



Soil Sampling – Consider the “Why”

MT DEQ Petroleum Tank Cleanup Section

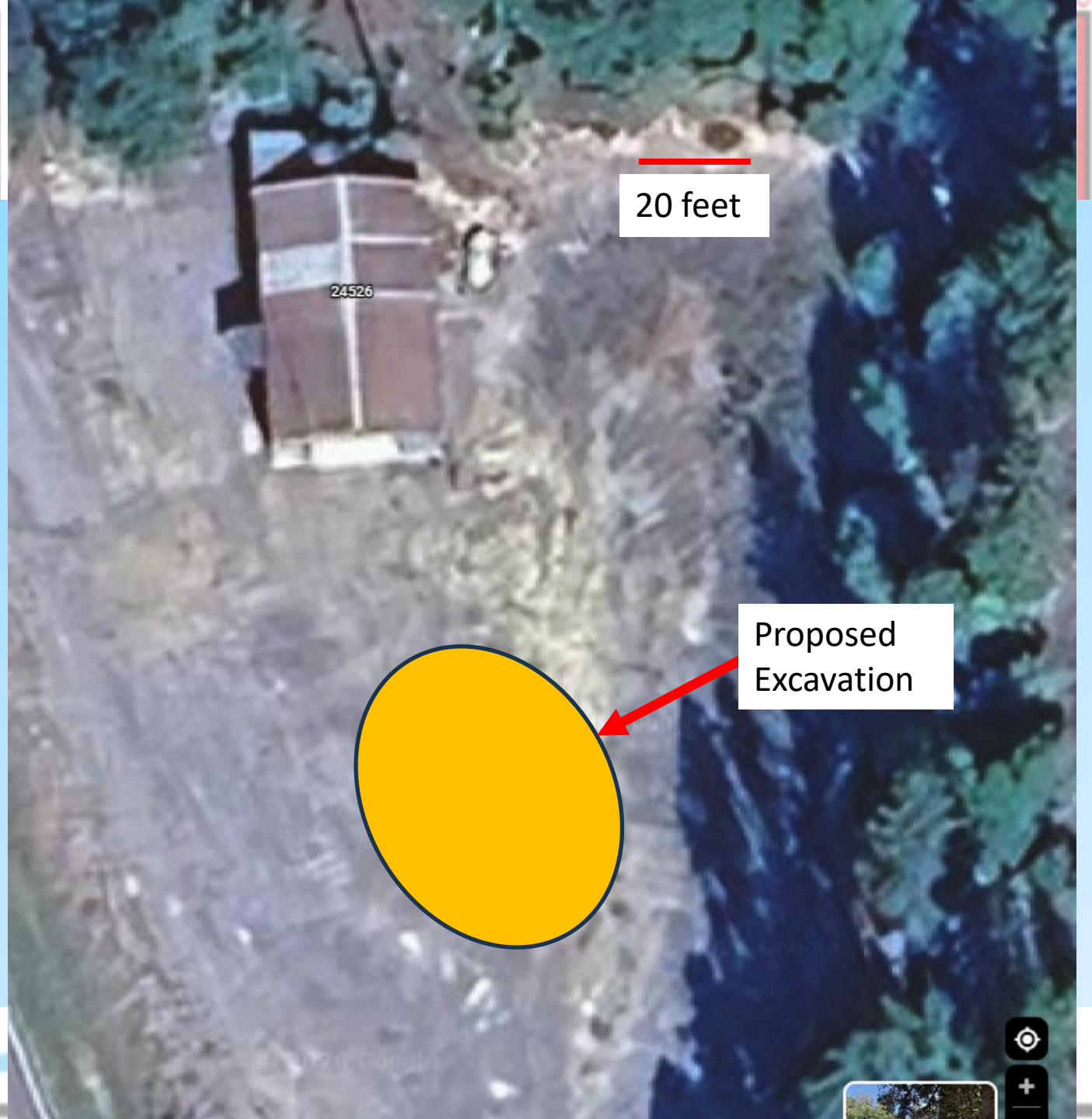
Consultant’s Day – April 16-17, 2026



Soil Sampling

How many soil samples?

What influences that estimate?



