Improvement of Site Investigation Reliability and Efficiency Using "Decision Unit" and "Multi Increment" Sampling Methods

USEPA Region 10

May 3, 2017

Instructors

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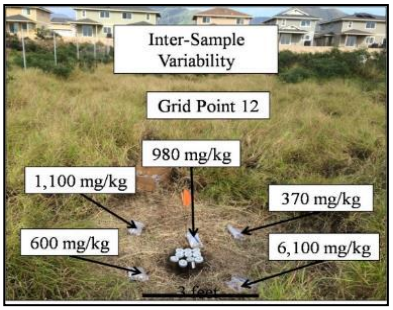

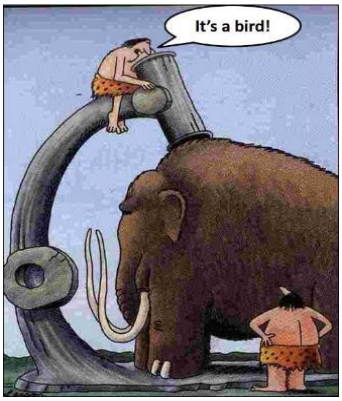

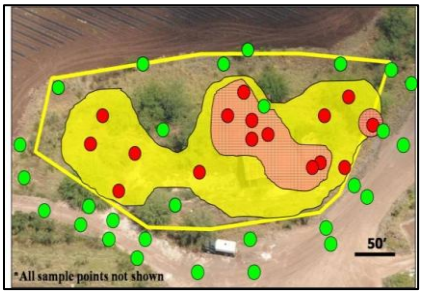

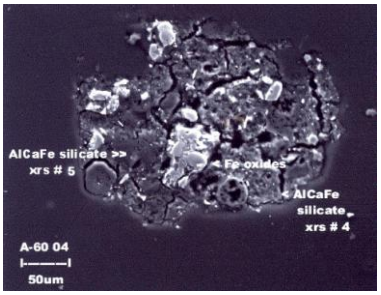

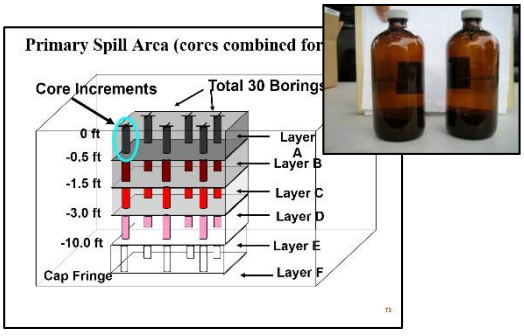

Improvement of Site Investigation Reliability and Efficiency Using "Decision Unit" and "Multi Increment" Sampling Methods

Presenters: Roger Brewer, Senior Environmental Scientist, Hawai′i Department of Health
John Peard, Senior Environmental Scientist, Hawai′i Department of Health
Harry Craig, USEPA Region X

Location: USEPA Region 10, Pacific Northwest, 1200 6th Ave., Seattle, WA

Date: May 3, 2017 (9:00am-5:00pm)

Subject: Overview of "Decision Unit" and "Multi Increment Sample" methods for the investigation and remediation of contaminated properties

Abstract: The workshop will explore the nature of random, small-scale variability of contaminant concentrations in soil and the use of "Decision Unit (DU)" and "Multi Increment Sample (MIS)" methods to help generate more reliable data for site investigation and remediation actions. The morning session will focus on field research and DU-MIS guidance published by the Hawai′i Department of Health (HDOH). DU-MIS methods have been used in Hawai′i since 2004, with the first guidance published in 2009. The afternoon session will focus on field experience and case studies overseen by USEPA Region X. The approaches outlined in the HDOH guidance are similar to methods presented in ITRC's "Incremental Sampling Methodology (ISM)" guidance document (ITRC 2012).

