What to Expect When Expecting an Environmental Project

August 12

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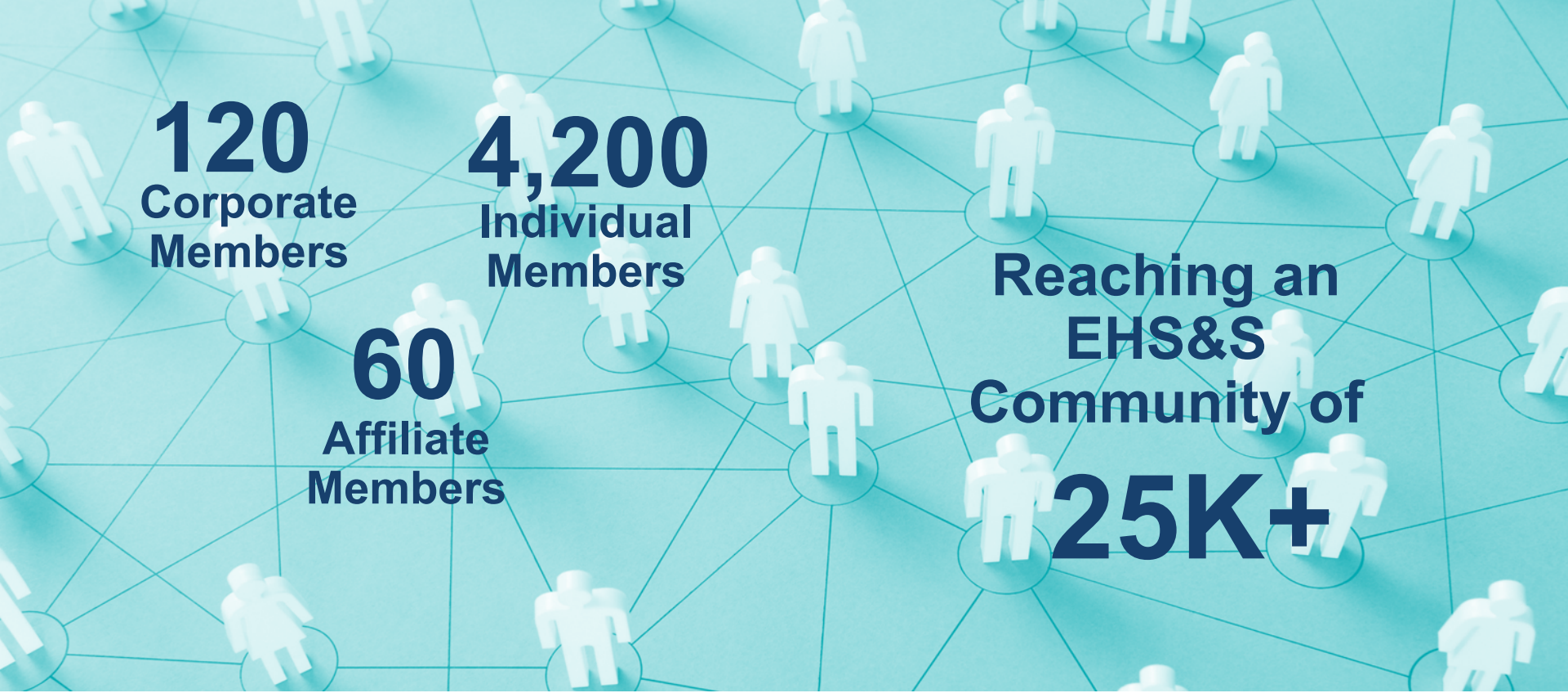

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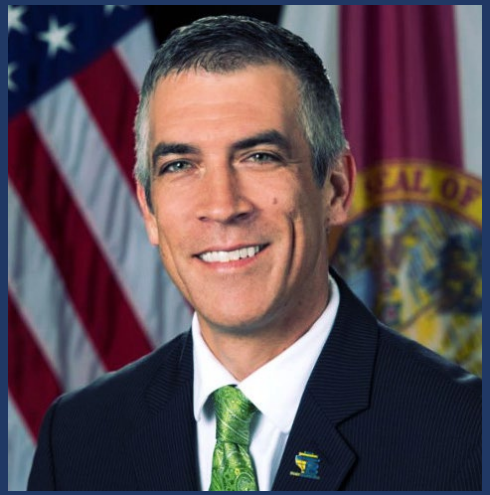
Today's Speakers