Small Sites

a. Excavation depth two feet or less:

- One 5-point composite soil sample collected for each 625 sq ft of excavation floor to be submitted for EPH analysis
- Two discrete (grab) soil samples collected for each 625 sq ft of excavation floor to be submitted for VPH analysis.
- One 5-point composite soil sample collected for each 625 sq ft of excavation floor to be submitted for analytical parameters listed in Table B and RCRA metals analyses.

b. Excavation depth greater than two feet:

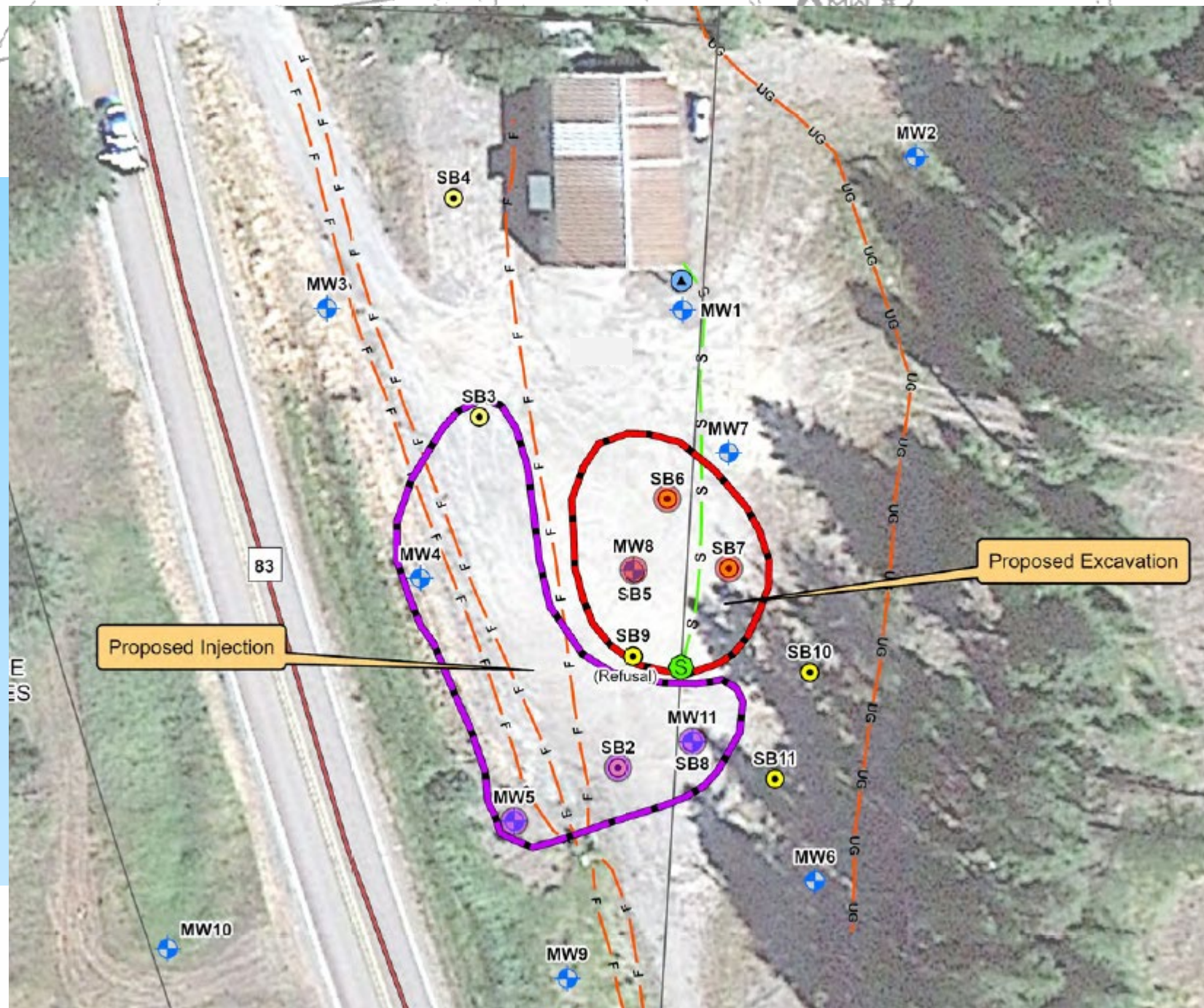
- Collect composite and discrete soil samples from the excavation floor as discussed in 1.a.
- One 5-point composite soil sample collected for each 25 linear feet of excavation sidewall to be submitted for EPH analysis.
- Two discrete (grab) soil samples collected for each 25 linear feet of excavation sidewall to be submitted for VPH analysis.
- One 5-point composite soil sample collected for each 25 linear feet of excavation sidewall to be submitted for analytical parameters listed in Table B and RCRA metals analyses.



Facility Use
chemistry (gas. Vs. diesel)
UST versus AST, etc.

