#### **Evaluating and Managing Contaminated Soil Part 1: Sample Collection and Environmental Concerns**











#### Roger Brewer Senior Environmental Scientist Hawai'i Department of Health Hazard Evaluation and Emergency Response

Protect Our Water Conference, Hawaii, November 18, 2020

There are three methods to gain knowledge: The first, reflection, is the noblest; The second, imitation, is the easiest; And the third, experience, is the bitterest.

Confucius

# **Investigation of Environmental Contamination** - Multiple Fields of Expertise Required-

- Chemistry: What is it?
- Geology: Where is it?
- Physics: Where is it going?
- Toxicology: What can it do to me?
- Combined: What are the concerns?
- Engineers: How can we fix it?
- Attorneys: Who is going to pay?

#### **Directly incorporated into HIDOH guidance**

## HIDOH Guidance for the Investigation, Remediation and Management of Contaminated Soil & Groundwater

**<u>1. Testing Soil, Water and Air for Contamination:</u>** *Technical Guidance Manual:* http://eha-web.doh.hawaii.gov/eha-cma/Org/HEER/

**2. Determining if There is a Problem:** 

**Evaluation of Environmental Hazards at Sites with Contaminated** Soil and Groundwater:

http://eha-web.doh.hawaii.gov/eha-cma/Leaders/HEER/EALs

Hawaii Edition: Environmental Action Levels (EALs)

**Tropical Pacific Edition: Environmental Screening Levels (ESLs)** (excludes HDOH-specific standards, originally developed for use in CNMI & Guam)

#### **HEER Webinars:**

http://eha-web.doh.hawaii.gov/eha-cma/Leaders/HEER/Webinar

#### **Testing of Stockpiles and Fill Material**

HDOH, 2017, Guidance for the Evaluation of Imported and Exported Fill Material, Including Contaminant Characterization of Stockpiles: Hawai'i Department of Health, Office of Hazard Evaluation and Emergency Response, http://www.hawaiidoh.org/



# **Collection of Multi Increment Soil Samples**

- Designate "Decision Unit (DU)" areas and volumes of soil for testing;
- Collect a single, 30- to 75-increment "Multi Increment" sample from each DU (three samples collected in at least one DUs to check precision);
- Process and analyze at laboratory for target contaminants;
- Compare to HIDOH Environmental Action Levels to identify concerns.



# **Stockpiles**

(DUs designated based on target volumes)





- Samples collected from dump trucks or conveyor belt as stockpile formed;
- One sample per 100 to 800+ cubic yards (depending on planned reuse);
- Testing exemption for known, clean soil/fill;
- Existing stockpiles flattened or...
- Faces of large stockpiles sequentially tested and removed as needed;
- Balance cost of testing vs cost of disposal.





#### **Different Methods for Different Projects Increment Shape**























### **Six-Part Webinar Training Series (2017, recorded)**

- 1. Site Investigation Design;
- 2. Decision Unit Designation;
- 3. Decision Unit Characterization (sampling theory);
- 4. Field Implementation of DU-MIS Methods;
- 5. Laboratory Processing;
- 6. Environmental Hazard Evaluation (aka "risk assessment").

#### Hawaii DOH Webinar Webpage:

http://eha-web.doh.hawaii.gov/eha-cma/Leaders/HEER/Webinar

# **Risk-Based Testing of Soils and Sediment**

- 1. What are the *primary environmental concerns*?
- 2. What are the *Site Investigation Objectives* (risk and/or optimization of remediation)?
- **3.** What *data resolution* is needed to meet the objectives (DU area and volume)?

**Every Spot?** 

#### **Each Playground?**

**The Entire Park?** 



- Best! Risk as well as potential remediation questions and needs considered *upfront in project design*;
- Avoid! Risk assessors and remediation specialists get stuck with *inadequate*, *after-the-fact data* and no time or money to collect additional samples.





**Gross Contamination Action Levels** (function of short-term exposure risk, odor threshold, solubility, sheens and visible staining/contamination etc.)

#### Short-term vapo emissions;

- Explosive vapors;
- Odors & nuisance;
- Potentially mobile free product;
- Staining or visible debris/contamination;
- Interference with future development;
- Include in site-specific EHMP if left in place.<sup>13</sup>



# **Environmental Action Levels (EALs)**

- EALs for 150+ common contaminants;
  - Volume 1: Tier 1 Final EALs;
  - Volume 2: Technical background and detailed action levels.
- Easy-to-use, Excel-based "EAL Surfer" *electronic lookup tables*:
  - Select site scenario (residential, commercial, etc.);
  - Select chemical by name or CAS #;
  - Input site sample data;
  - Automatically identifies potential environmental hazards;
  - Summary report generated;
- No significant hazards if concentrations <EALs;
- Additional evaluation +/- remediation or long-term management required if EALs exceeded.