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Prepared for NAEM Webinar Series

What to Expect When Expecting an Environmental Project

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August 12, 2021

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Introduction

- Poll – as an environmental manager, what are your primary responsibilities?
  1. Loss prevention
  2. Safety audits
  3. Employee/subcontractor safety training
  4. ISO compliance
  5. Workers compensation investigations
  6. Environmental projects

Introduction

- Today's environmental managers have a wide spectrum of responsibilities from security to ISO compliance.
- An environmental manager may be tasked with overseeing a project dealing with a contaminated site.
- This presentation was prepared as an introduction to different chemicals that are commonly encountered during an environmental project, and touch on investigation methods and waste disposal.

From Environmental Manager to Environmental Manager, heart to heart

- Read the conclusions and recommendations of every report submitted to an agency to assure they match the culture of your company.
- Second opinions matter! If in doubt bid your project scopes/budgets to more than one reputable environmental consultant!
- Beware of what you sign…some environmental "agreements" including offsite access permission are onerous and can lock a company into costly long-term ongoing obligations.

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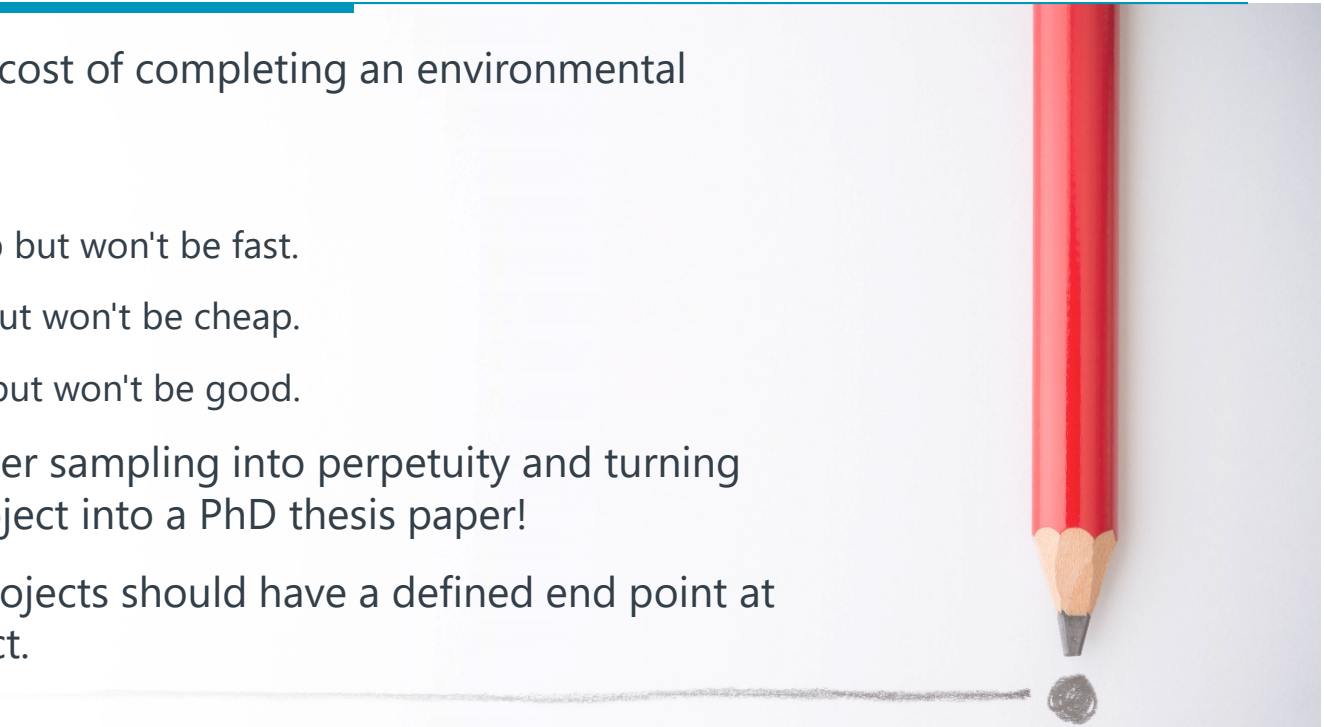
From Environmental Manager to Environmental Manager, heart to heart

