

Draft Area Averaging Guidance

Soil Compliance for Direct Contact
Exposure Scenarios

Georgia Brownfield Association (GBA)

July 30, 2020

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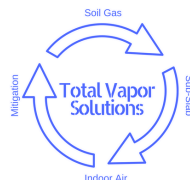
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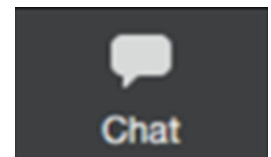
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Zoom Meeting Etiquette

Area Averaging Guidance Document Overview

- Please **Mute** Your Microphone
- This Presentation Will Be Recorded
- Asking Your Questions
 - After Each Section of Presentation, You May Ask a Brief Question
 - Unmute; Introduce Yourself and Ask Question, or
 - Send Question By “**Chat**” Function
 - At End of Presentation, You May Ask Questions
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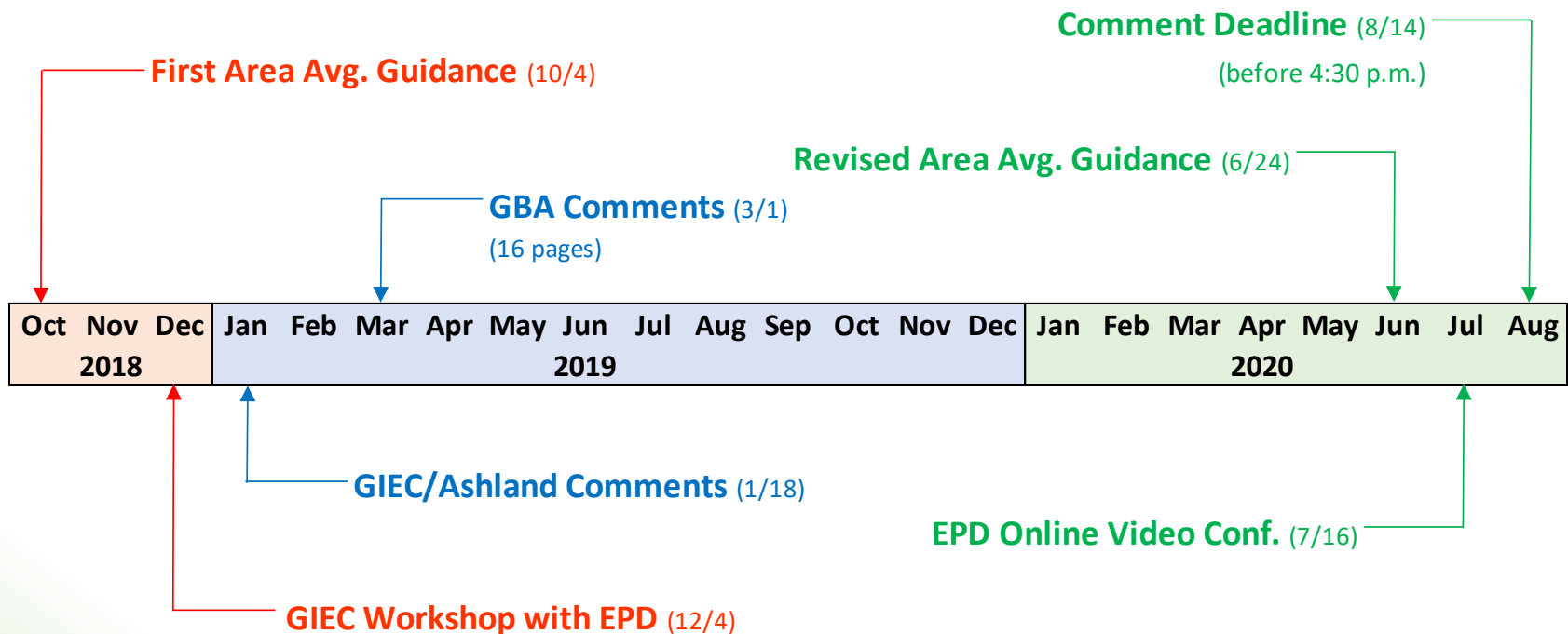
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Timeline / GBA Engagement



GBA = Georgia Brownfield Association
GIEC = Georgia Industry Environmental Coalition

Presentation Overview

1. Introduction and Background

2. Example of Area Averaging

3. Section-by-Section Review

4. Questions & Answers

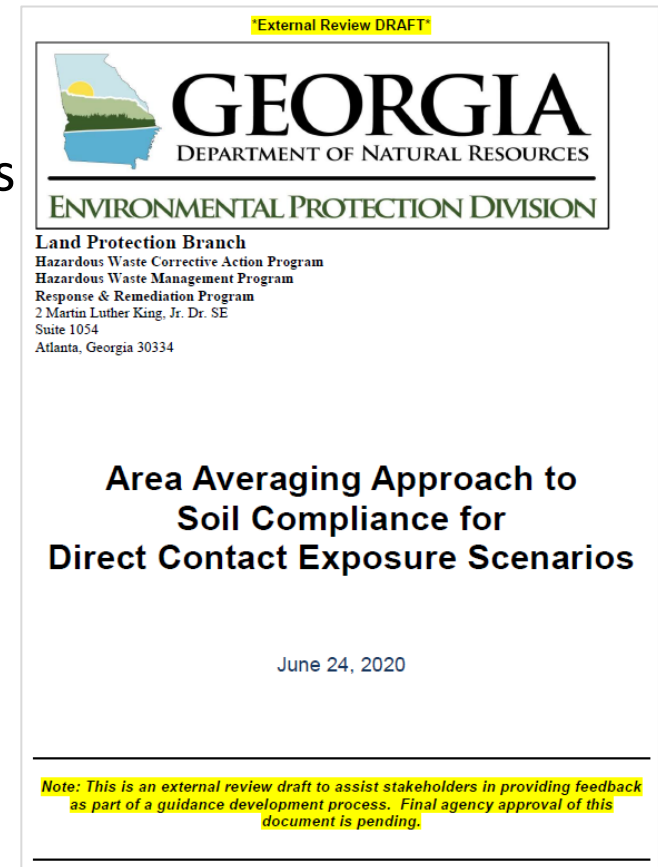
Area Averaging Guidance

- New Draft Guidance by EPD
 - Completely Rewritten
 - Significantly Improved
 - Supports Risk Assessment
 - Direct Contact with Surface Soil
- Applicable Programs
 - RCRA, CERCLA (Superfund), Hazardous Site Response Act, Voluntary Remediation Program (VRP), and Brownfield Act
- Send Your Comments by **August 6th** to:
 - Holly Hill, hollister.hill@troutman.com (404) 885-3366
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Guidance Document Structure