# Identification of Potential Environmental Concerns (e.g., TPHg and BTEX)



#### **Partial Remediation and Long-Term Management**

#### -Environmental Hazard Management Plans (EHMPs)-



- **Example Remediation and Redevelopment Design:** 
  - Active remediation of Gross Contamination and *highest-risk* Vapor Intrusion and Direct Exposure risk areas;
  - Passive vapor barrier to future buildings as added measure of protection;
  - Monitoring of groundwater confirms dissolved-phase plume not migrating offsite above levels of potential concern; 17
  - Long-term management of soil & gw required for subsurface activities (EHMP).

# Summary

- Step 1: Collect samples representative of potential environmental concerns;
- Step 2: Environmental Hazard Evaluation (EHE):
  - Use of reasonably conservative, Environmental Action (EALs expedites the risk assessment & remediation process;
  - Comprehensive action levels ensures that common, potential environmental hazards are not overlooked;
  - Advanced, *site-specific evaluation* for identified, potential hazards as necessary (rarely time/cost beneficial for Direct Exposure and Vapor Intrusion);
  - Results and recommendations summarized in Environmental Hazard Evaluation report;
- Step 3: Remediation and/or Environmental Hazard Management Plan (EHMP)
  - EHMP used to manage remaining contamination (e.g., planned construction, future utility work, etc..

Identification and Management of Contaminated Soil and Groundwater during Construction and Redevelopment



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Sven Lindstrom Voluntary Cleanup Program (VCP) Specialist

Hawaii Department of Health Hazard Evaluation and Emergency Response (HEER) Office Site Discovery, Assessment, and Remediation (SDAR)



## Identification and Management of Contaminated Soil and Groundwater during Construction and Redevelopment

#### **OUR REGULATORY AUTHORITY and GUIDANCE**

- Hawaii Revised Statutes (HRS) 128D Hawaii Environmental Response Law
- Hawaii Administrative Rules 11-451 State Contingency Plan
- HEER Office Technical Guidance Manual (TGM) for the Implementation of the Hawai'i State Contingency Plan
- EHE Guidance Evaluation of Environmental Hazards at Sites with Contaminated Soil and Groundwater:
  - Volume 1 (User's Guide)

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- Volume 2 (Lookup Tables and Appendices)
- HDOH Environmental Action Level (EAL) Surfer
- Guidance for Soil Stockpile Characterization and Evaluation of Imported and Exported Fill Material – Clean Fill Guidance





- Phase I Environmental Site Assessment
- Review iHEER Data Base
- Geotechnical Boring Data Observations
- Contact the HEER Office
- Collect Samples

Hazard Evaluation and Emergency Response Office





- Phase I Environmental Site Assessment (ASTM 1527-13/AAI)
  - Review Regulatory Records
  - Historic Maps and Photos
  - Interviews

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• Identify *Recognized Environmental Conditions (RECs)* 





• iHEER Database:

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https://eha-cloud.doh.hawaii.gov/iheer#!/home

- Sites shown on Viewer map
- Documents available to Public
- Other Features in Development (Status, Ranking, COPCs, ICs/ECs)

Environmental Health iHEER • Hazard Evaluation and Emergency Response System					
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- Geotechnical Boring Data Observations
  - Staining

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- Suspicious Odors
- Free Product (requires immediate notification to HEER Office)
- Contact HEER Office: 808-586-4249
- <u>Collect Samples</u>



Photo source: geotekhawaii.com



Pre-Construction *Sampling* of Soil, Soil Vapor and Groundwater

#### Hire a Qualified Environmental Consultant:

https://health.hawaii.gov/heer/files/2020/05/HowToChooseAConsultant05062020.pdf

- Prepare a Sampling and Analysis Plan (SAP) approved by the HEER Office
- Identify Decision Units (DUs)

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- Collect Multi-Increment Samples (MIS)
- Screen against HDOH Tier 1 Environmental Action Levels (EALs)





