

(NOT SO) LUCKY MINI MART

*Soil Vapor Sampling and Laser-Induced
Fluorescence As Starting Points to an
Investigation followed by Unexpected
Risk Management*

*Prepared For: Environmental Remediation and Risk
Management Conference*

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PROJECT TEAM

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SITE HISTORY

- „ Part 213 site
- „ Active gas station and convenience store
- „ 1,800 sq. foot building on ~ 0.39 acres with two fuel dispensing canopies, asphalt/concrete parking lot and landscaping greenbelts
- „ Past – Five former USTs installed in 1976, excavated/removed in 2001
- „ Present – Two USTs; (1) – 8,000 gal. gasoline, (1) – 12,000 gal. gasoline
- „ Two historical release – 1994 and 2001
- „ DEQ obtained state funds to assess site risk

LUCKY MINI MART

- Initial information was limited to two confirmed release reports

Confirmed
Release
Locations



WHAT WERE OUR GOALS?

Move fast, Identify the Risk, Mitigate

- „ We decided to be innovative (because we can)
 - „ Sec. 20118 (12) *“The department shall encourage the use of innovative cleanup technologies.”*
- „ We developed a CSM
- „ We decided to do something other than the “typical” approach:
 - „ Soil Borings
 - „ Monitoring Wells
 - „ More Borings, Wells, etc...

WHAT DID WE DO DIFFERENTLY?

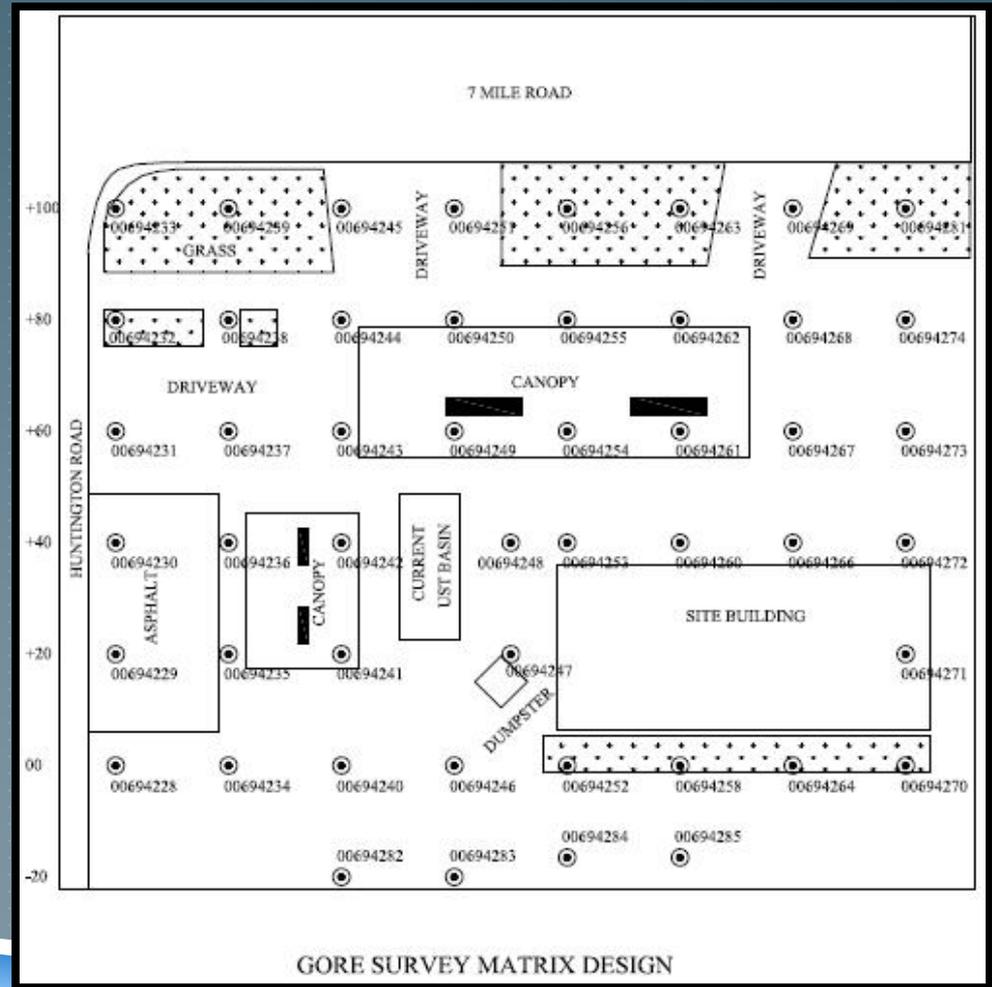
- " We decided to attack the critical pathway (VI) first
- " We effectively reversed the process
- " VI à LIF à Soil Borings and Monitoring Wells
 - " (Does VI represent the soil and GW impacts?)
 - " (Why LIF?)