- Pick only two for the cost of completing an environmental project:
  Good. Fast. Cheap.
  - Good can be cheap but won't be fast.
  - Fast can be good but won't be cheap.
  - Cheap can be fast but won't be good.
- Beware of groundwater sampling into perpetuity and turning an environmental project into a PhD thesis paper!
- ALL environmental projects should have a defined end point at the start of the project.



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Polyfluoroalkyl Substances (PFAS)

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PFAS – The elephant in the room…

- PFAS is commonly associated with AFFF (firefighting foam) and can be comingled with petroleum contamination
- EPA has passed a health advisory for drinking water of 70 ng/L but has not promulgated an enforceable standard
- EPA has added PFAS to TRIS and parts of TSCA but has not included it as a "hazardous substance" in RCRA

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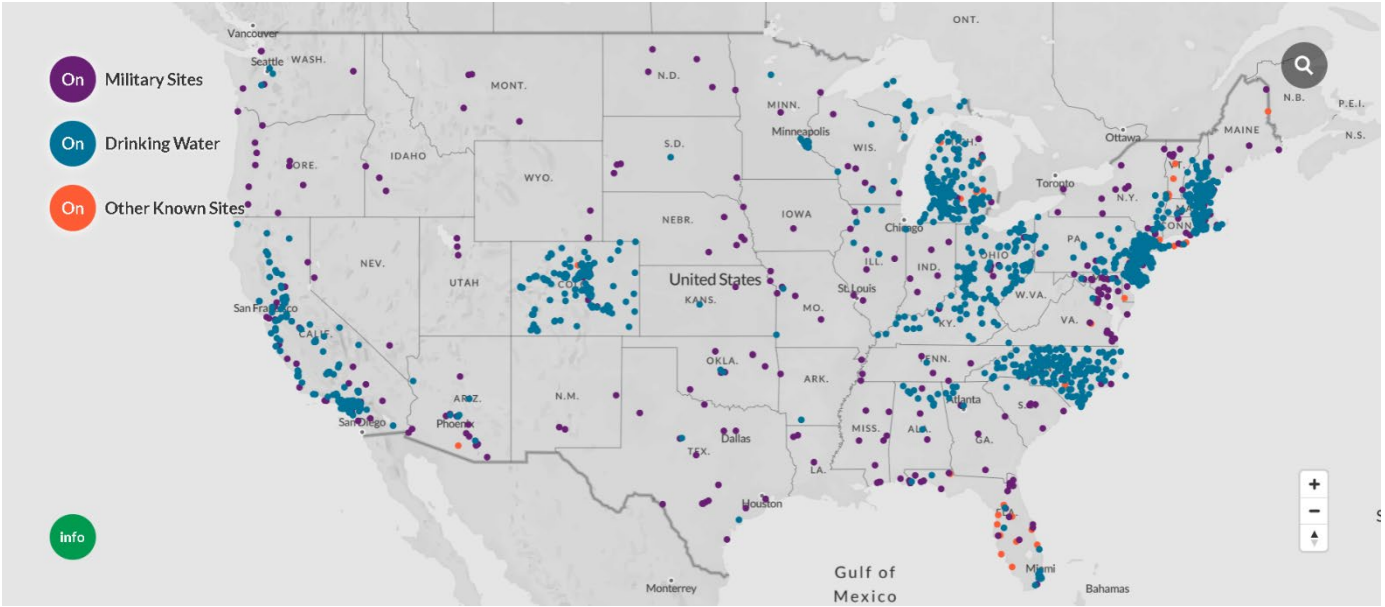
PFAS – The elephant in the room…