1. Introduction
2. Key Area Averaging Concepts
3. General Site Assessment Considerations
 - Data Quality Objectives (DQO) and Conceptual Site Model (CSM)
4. Choosing a Sampling Design
 - Discrete, Composite and Incremental
 - Judgmental, Random, and Grid
5. Establish a Decision Unit (DU)
 - Residential, Non-residential and Other
6. Dataset and Action Levels
 - Exposure Point Concentration (EPC)
 - Achieving Compliance
7. References



Example of Area Averaging

GBA Area Averaging Overview

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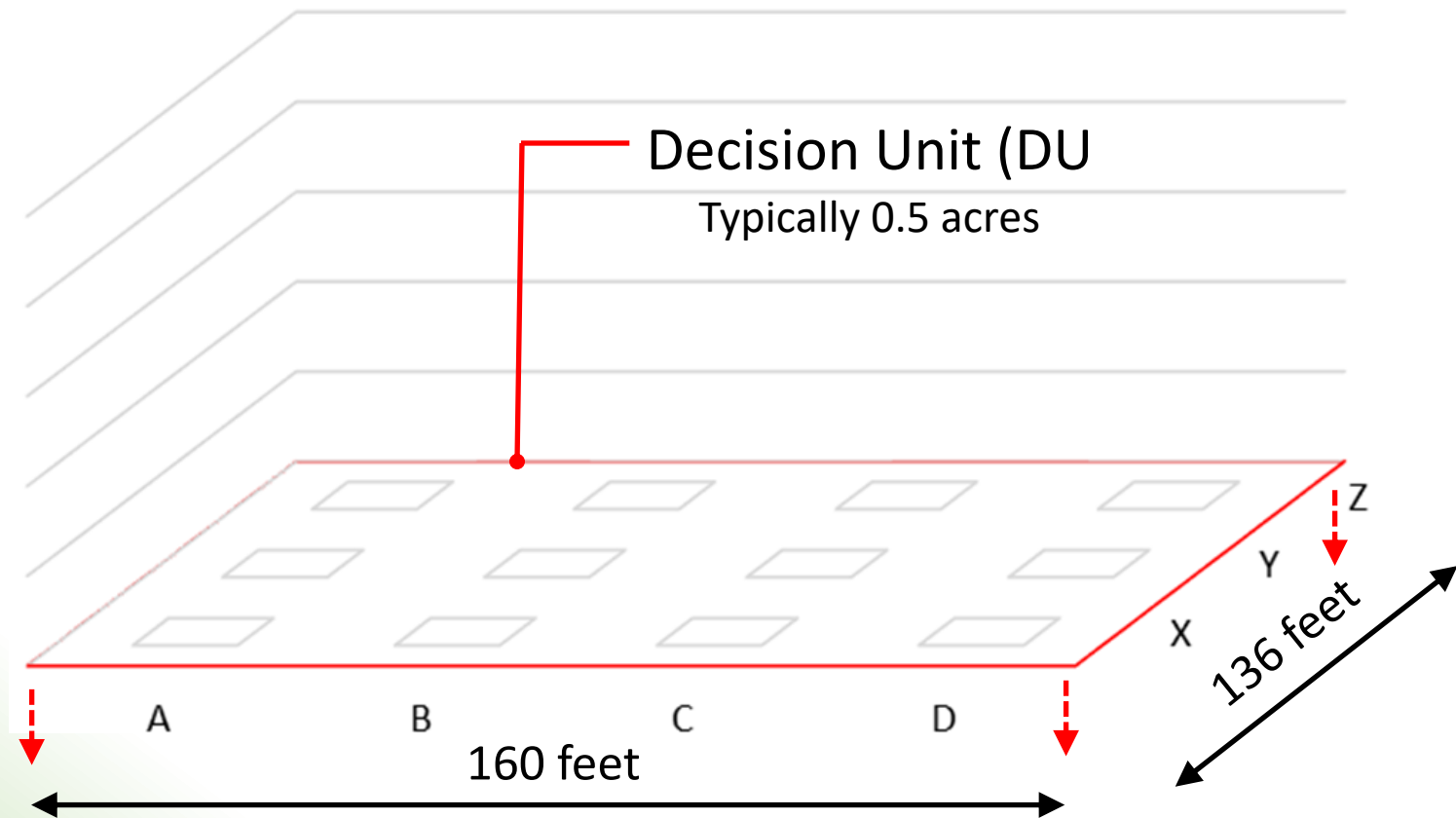
What is Decision Unit (DU)?