INNOVATIVE RI APPROACH

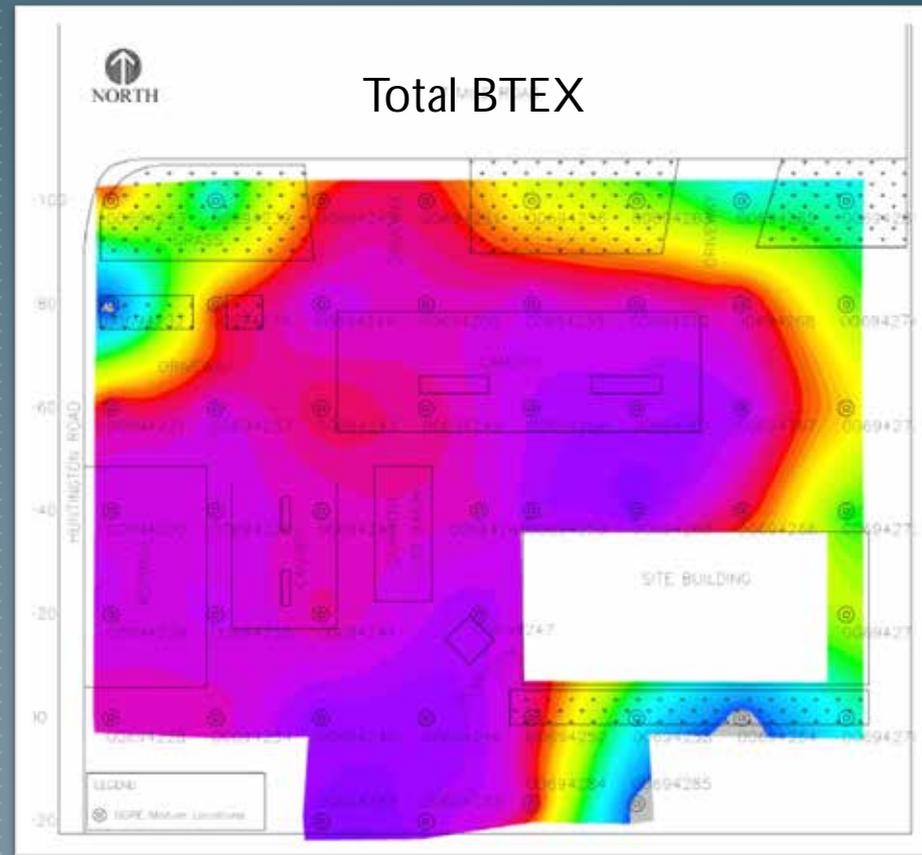
- „ GORE-SORBER – to define the extent
(we gridded the site)
- „ LIF – to identify NAPL based on “hot” vapors
(new CSM, two days work, focus on NAPL)
- „ Soil Borings – to verify NAPL and “clean” areas
(new CSM, we verified NAPL extent)
- „ Monitoring Wells – to ID extent
(we determined where GW was migrating)

GORE-SORBERS AND FIELD ACTIVITIES

- " ePTFE membrane tube
- " Chemically-inert, waterproof, vapor-permeable barrier which houses engineered absorbents
- " VOCs, SVOCs present in air, soil gas or water diffuse through membrane to absorbent material
- " 49 GORE SORBER sample locations w/20' grid spacing
- " Field activities conducted in August 2012