Environmental Working Group, Interactive Map, www.ewg.org



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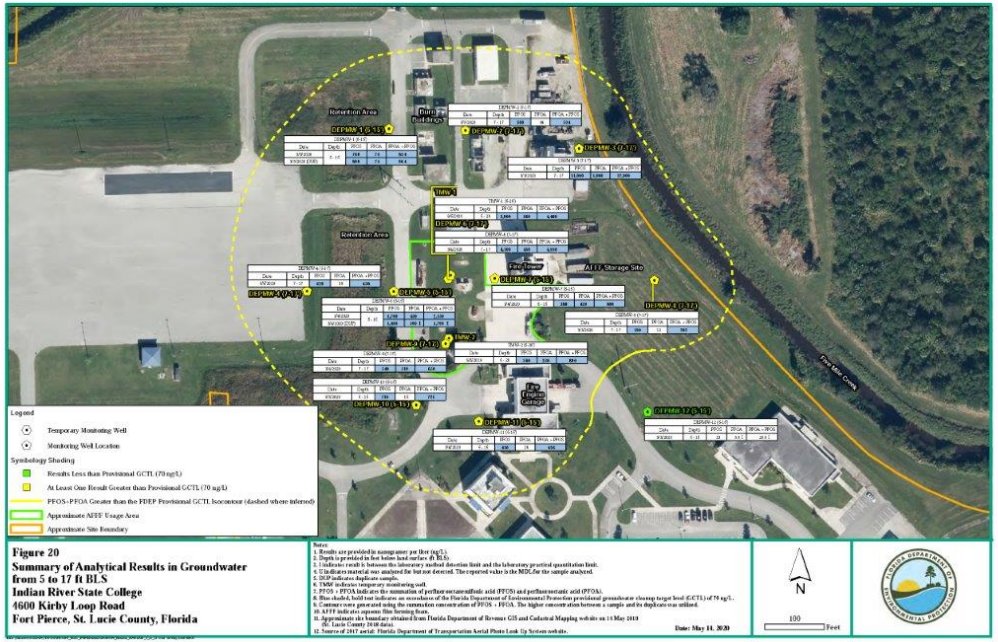
PFAS – The elephant in the room…

FDEP, Map Direct, Fire Training Facilities 2019, https://ca.dep.state.fl.us/mapdirect/



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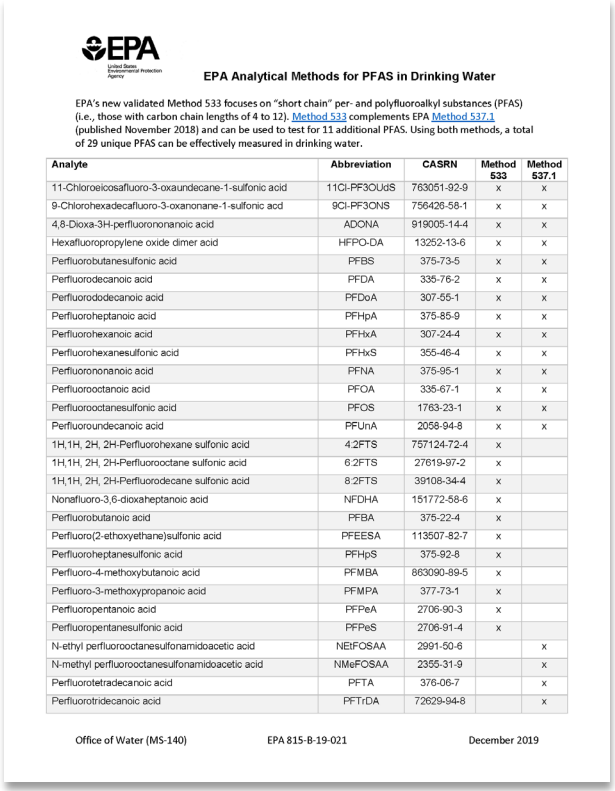
Laboratory Considerations



EPA Analytical Methods for PFAS in Drinking Water

EPA's new validated Method 533 focuses on "short chain" per- and polyfluoroalkyl substances (PFAS) (i.e., those with carbon chain lengths of 4 to 12). Method 533 complements EPA Method 537.1 (published November 2018) and can be used to test for 11 additional PFAS. Using both methods, a total of 29 unique PFAS can be effectively measured in drinking water.