Section 2.0 & 5.0

- Volume of Surface Soil to Which Receptor is Exposed
 - Assumes Average Chemical Exposure to Receptor Across Entire DU
- Residential DU
 - Typically 0.5 Acres for Single-Family Lot
 - Site-Specific for Multi-Family Structures
- Non-Residential DU
 - Site-Specific Size
- Other DU
 - Divide Site into Homogenous Strata

Example Residential DU

Section 2.0 & 5.0



Hypothetical Sampling Results

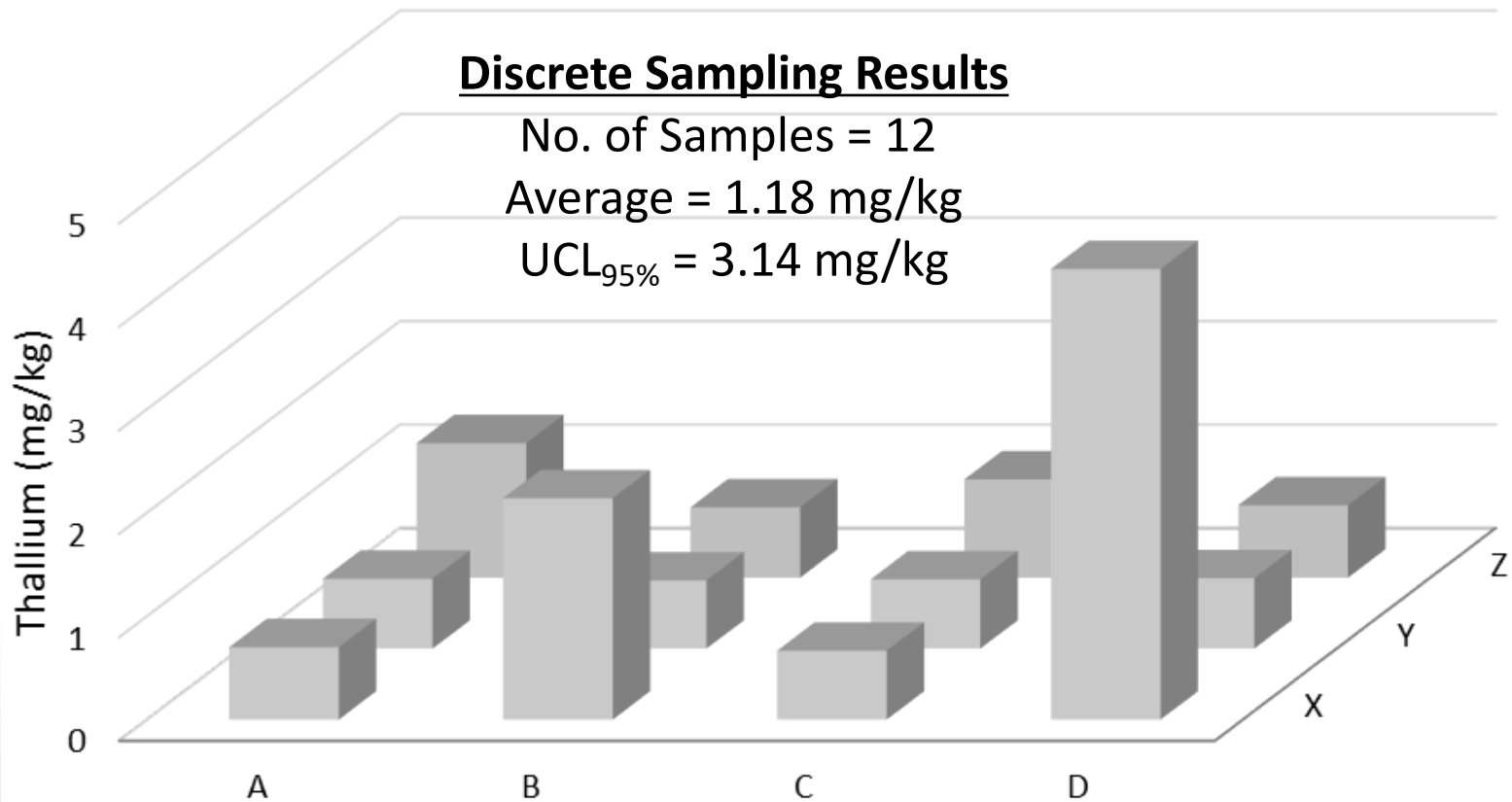
Section 2.0, 4.0, 5.0, & 6.0

Discrete Sampling Results

No. of Samples = 12

Average = 1.18 mg/kg

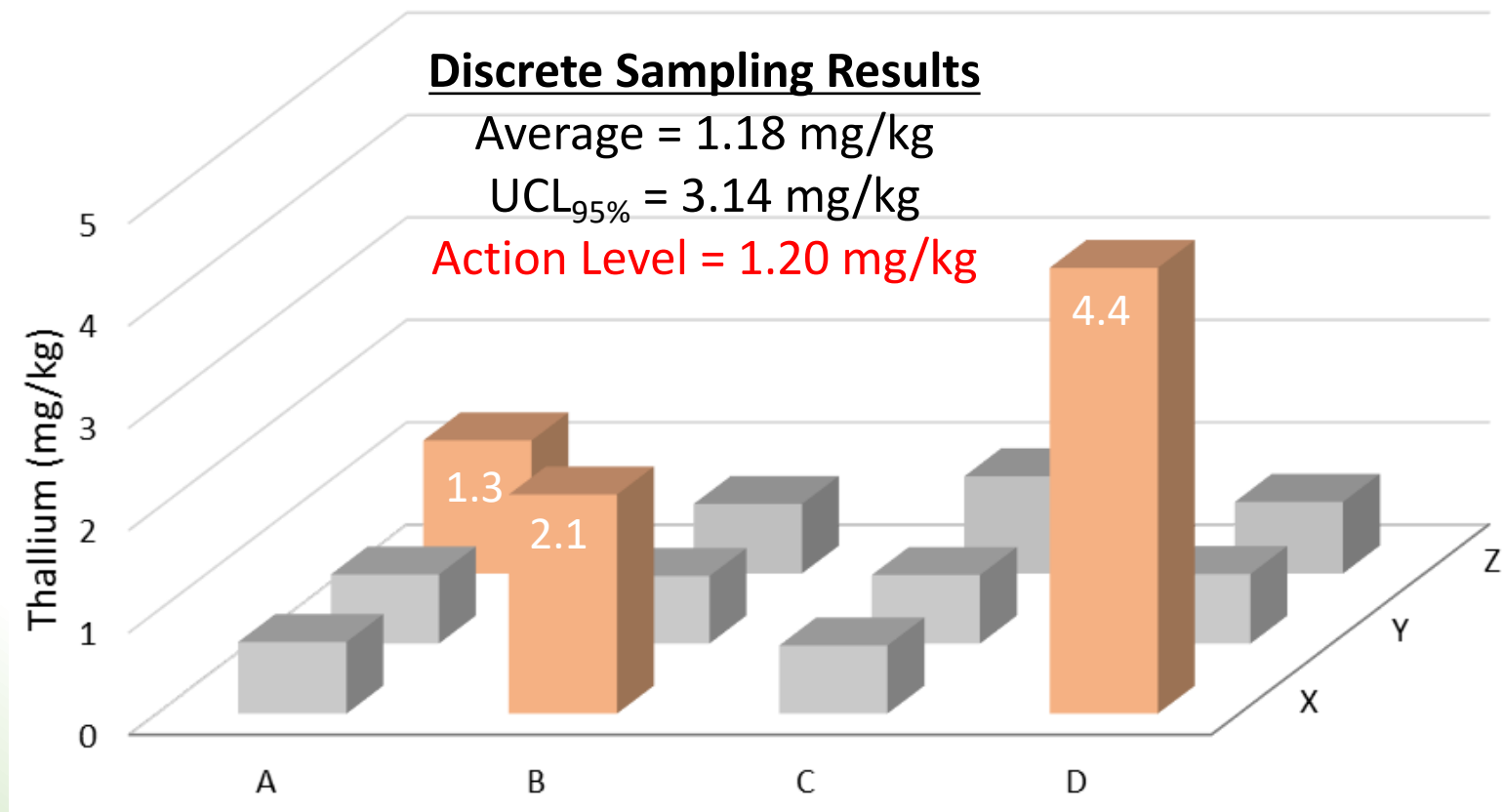
UCL_{95%} = 3.14 mg/kg



UCL₉₅ = 95% Upper Confidence Limit, often used as Exposure Point Concentration (EPC)