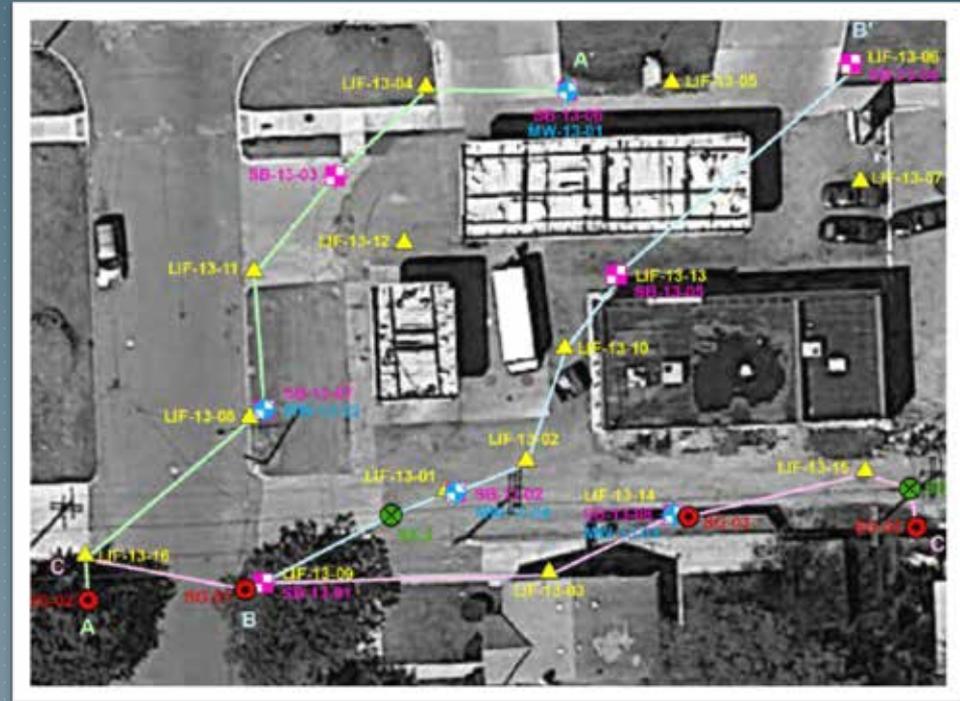
GORE-SORBERS – DATA ANALYSIS



We now know the approx. lateral extent

LIF (UVOST) – FIELD ACTIVITIES

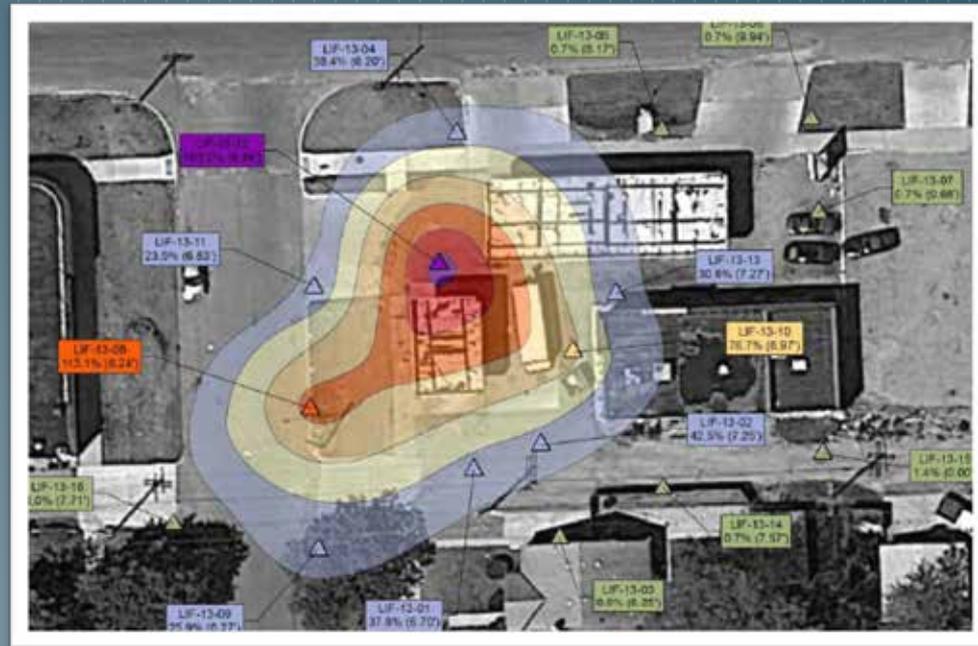
- " Field activities conducted in March 2013 – two days
- " SOMAT Engineering and Fibertec Env. Services
- " 16 LIF locations
- " All LIF borings were then driven (direct-push; Geoprobe 6620DT) from grade to 15 feet below ground surface
- " Real-time LIF logs contained a color-coded signal response calibrated against a known Reference Emitter (RE)