Existing Data
vertical profile,
lateral extent

Intended Follow-up Action





Soil Sampling

When are soil Samples Collected?

Soil Boring/Monitoring Well Installation

System Removal

Test Pit Installation

System Repairs

Excavations

Surface Spills



LOCATION OF
FORMER 10,000
GAL. GAS UST



FORMER 5,000 GAL. DIESEL UST
(CONVERTED FROM GAS UST)



Soil Sampling

Purpose of Sampling Soil:

Release Confirmation

Determine Magnitude of Contamination

Determine Extent of Contamination
Lateral and Vertical

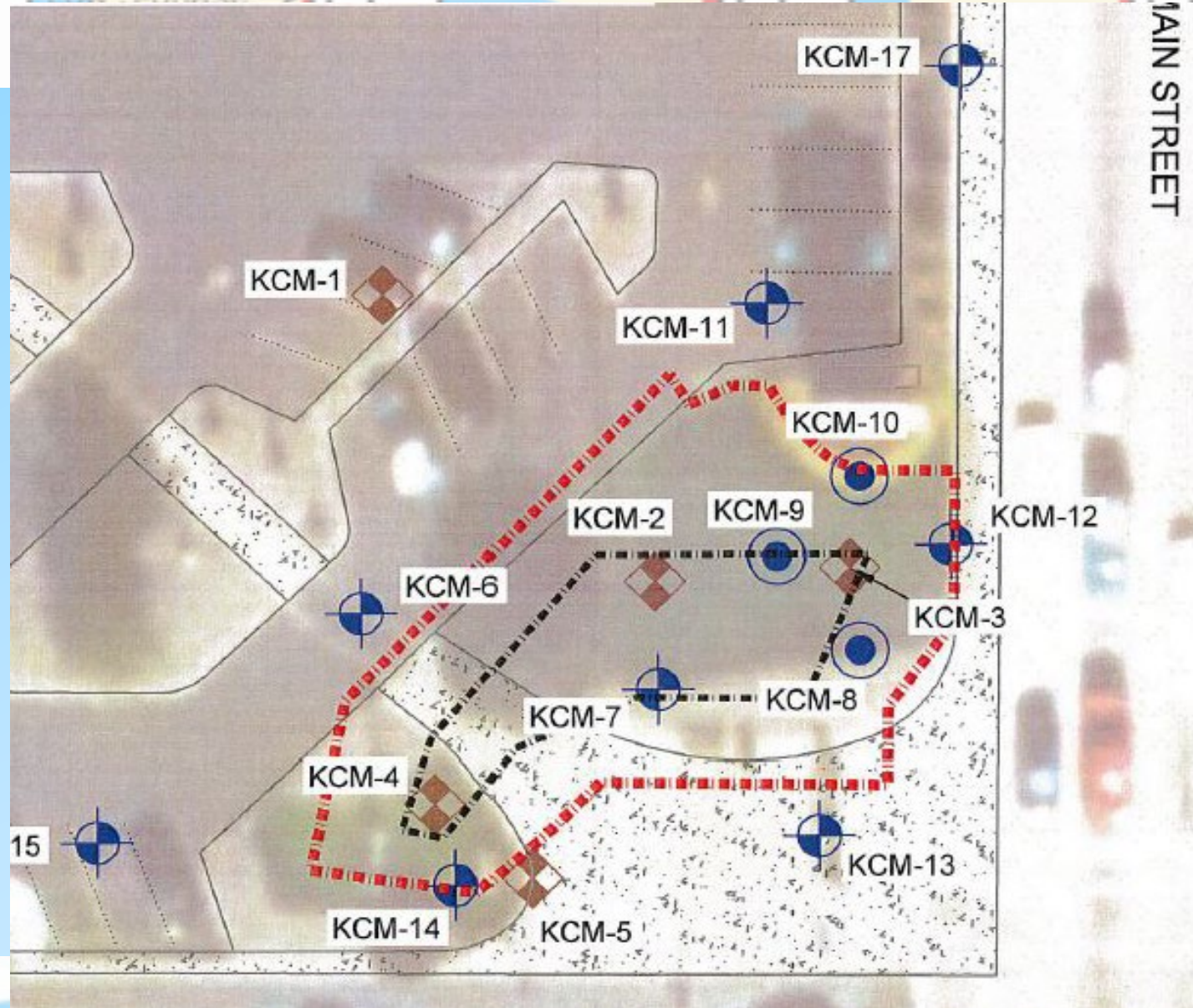
Assess Exposure Pathways/Risk

Remediation Design

Waste Characterization

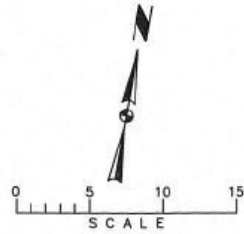
Soil Sampling

Default
sampling at
PTCS sites?