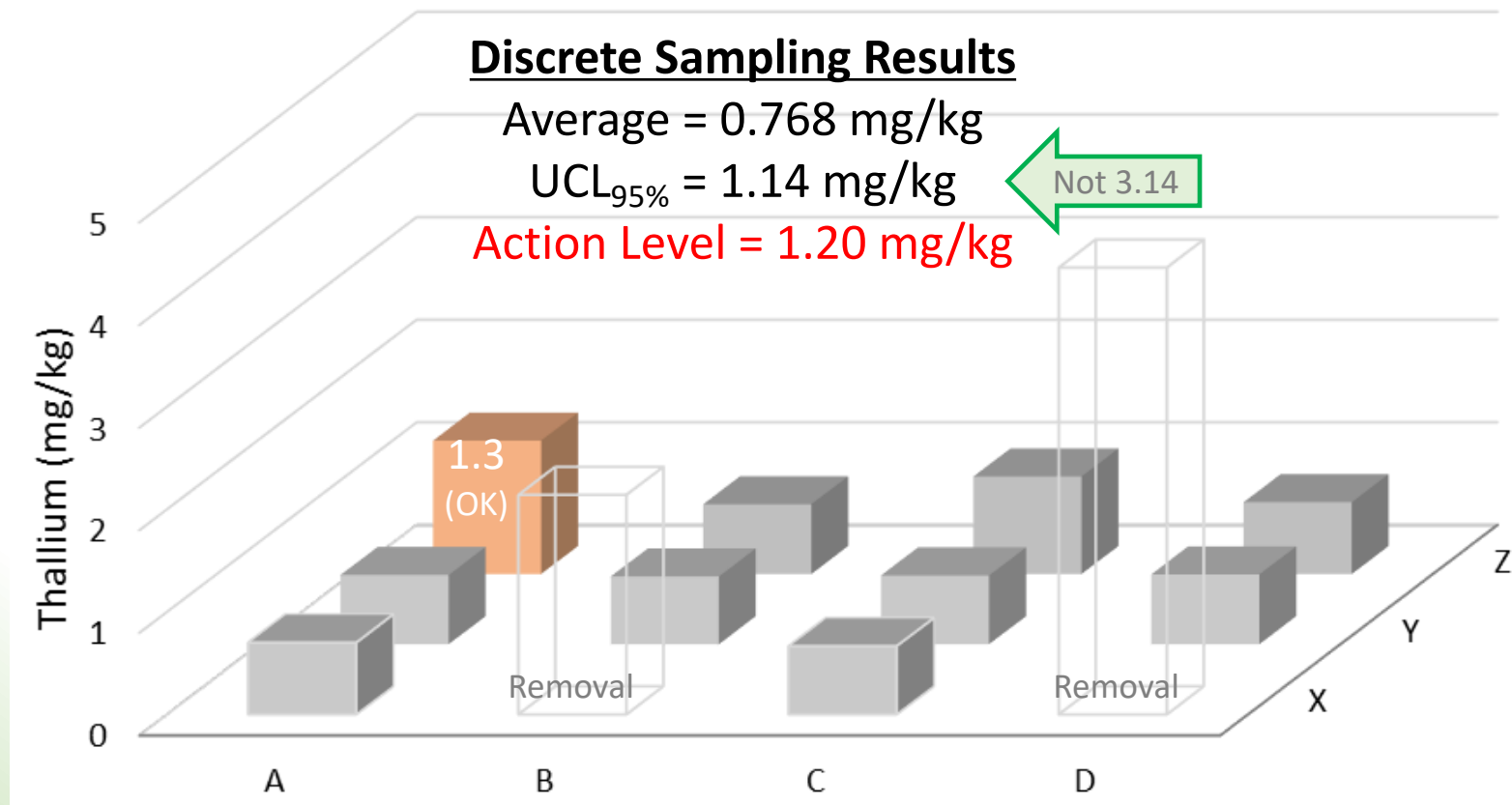
Comparison to Action Levels

Section 2.0, 4.0, 5.0, & 6.0



Post-Soil Removal / Management

Section 2.0, 4.0, 5.0, & 6.0



Section 3.0 - General Site Assessment Considerations

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Data Quality Objectives

Section 3.0

