conditions

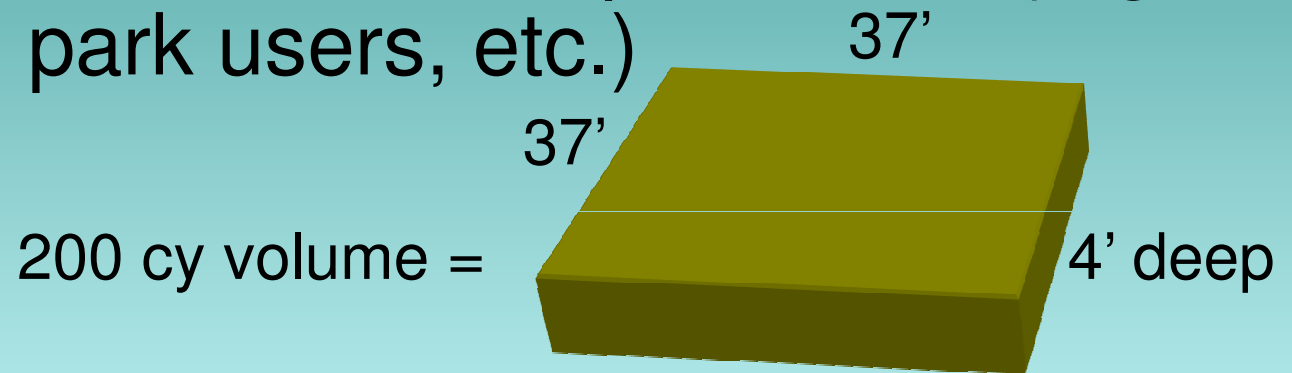
- At these 5 sites, it is clear that the arsenic is natural in origin (no correlation with other contaminants)
- MERAGs have protocols for dealing with background conditions.
- **In general, you do not have to clean up contaminants below background levels.**
- But you need to prove that it is background, such as showing that nearby properties have the same contaminants at similar levels.

Petroleum Cleanup Guidelines

- All individual petroleum compounds (like benzene or xylene) have RAGs, but DEP deals with petroleum contamination a little differently
- Soil exposure guidelines based on test methods newly adopted by DEP
 - Volatile Petroleum Hydrocarbons (VPH) and Extractable Petroleum Hydrocarbons (EPH)
 - Big improvement over old methods (DRO and GRO).
 - Includes common petroleum compounds as well as groups of compounds like “aromatics” and “aliphatics”
- Maine labs are all up to date on these methods.

Petroleum Cleanup Guidelines

Petroleum contaminated soil <200 cubic yards must meet most conservative exposure scenario for that parameter (e.g., residential, park users, etc.)



Cleanup guideline for >200 cy depends on current or likely future land use exposure scenario (just like MERAGs)

Summary

- New MERAGs based on better science
- Provide more protocol and flexibility for issues like background or multiple contaminants
- **MERAGs are well-suited for Brownfield sites where flexibility may exist on redevelopment plans**

References

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