(LIF Locations were comprehensive.
But, LIF could have been completed in one day)

LIF – DATA ANALYSIS

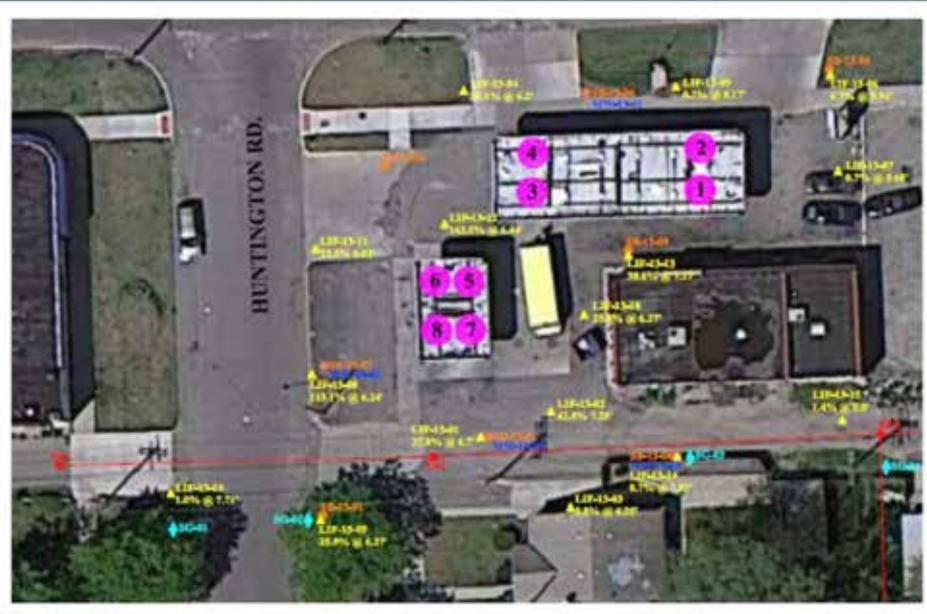
- LIF logs used to create an aerial footprint of the NAPL-related plume
- Attempted to delineate the horizontal and vertical extents of impacted soils
- LIF log profiles indicated short-chained aromatics and short wavelength responses
- LIF results indicate the plume composition is predominantly weathered gasoline



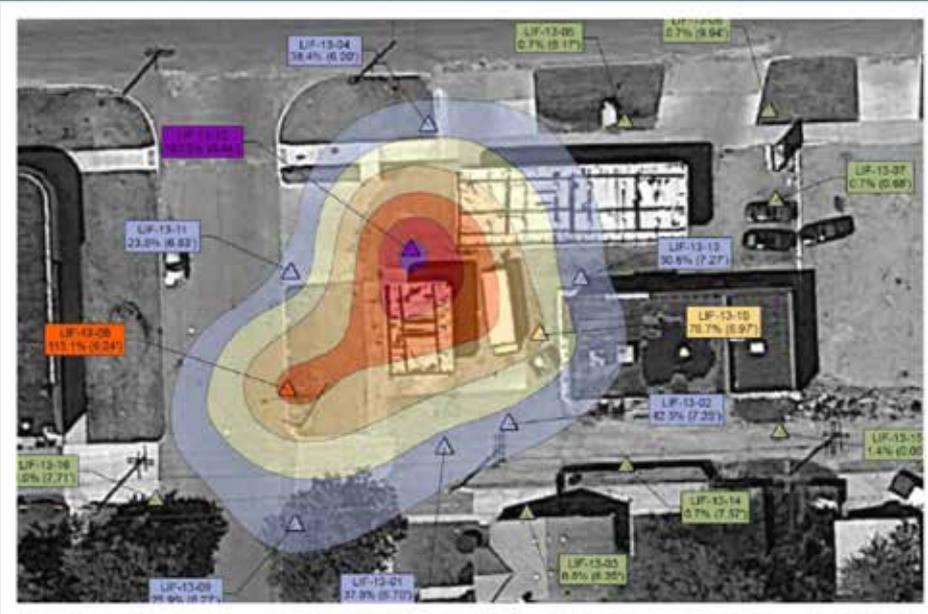
LIF Data

TRADITIONAL RI FIELD ACTIVITIES

- Field activities were conducted post-LIF survey (March 2013)