Analyte	Abbreviation	CASRN	Method 533	Method 537.1
11-Chloroeicosafluoro-3-oxaundecane-1-sulfonic acid	11Cl-PF3OUdS	763051-92-9	x	x
9-Chlorohexadecafluoro-3-oxanonane-1-sulfonic acd	9Cl-PF3ONS	756426-58-1	x	x
4,8-Dioxa-3H-perfluorononanoic acid	ADONA	919005-14-4	x	x
Hexafluoropropylene oxide dimer acid	HFPO-DA	13252-13-6	x	x
Perfluorobutanesulfonic acid	PFBS	375-73-5	x	x
Perfluorodecanoic acid	PFDA	335-76-2	x	x
Perfluorododecanoic acid	PFDoA	307-55-1	x	x
Perfluoroheptanoic acid	PFHpA	375-85-9	x	x
Perfluorohexanoic acid	PFHxA	307-24-4	x	x
Perfluorohexanesulfonic acid	PFHxS	355-46-4	x	x
Perfluorononanoic acid	PFNA	375-95-1	x	x
Perfluorooctanoic acid	PFOA	335-67-1	x	x
Perfluorooctanesulfonic acid	PFOS	1763-23-1	x	x
Perfluoroundecanoic acid	PFUnA	2058-94-8	x	x
1H,1H, 2H, 2H-Perfluorohexane sulfonic acid	4:2FTS	757124-72-4	x	
1H,1H, 2H, 2H-Perfluorooctane sulfonic acid	6:2FTS	27619-97-2	x	
1H,1H, 2H, 2H-Perfluorodecane sulfonic acid	8:2FTS	39108-34-4	x	
Nonafluoro-3,6-dioxaheptanoic acid	NFDHA	151772-58-6	x	
Perfluorobutanoic acid	PFBA	375-22-4	x	
Perfluoro(2-ethoxyethane)sulfonic acid	PFEESA	113507-82-7	x	
Perfluoroheptanesulfonic acid	PFHpS	375-92-8	x	
Perfluoro-4-methoxybutanoic acid	PFMBA	863090-89-5	x	
Perfluoro-3-methoxypropanoic acid	PFMPA	377-73-1	x	
Perfluoropentanoic acid	PFPeA	2706-90-3	x	
Perfluoropentanesulfonic acid	PFPeS	2706-91-4	x	
N-ethyl perfluorooctanesulfonamidoacetic acid	NEtFOSAA	2991-50-6		x
N-methyl perfluorooctanesulfonamidoacetic acid	NMeFOSAA	2355-31-9		x
Perfluorotetradecanoic acid	PFTA	376-06-7		x
Perfluorotridecanoic acid	PFTrDA	72629-94-8		x

Office of Water (MS-140) EPA 815-B-19-021 December 2019

- Laboratories have standard lists for groups of analytes, usually selected based on the contamination investigated
- There are standard internal quality assurance criteria so data can be validated
- Laboratories should be certified by NELAC or a state health department
- There is fierce competition between laboratories for pricing