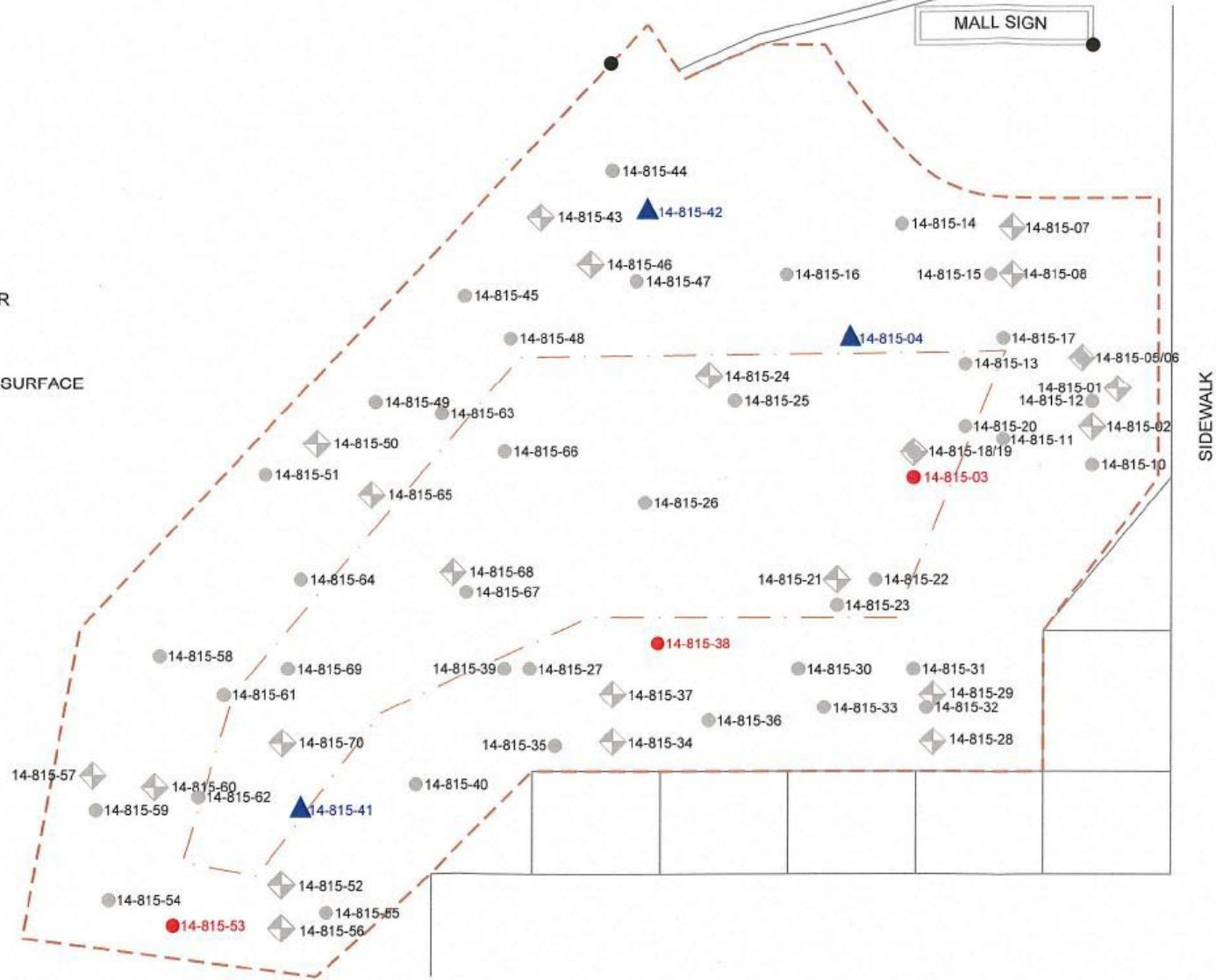
Soil Sampling

Default Sampling at PTCS sites?