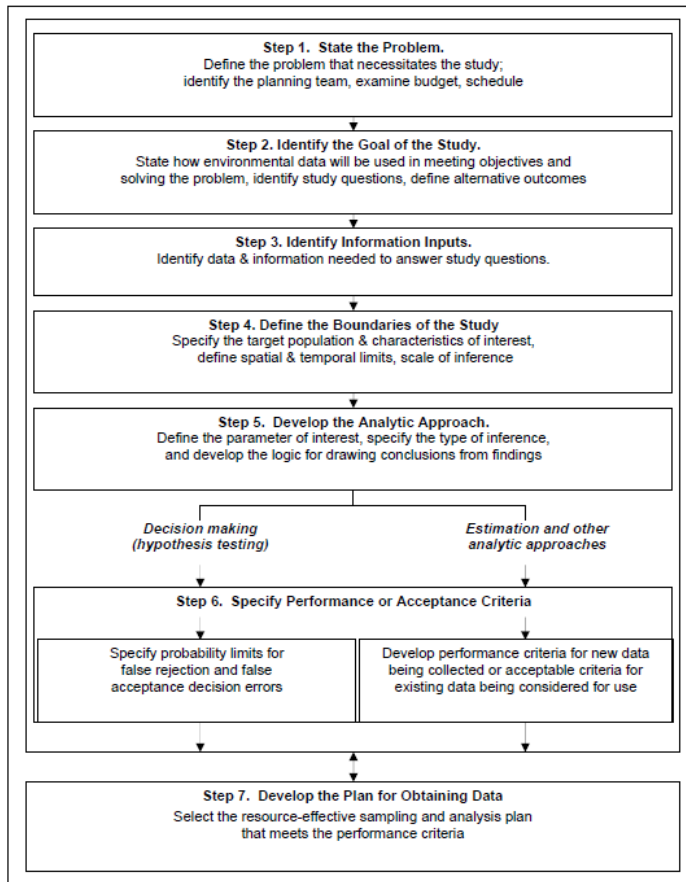
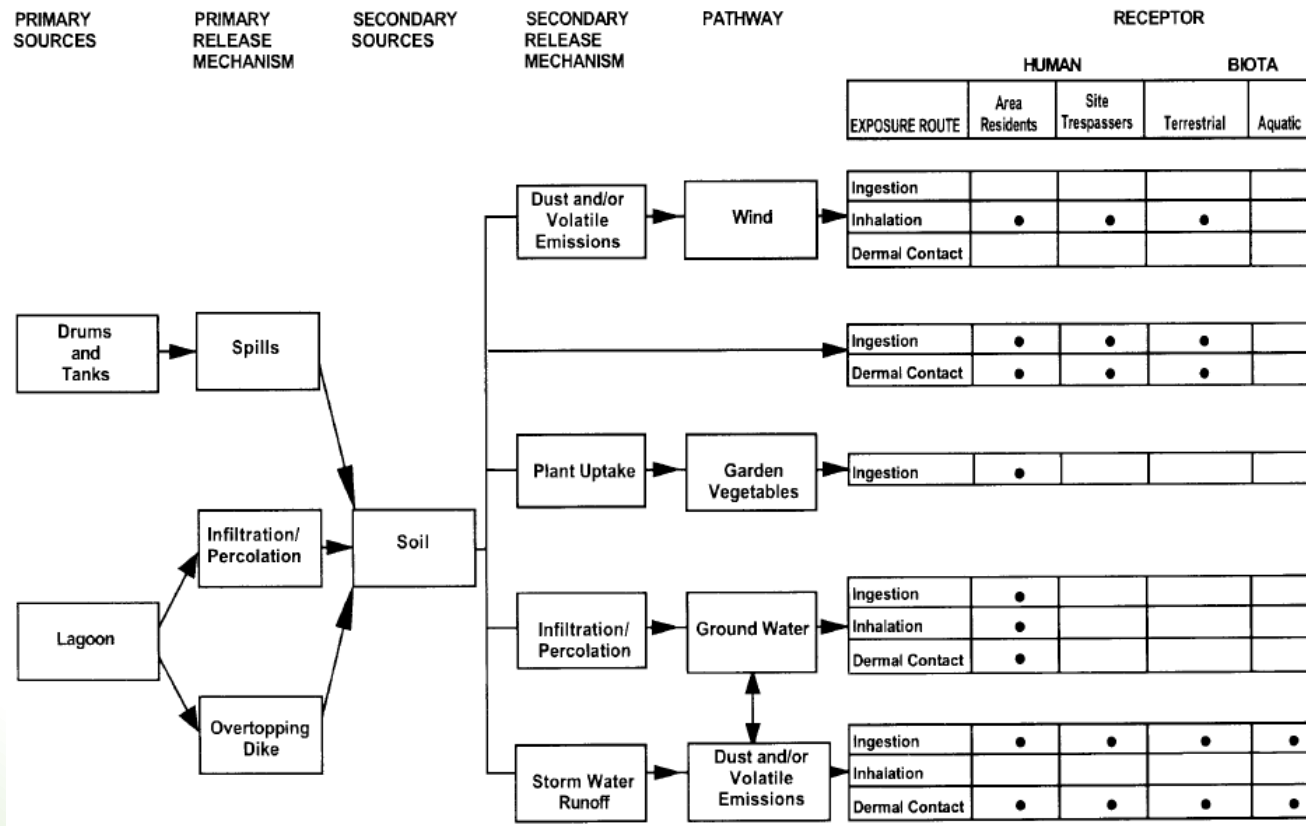


Figure 2. The Data Quality Objective Process

- What Data are Needed to Support Decisions?
- Why Sample?
- How Big is Site, What are Boundaries?
- Which Field Sampling and Lab Methods/Detection Limits?
- What are Action Levels?
- When are We Done?