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Chlorinated Solvents

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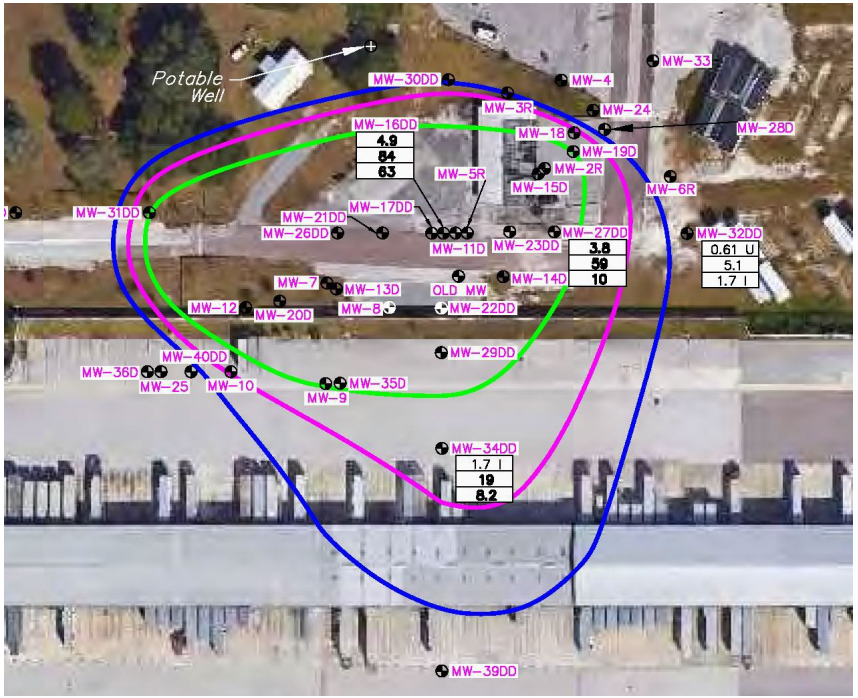
Chlorinated Solvents – An old favorite with a new twist!

- Chlorinated solvents have been used in drycleaning, industrial, and automotive industries because of their powerful properties to remove grease and oil
- Most commonly PCE (PERC) in drycleaning and TCE as an industrial degreaser
- Chlorinated solvents are recalcitrant “sinkers” that can migrate for miles in aquifers
- 1,4-Dioxane is an emerging contaminant that was used as a stabilizer and strongly associated with 1,1-DCE use

Chlorinated Solvents – An old favorite with a new twist!

- A plume of 1,4-dioxane comingled with a chlorinated solvent plume
- This “sinking” plume resulted in groundwater assessments on two contiguous properties, within two aquifers up, and up to 110 feet deep
- Resulting closure was risk-based, demonstrating plume stability with statistics, and restricting groundwater use with an institutional control



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Sonic Drilling Method

Developed for the mining industry, relatively new to the environmental industry within the last 20 years

- Mobilization cost not cheap
- Takes a lot of clean water
- Heats up soil cores and can distort field screening
- Fast drilling – decreased onsite time
- No drilling tool refusal
- Reduced investigation derived waste
- Near 1-1 core recovery for logging

Organochlorine Pesticides

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Organochlorine Pesticides – Doing what they were designed to do!

- GOOD READ – “Silent Spring” by Rachel Carson that has been credited with starting the environmental movement that lead to RCRA
- Designed to be applied to a surface and stay there to kill insects, were common practice for agricultural operations
- Once in groundwater, certain OCPs can become highly mobile and resistant to natural attenuation
- Dieldrin has a part per trillion cleanup target level (Florida) in groundwater because of its toxicity