LEGEND

- DISCRETE SOIL SAMPLE
- ◆ COMPOSITE SOIL SAMPLE
- ▲ VERIFICATION SOIL SAMPLE
- 14-815-01 SOIL SAMPLE IDENTIFICATION NUMBER
- 14-815-03 SOIL SAMPLE ABOVE RBSL
- 14-815-42 VERIFICATION SOIL SAMPLE
- - - EXTENT OF EXCAVATION AT GROUND SURFACE
- - - BASE OF EXCAVATION





The "Why"

Surface Spill

Document Residual

- Assess:
- Direct Contact
 - Leaching
 - Vapor Intrusion



Legend

Excavation	Sidewall Composite Sample	Sidewall Composite Sample
AST	Pit Bottom Composite Sample	
Discrete Samples		

10 5 0 5 10 Feet 1 in = 10 ft

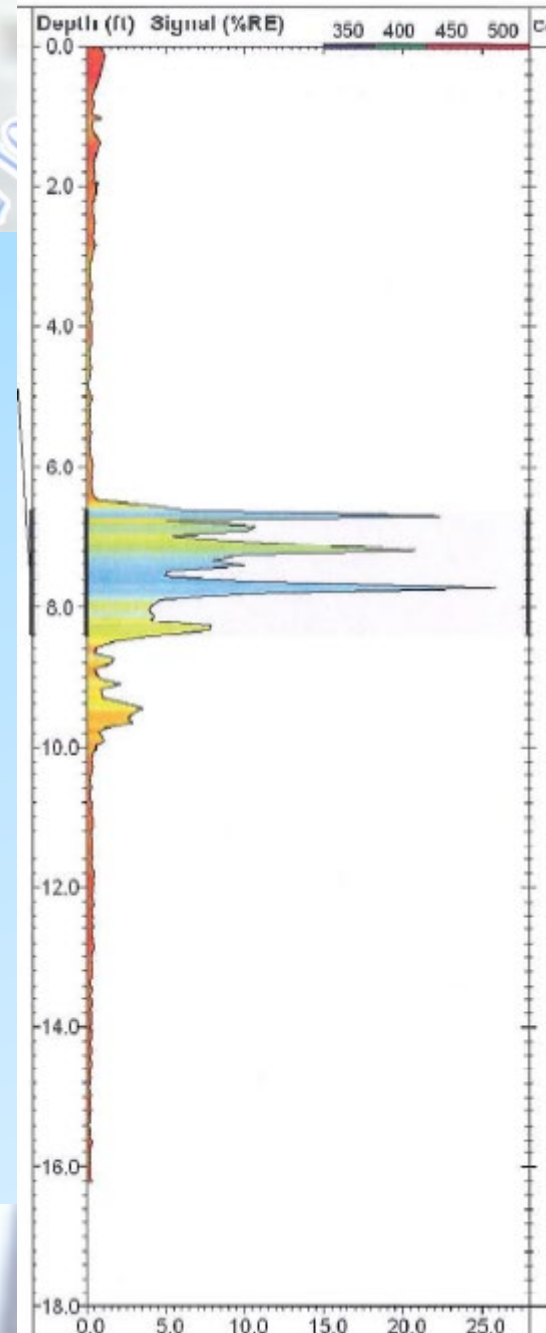
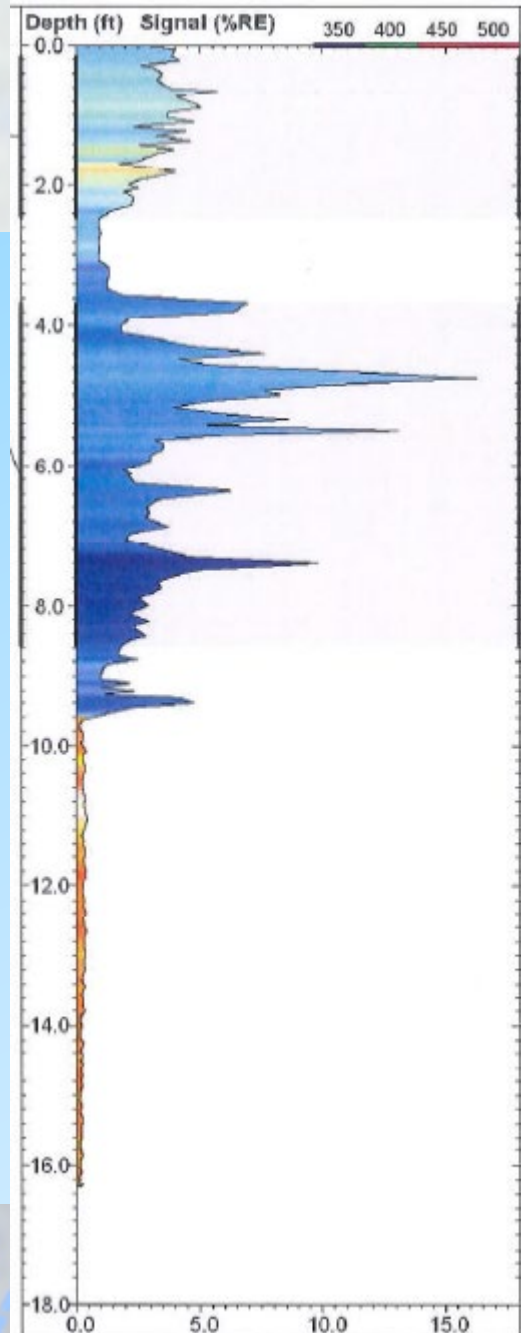
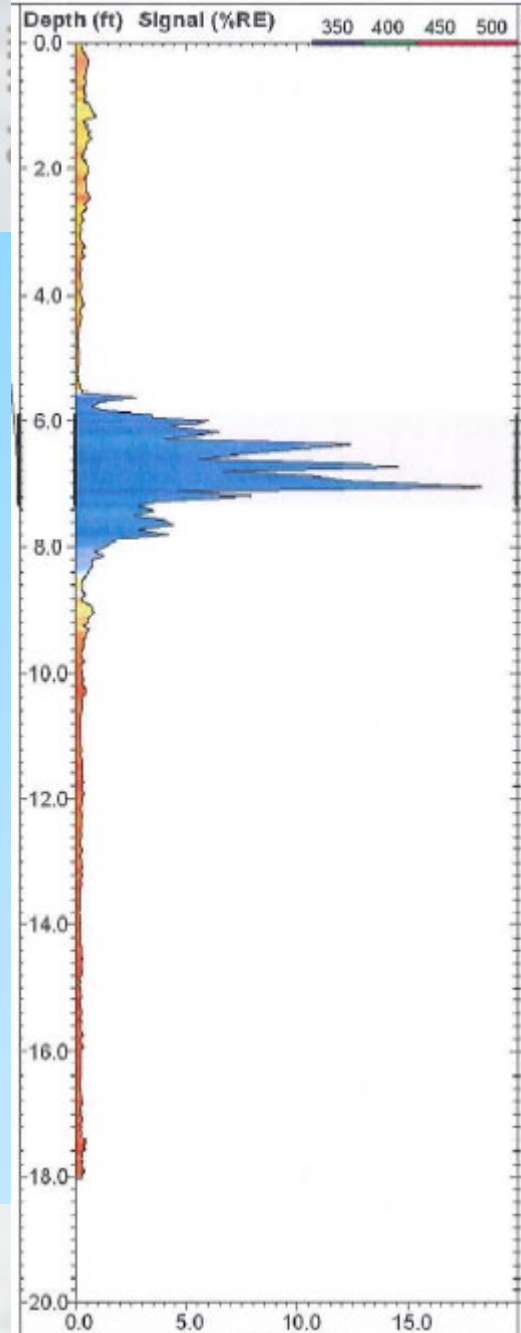
N