# Proper Response and Required Notification When Contamination is Identified <u>**During</u>** Construction</u>

- Don't let this happen to you!!
  - <u>Stop Work</u> in the area immediately and notify HEER (call 586-4249)
  - HEER On-Scene Coordinators will work with your Consultant to identify and contain the release
  - Site Characterization and Remediation may be necessary
  - Plans may need to be revised to integrate Engineering Controls, long-term management and/or additional site characterization and remediation
  - Prepare a C-EHMP





# Prepare a *Project-Specific* Construction Environmental Hazard Management Plan (C-EHMP)

• Purpose of a C-EHMP

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- Document the presence of residual contaminated media on a site
- Describe how the residual contamination will be managed during construction activities
- Describe measures to protect human health from hazards associated with contamination
- C-EHMP Templates and Fact Sheet



Photo source: FAI

https://health.hawaii.gov/heer/2020/02/05/revised-construction-ehmp-template-fact-sheet/



# Site-Specific

#### Environmental Hazard Management Plans (EHMPs)

#### • Purpose of EHMP

- Document the presence of residual contaminated media on a site (generally following a Response Action)
- Describe Engineering and Institutional Controls (ECs & ICs) to manage contamination
- Provide guidance for soil management during small scale and emergency excavations



Photo source: NAVFAC Hawaii

• NOT intended for large-scale redevelopment (prepare C-EHMP)



# **Programmatic and Area-wide Environmental Hazard** Management Plans (AEHMPs)

#### **Purpose of AEHMP**

- Identify areas of known or suspected contamination across multiple properties that may be from multiple sources
- Provide worker protection and soil management guidance for limited activities that may be project-specific
- May be supplemental to Site-Specific EHMPs
- **Generally not intended for large-scale redevelopment** (prepare C-EHMP)





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# Programmatic and Area-wide Environmental Hazard Management Plans (AEHMPs)

#### • Examples of AEHMPs

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- Iwilei District IDPP Programmatic EHE/EHMP – developed to address public roads and infrastructure
- HART Programmatic EHE/EHMP addresses HART construction activities
- Waikoloa Maneuver Area AEHMP addresses Unexploded Ordnance (UXO) hazards



Photo source: WMA AEHMP Fact Sheet



# Management and Disposal of Contaminated Soil and Groundwater

#### • Contaminated Soil Disposal Options

- Re-use on-site (not grossly contaminated)
- Off-site re-use (see *Clean Fill Guidance*)
- Landfill disposal (check with landfill)
- Contaminated GW Disposal Options
  - Re-infiltrate on-site (remove free product)
  - Discharge with permit from CWB
  - Pump and haul for treatment/disposal



Photo source: KSK, LLC



### **Release Reporting Requirements**

https://health.hawaii.gov/heer/how-to-report-a-release-spill/

#### • Release of a Reportable Quantity

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- Immediate notification by phone/in person to HEER required by law
- 30-day follow-up written notification required by law
- Notification to National Response Center at 1 (800) 424-8802
- Notification to Local Emergency Planning Committee (by County)
- Unknown Quantities (Historic Release)
  - Consult with your Qualified Environmental Professional (and HEER RPM)
  - Report Exceedances of Tier 1 EALs (Residential)



### ePermitting document submittal

https://health.hawaii.gov/heer/submit-documents-to-heer/submit-documents/

- Set-up an account
  - Register and create a User Profile (with password) at <u>https://eha-cloud.doh.hawaii.gov/epermit/registration/new?httpMethod=GET</u>
- Submit Documents and Construction Notifications to SDAR
  - "Submittal of Assessment and Remediation Related Reports"
  - *"Notification of Construction Activities"* (no Documents)
- Submit Release Notifications to the *Emergency Preparedness and Response* (EP&R) Section



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# **HEER Office Links**

https://health.hawaii.gov/heer/

#### • My Contact

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(808) 586-4249

#### • HEER Office Useful Links

HEER Website: https://health.hawaii.gov/heer/ iHEER Database: https://eha-cloud.doh.hawaii.gov/iheer#!/home Technical Guidance Manual: http://www.hawaiidoh.org/ C-EHMP: https://health.hawaii.gov/heer/guidance/environmental-hazard-management-plans/ Clean Fill Guidance: http://hawaiidoh.org/references/HDOH%202017d.pdf ePermitting: https://health.hawaii.gov/heer/submit-documents-to-heer/submit-documents/ Release Notification: https://health.hawaii.gov/heer/how-to-report-a-release-spill/