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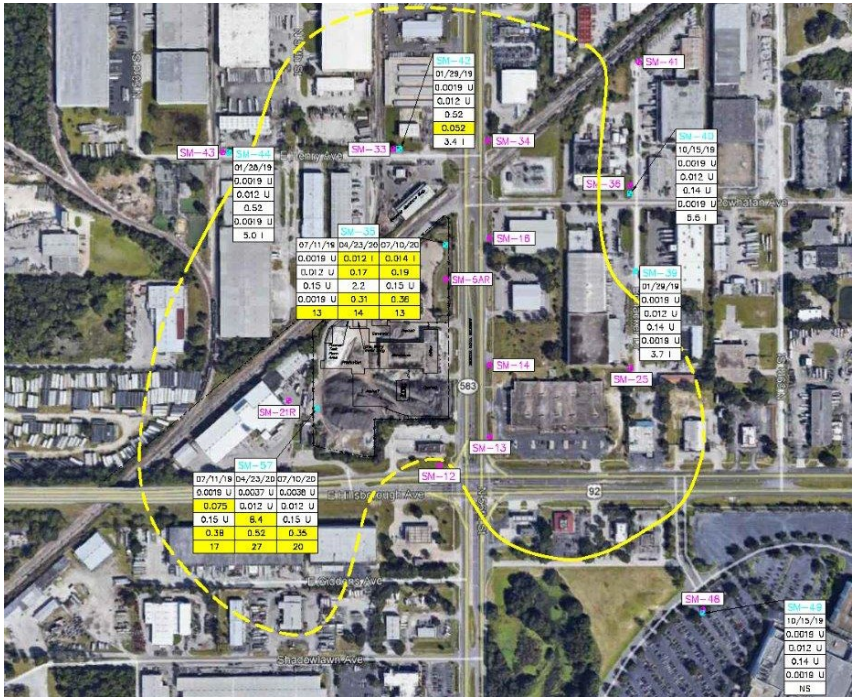
Organochlorine Pesticides – Doing what they were designed to do!



- Pesticide manufacturing facility since the 1970s
- The release was likely the result of poor waste management practices
- Comingled plumes of petroleum, arsenic, fumigant, and pesticides in soil and groundwater
- A dieldrin plume in groundwater covering acres up to 125 ft deep

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Investigation Derived Waste Disposal

- Investigation derived waste generated from excess soil and groundwater from drilling and sampling
- Stage drums on asphalt/pavement, labeled, away from traffic, and under cover from the elements

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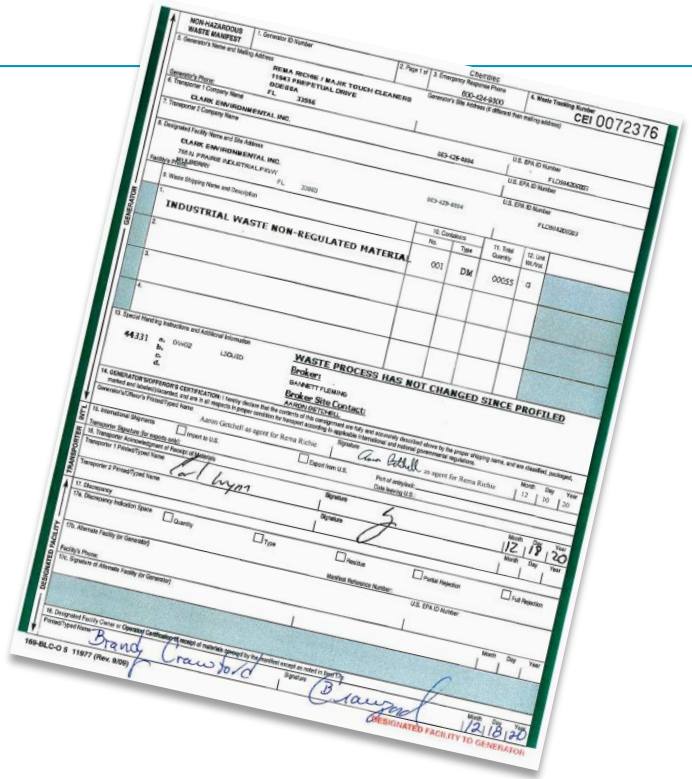
Investigation Derived Waste Disposal

- RCRA – enacted in 1976 by the EPA to provide a framework of managing waste
- Waste Characterization – sampling to determine if a remediation waste is characteristically hazardous or non-hazardous
- Waste Profiling – assigning the generator, site address, and waste description
- Waste Manifesting – documentation of the final disposition of the waste