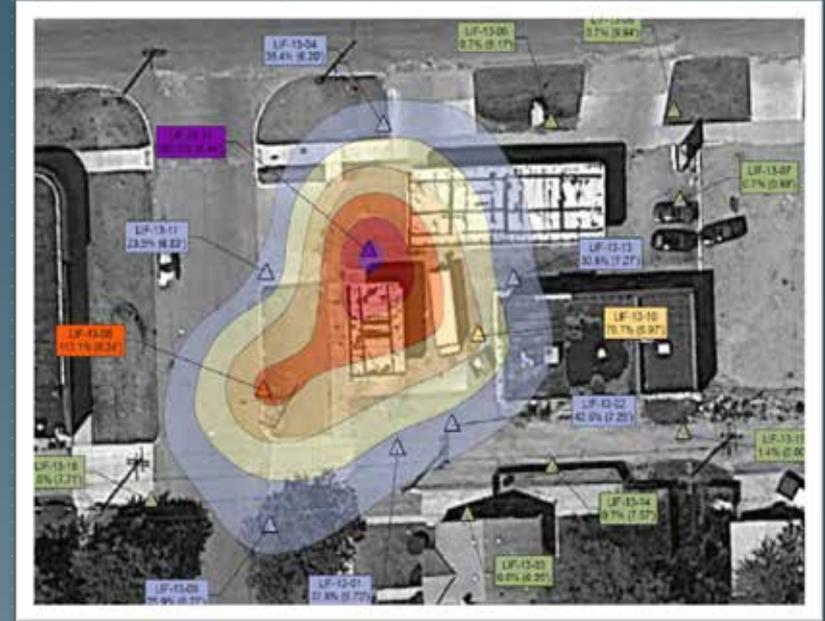


8 soil borings, 4 monitoring wells, 2 temp. monitoring wells, 4 soil gas sampling points