The "Why"

Remediation Design

Assess:

- Direct Contact
- Leaching
- Vapor Intrusion (?)





Soil Sampling

Common Phrases in Work Plans

“Samples will be collected according to DEQ requirements”
(or Guidance)

- * Petroleum Tank Cleanup Section Guidance:
 - Remedial Investigation Work Plan and Report
 - Montana Risk-Based Corrective Action Guidance
 - Montana Quality Assurance Plan for Investigation of Underground Storage Tank Releases

Soil Sampling

Parameter	Analytical Method	Sample Container/ Preservation	Holding Time
Soil Samples			
VPH	Montana Method VPH	<p>60 mL or 40 mL VOA vials or 4 oz wide mouth jar. Collect at least 10 g of soil, cool to $4 \pm 2^\circ \text{C}$. Must be preserved at the lab in methanol within 48 hours of collection.</p> <p>or</p> <p>Methanol preservation in the field. 1 mL methanol for every g soil, +/- 25%; lab can provide appropriate vials with methanol for easy collection; cool to $4 \pm 2^\circ \text{C}$.</p> <p>If preserving with methanol in the field, a sample containing no methanol must also be submitted for determining moisture percentage.</p>	<p>28 Days to analysis from collection.</p> <p>If collecting in the field without methanol, lab preservation in methanol w/in 48 hours and 28 days to analysis from collection.</p>

Soil Sampling

- Terra Core Sampler
- 5 mg soil
- 1/1 ratio soil to preservative





Soil Sampling

Common Phrases in Work Plans

“Samples will be collected based on field screen, visual, and olfactory observations”