Conceptual Site Model

Section 3.0



Source → Release → Pathway → Receptor

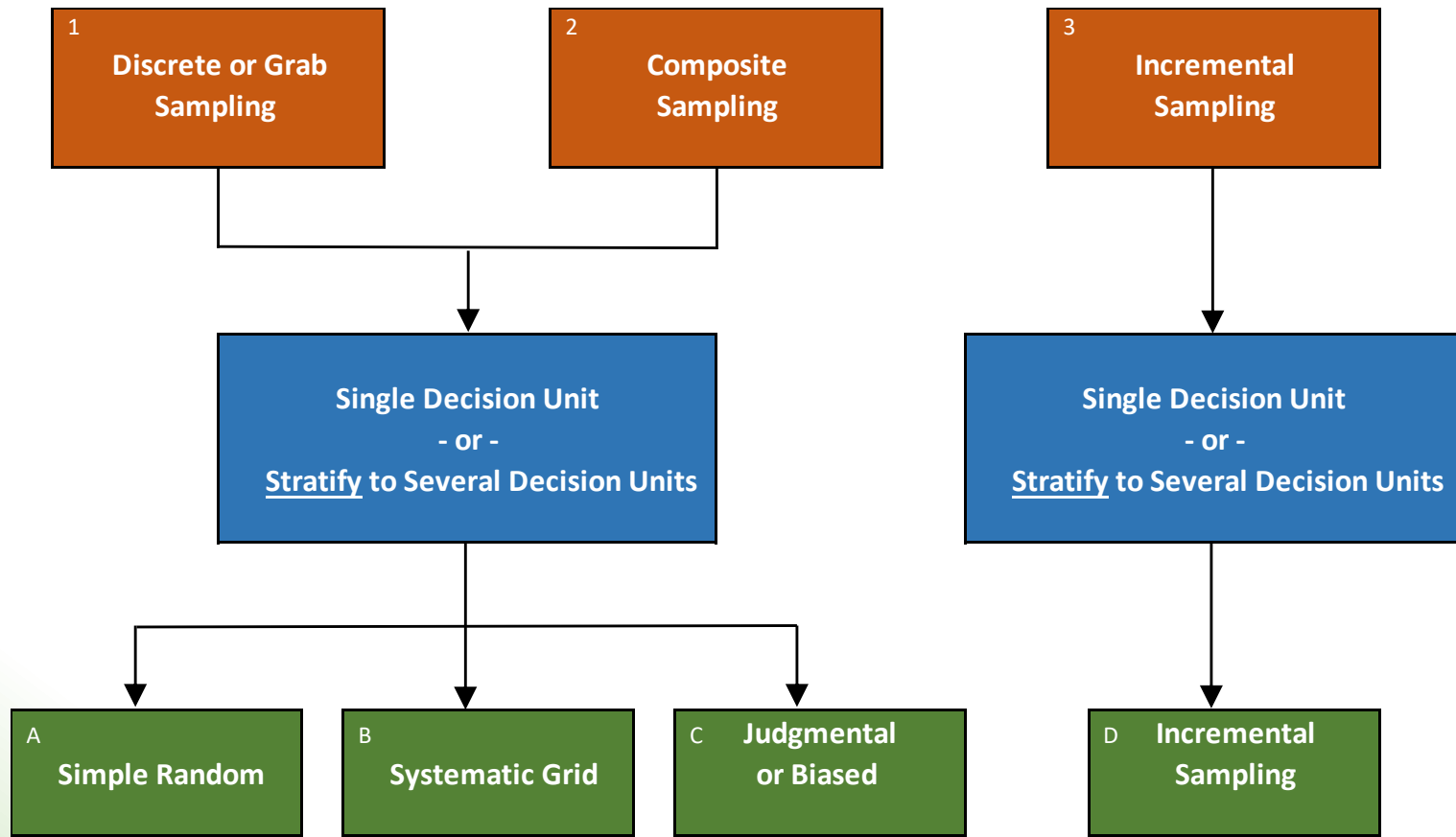
Section 4.0 - Choosing a Sampling Design