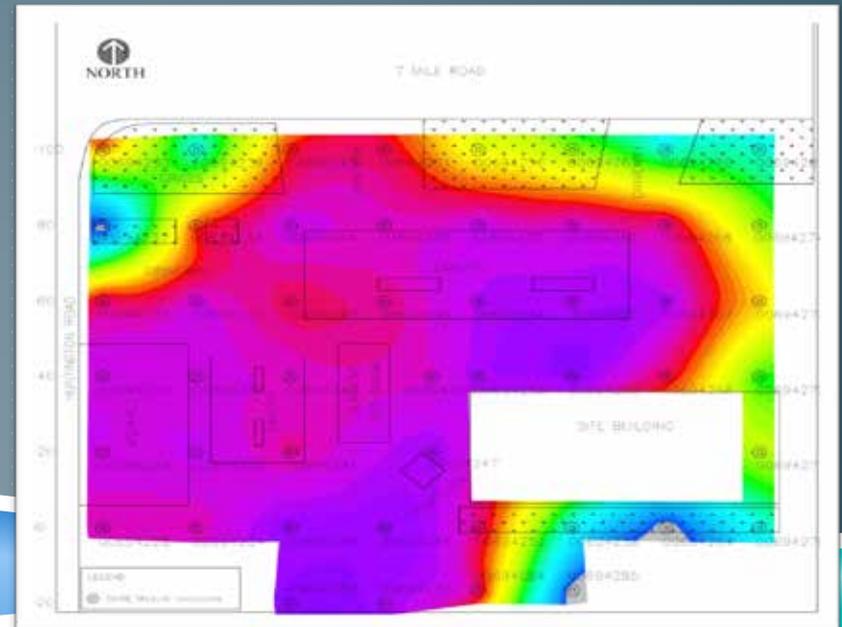


LIF Data

DATA ANALYSIS AND COMPARISON

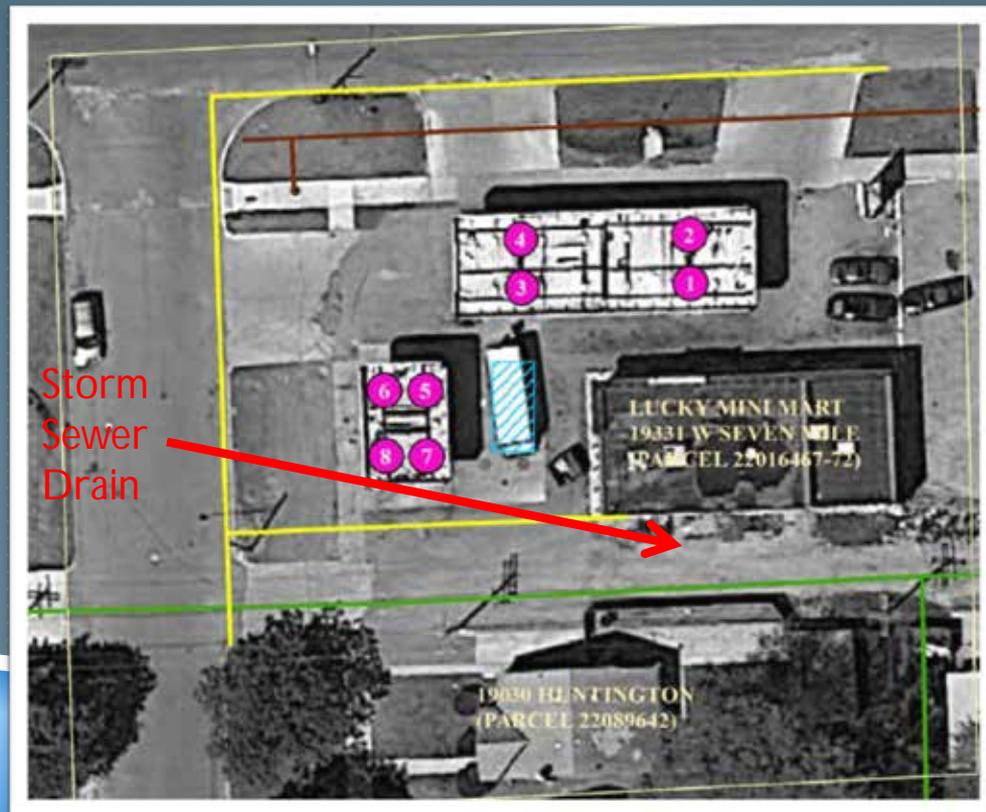


We know the VI extent
We know the NAPL extent
We know the soil (GRO) extent



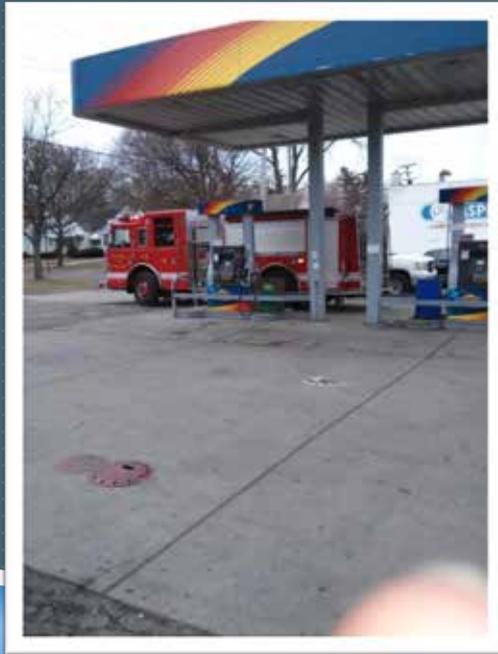
NOT-SO LUCKY MINI MART

- „ In March 2013, DEQ and GRT discovered a new release
- „ Mechanical issue (i.e., sump) at pump islands



EMERGENCY!

- „ Detroit Fire Department
- „ Closure of gas station
- „ Acute Risk Abatement
- „ Impact on adjacent residents
- „ Effect of acute risk abatement
- „ Long-term monitoring



OVERALL RESULTS

- " We produced an accurate CSM in short order
 - " Lateral extent first
 - " NAPL second
 - " Compliance data last
- " We ID'd a significant offsite risk
- " We ID'd a new release
- " We did it cheaply (because it was fast)
 - " RI/FS Cost = \$57K (Budgeted \$83K)
- " We assisted in emergency response actions

TAKEAWAY

- „ What we did
 - „ We embraced innovation
 - „ We took a chance
 - „ We learned
- „ Why it worked
 - „ Our CSM was fluid
 - „ We limited our preconceptions

WISH LIST

- „ We need a cheaper and faster VI screening method
- „ We need data correlating VI to soil and GW
when can we expect a correlation?
- „ LIF – Old vs. New Release

THANK YOU & QUESTIONS

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