Or

“The extent of the excavation will be determined in the field based on field screen, visual, and olfactory observations”



Soil Sampling

Common Phrases in Work Plans

“Up to 3 soil samples will be collect per boring”

Soil Sampling

Common Samples – Soil Borings/Monitoring Wells

- Soil/Groundwater Interface

- Purposes of “Soil Groundwater Interface”?
 - Outside of Source Area, this is often “worst case”
 - Assess leaching potential
 - Remediation Design

Soil Sampling

Common Samples – Soil Borings/Monitoring Wells

- “Worst Case”

- Purposes of “Worst Case”?
 - Release Confirmation
 - Extent and Magnitude

Soil Sampling

Common Samples – Soil Borings/Monitoring Wells

- **Bottom of Boring (Bottom of Contamination(?))**
 - Purposes of “Bottom of Boring/Contamination”?
 - Assess leaching if groundwater is not reached
 - Remediation Design (?)

Conclusions

1. Consider the Purpose of the Sample(s).
2. Non-PTCS Guidance(s) may not be appropriate as they were developed under different assumptions



Soil Sampling

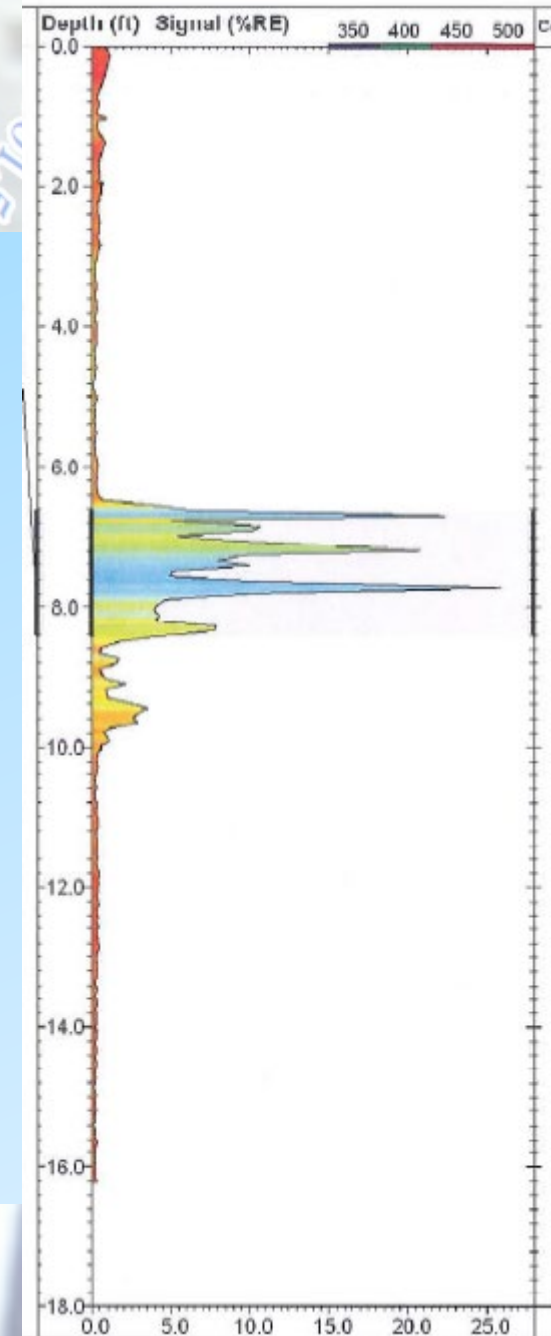
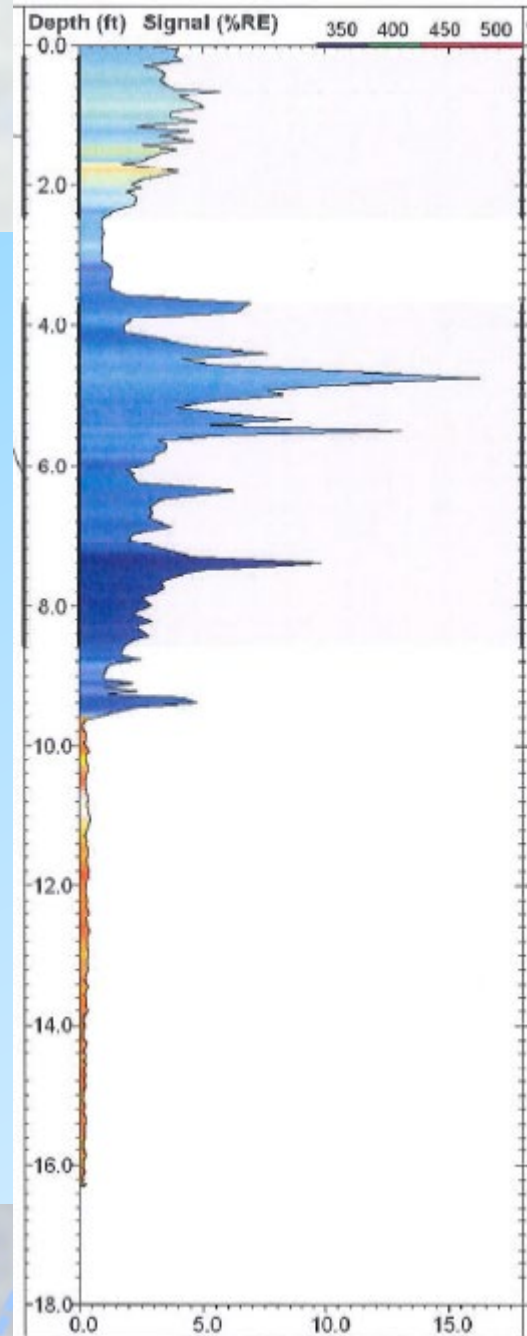
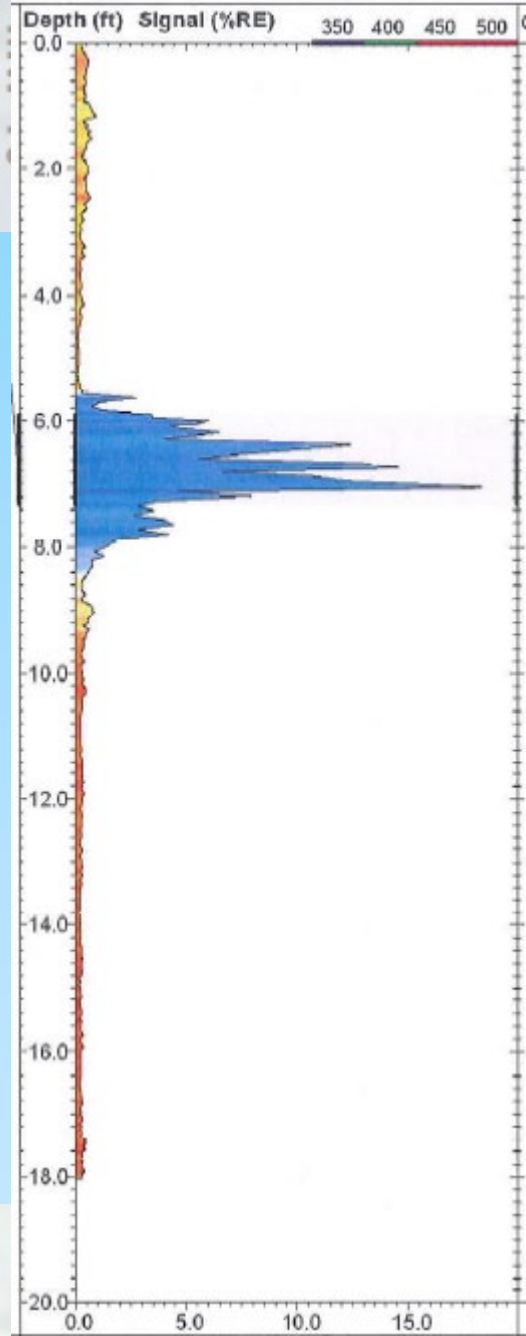
Conclusions

3. Remember to Consider Holding Times when developing your Sampling Plan



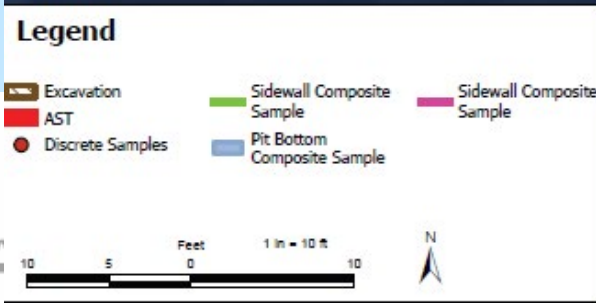
Conclusions

- 4. Developing a good vertical profile is very useful.



Conclusions

- 6. Don't use default language/ cookie-cutter approach - Consider the purpose of the samples from release confirmation to release resolution.



MT DEQ Contacts

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- Questions?

DEQ
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