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Sampling Approaches

Section 4.0



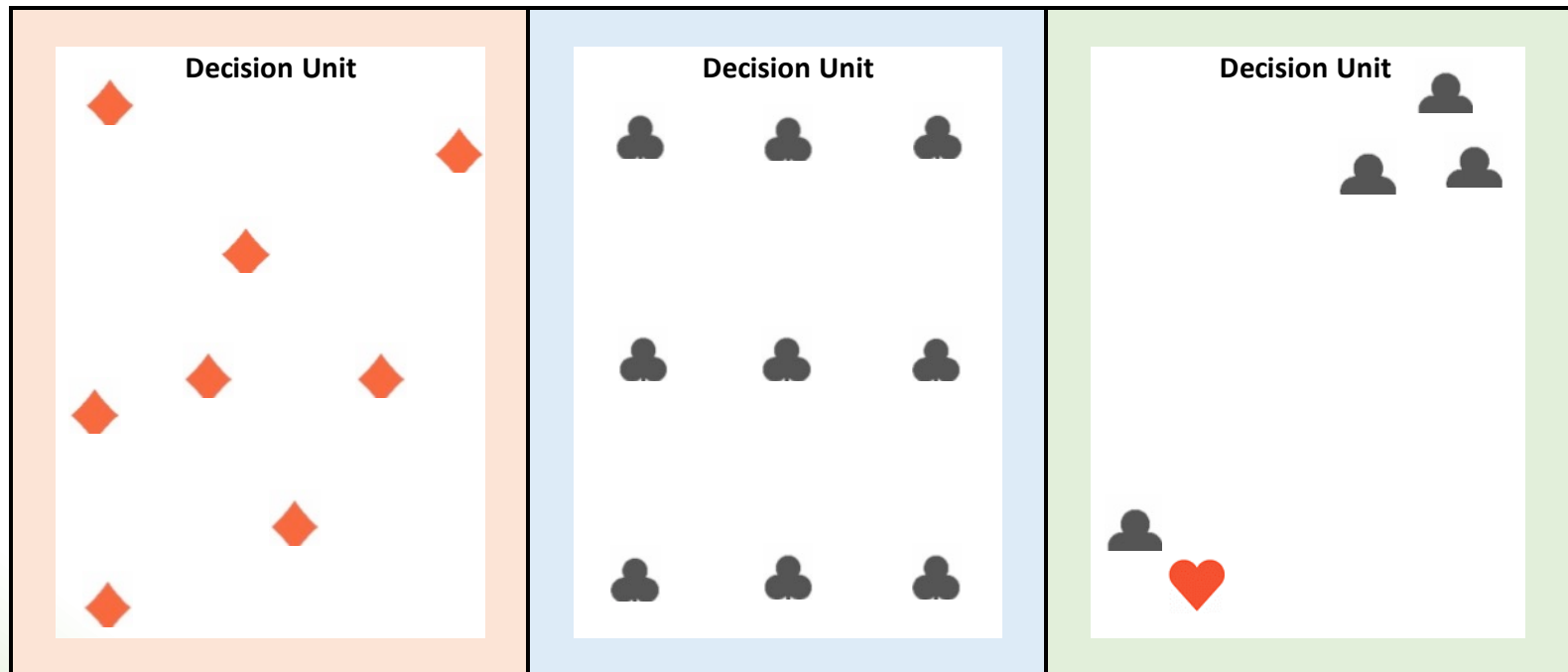
Example Sampling Designs

Section 4.0

Simple Random

Systematic Grid

Judgmental/Biased

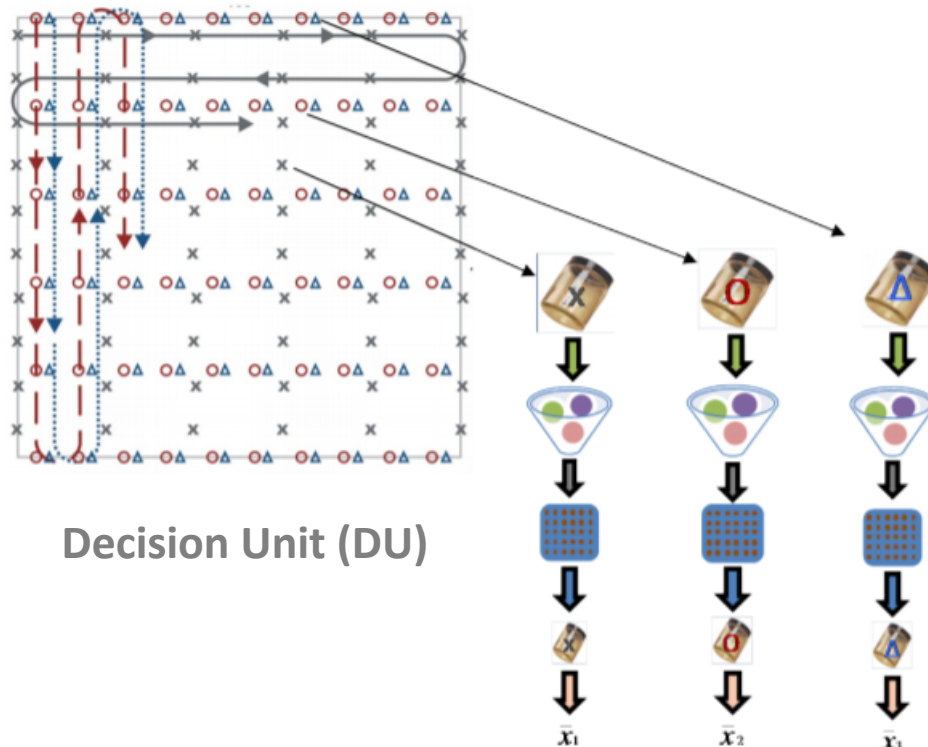


Discrete or Composite

Strata A and Strata B

Incremental Sampling Method

Section 4.0



Composite Field Sampling and Lab Processing Method

- Estimates Average Contaminant Concentration
- Typically 30 to 100 Field Increments
- Fewer Lab Tests
- See Guidance from Interstate Technology & Regulatory Council (ITRC)