The workshop will begin with the results and implications of a field study of discrete soil sample data variability carried out by HDOH under a grant from USEPA Region 9. This will be followed by a basic review of sampling theory, with a focus on the use of "Decision Units (DUs)" to guide environmental investigations and the collection of large-mass, MI samples to more reliably characterize targeted DU areas. Examples of DU designation and sample collection under different site scenarios will be presented and used to assist in discussions. Case studies will include commercial, residential and agricultural settings, as well as characterization of surface soils, subsurface soils and sediments, and a variety of contaminants including arsenic, dioxins, pesticides, PCBs, munitions related explosives and VOCs. The implications of small-scale heterogeneity on the representativeness and reliability of indoor air and soil vapor data for use in vapor intrusion investigations will also be discussed (same issue, different media).

Case studies to be presented by USEPA Region X staff include the use of DU-MIS for the combined investigation of explosives and metals in soils and further elaboration of laboratory processing of MI samples. Other case studies to be presented include the use of DU-MIS approaches for sediment and eco-risk investigations.

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Workshop Agenda (May 3, 2017)

8:30 – 9:00 am: Setup and check in

9:00 – 9:15 am: Introductions
(15 min) *Instructor introductions; audience job titles and experience with MIS (ISM)*

9:15 – 10:00 am: Background and Reliability of Discrete Soil Sampling Methods.

10:00 – 10:15 am: Q & A

10:15 – 10:30 am: BREAK (15 min)

10:30 – 11:15 pm: Decision Unit & Multi Increment Sampling Basics. *Topics covered: Terminology, DU designation, sampling theory, sample collection, replicate samples, application to subsurface soil, stockpiles, VOCs, sediment, etc.*

11:15 – 12:00 pm: Hawaii - Case studies and Field Implementation (including commercial, residential, agricultural, surface soils, subsurface soils, sediments, arsenic, dioxins, PCBs, VOCs, etc.)

12:00 – 1:00 pm: LUNCH

1:00-1:30 pm: ISM lab sample processing experience and lessons learned (Gerald Dodo)

1:30- 2:00 pm: Case study one – Upper Columbia River (Marc Stifelman)

2:00 – 2:30 pm: Case study two – T-177 (Lon Kissinger)

2:30 – 3:00 pm: Case study three – Umatilla ADA OU (Harry Craig)

3:00-3:15 pm: Break

3:15-3:45 pm: Case study four – Farragutt Training Range (Harry Craig)

3:45-4:15 pm: Case study five - Agrium/EMF (Marc Stifelman)

4:15-4:45 pm: Case study six – Warm House Beach Dump (Rebecca Chu)

4:45-5:00 pm: Q & A/Wrap up

Key References:
Technical Guidance Manual (updated August 2016)

- Sect 3: Sampling Theory and Systematic Planning
- Sect 4: Decision Unit (DU) Characterization and Multi Increment Sample (MIS) Collection
- Sect 5: Field Implementation (DU selection, MIS sample collection, laboratory processing, data interpretation)
- Section 8: Field Screening (including use of portable XRF)

Hawai′i Department of Health, Hazard Evaluation and Emergency Response: http://eha-web.doh.hawaii.gov/eha-cma/Org/HEER/

Brewer, R., Peard, J., and Heskett, M. 2016. A critical review of discrete soil sample reliability: Part 1 – Field study results. *Soil and Sediment Contamination*. Vol 26, No 1. Available from: http://dx.doi.org/10.1080/15320383.2017.1244171

Brewer, R., Peard, J., and Heskett, M. 2016. A critical review of discrete soil sample reliability: Part 2 – Implications. *Soil and Sediment Contamination*. Vol 26, No 1. Available from: http://dx.doi.org/10.1080/15320383.2017.1244172

Taylor et al., 2011, Guidance for Soil Sampling of Energetics and Metals, U.S. Army Corps of Engineers, Cold Regions Research and Engineering Laboratory (CRREL), Hanover, NH, ERDC/CRREL TR-11-15, October 2011. http://oai.dtic.mil/oai/oai?verb=getRecord&metadataPrefix=html&identifier=ADA583020

ITRC, 2012, Incremental Sampling Methodology: Interstate Technology Regulatory Council, February 2012, http://itrcweb.org/ism-1

EPA, 2012, Federal Facilities Forum Issue Paper: Site Characterization for Munitions Constituents, Office of Solid Waste and Emergency Response, Washington, D.C., EPA-505-S-11-001, January 2012. https://www.epa.gov/sites/production/files/documents/site_characterization_for_munitions_constituents.pdf