Exposure Point Concentration

Section 2.0 & 6.1

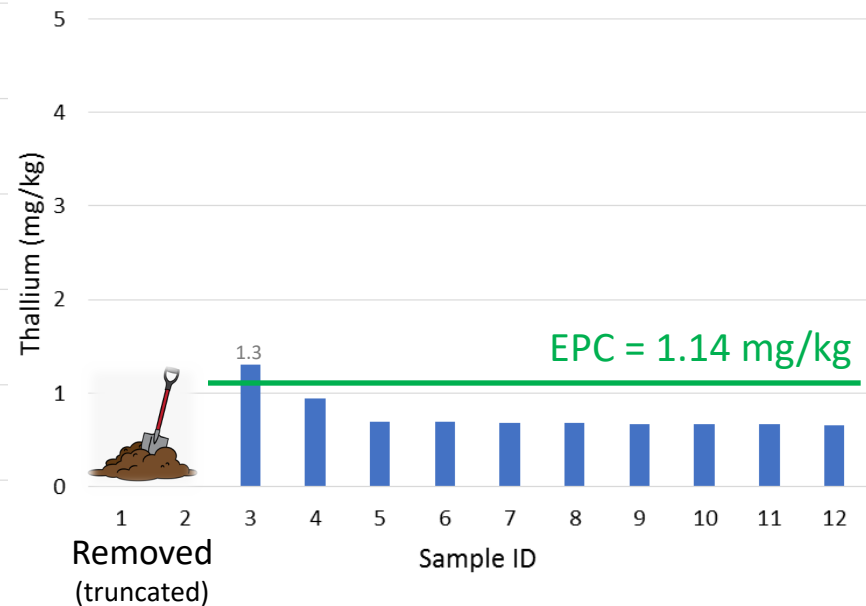
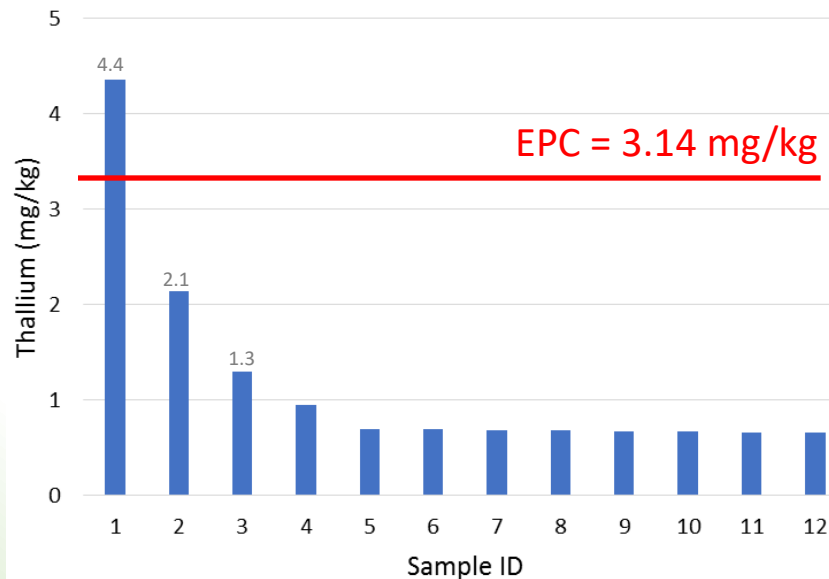
- Average Chemical Concentration to Which Receptor is Exposed
 - Because of Uncertainty in Measuring the True Average, the 95% Upper Confidence Limit is Generally Used
- Discrete (Grab) Samples
 - You Calculate 95% UCL from Multiple Samples
 - USEPA's ProUCL Software Often Used
- Composite and Incremental Samples
 - Lab Typically Reports the Average for DU
- Lead (Pb) Exposure
 - You Calculate Average from Discrete Samples

Iterative Truncation Method

Section 6.0

Remove (or truncate) highest sample concentration(s) and re-calculate Exposure Point Concentration (EPC), then compare to Action Level.

Action Level = 1.2 mg/kg



See also: EPD's 2017 Guidance for Demonstrating Completion of Soil Removal Actions

What About Hot Spots?

Section 4.0

- Higher Concentrations in One or More Samples
 - Based on Site Sampling Data
 - Statistically Higher Concentrations
 - Best Professional Judgement
 - Must Address Independently
- Similar to Release Areas
 - Based on Site Information
 - Stained Soil, Stressed Vegetation, etc.
 - Area Where Contaminants Stored, Handled, or Released



Section 6.0 - Dataset and Action Levels

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Other Misc. Topics

Section 6.0

- Exposure Point Concentrations (EPC)
 - Using USEPA's ProUCL Software
 - Few Detections, Non-normal Distributions, Goodness-of-Fit, Outliers, etc.
- Weighted Averages
- Geo-statistics/Geospatial Analysis
 - Kriging
- Software/Modeling Recommendations
- Multiple Constituents of Concern (COCs)



Multiple COCs in Soil

Section 6.0

- Often Multiple Constituents of Concerns (COCs) in Soil
- Cumulative (Total) Cancer Risks and Non-cancer Hazards Must Comply with Applicable Limits

Inorganic	Hazard Quotient Non-cancer Risk	Excess Lifetime Cancer Risk
Aluminum	0.20	- - -
Antimony	0.15	- - -
Arsenic	1.1	4.16E-05
Cobalt	0.63	2.68E-09
Iron	1.7	- - -
Selenium	0.02	- - -
Thallium	2.1	- - -
Vanadium	0.09	- - -
Total:	6.0	4.2E-05
Typical Limit*:	1.0	1.0E-05

Draft GBA Comments

(Pending review/approval by GBA Board of Directors)

- Significantly Improved Revised Draft Guidance
- Recommended Clarifications
 - Allow Use of Discrete, Composite and Incremental Sampling Approaches
 - Different Definitions of Surface Soil
 - Surface to 1 foot and Surface to 2 feet
 - Sampling Approaches
 - Single DU or Stratification
 - Simple Random, Systematic Grid or Judgmental/Bias Sampling
 - Lead Action Levels for Children and Adults from Blood-lead Level Models
- Only Use “Solid Waste Management Units” (SWMU) for RCRA Corrective Action Projects

Draft Comments – Cont'd

(Pending review/approval by GBA Board of Directors)

- Using USEPA's Removal Action Levels (RML)
 - Target Risk Levels May Conflict with (more conservative) HSRA Risk Reduction Standards
- Strongly Support
 - EPD Does Not Require Specific Minimum Number of Samples
- Action Level Exceedance Should Not Always Require Soil Removal or Treatment
- Your Suggestions and Comments?

Your Questions & Answers



Thank You

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