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Metals

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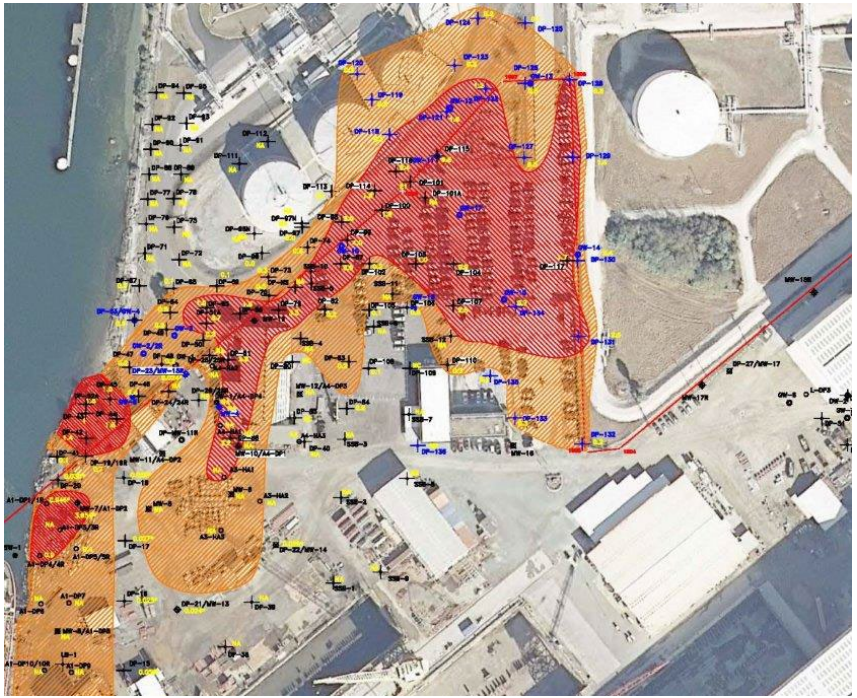
Metals – Naturally occurring but can be hazardous!

- Most commonly investigated are the 8-RCRA Metals (arsenic, barium, cadmium, chromium, lead, mercury, selenium, and silver)
- Two more common are arsenic and lead
- Arsenic can be anthropogenic (dredge spoils) but has been used in arsenical pesticides (cattle dip vats and Thrip Juice) or can be a by-product from scrap yards (torch cutting metal and rusting galvanized steel) or used oil
- Lead is commonly associated with leaded gasoline, added as an anti-knock agent as early as the 1920s, widely available by the mid 1970s and banned in 1996

Metals – Naturally occurring but can be hazardous!



- Metals have different cleanup criteria based on the state or regulatory framework the project is managed
- Metals (like arsenic or lead) can be listed or characteristically hazardous waste if concentrations are high enough or leachable
- Laboratory analysis for metals is cheap, mobilizations to a site are not…

Polychlorinated Biphenyls (PCBs)

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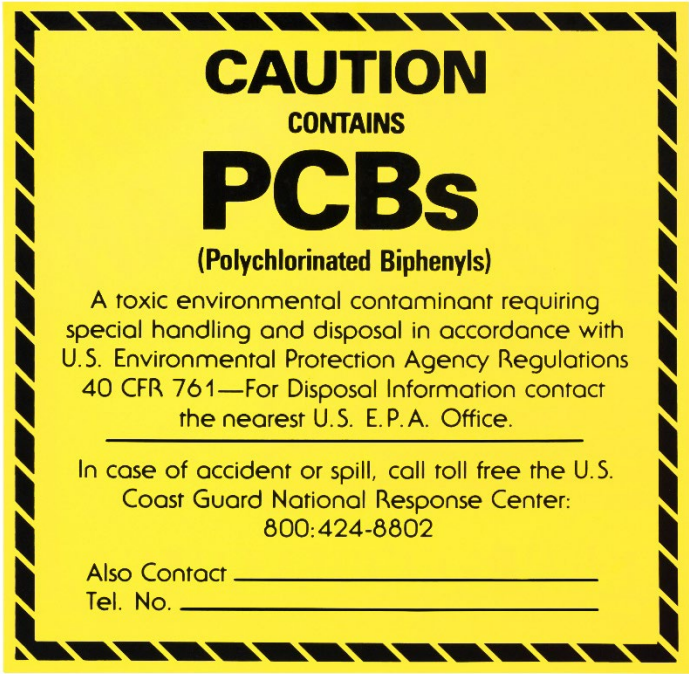
PCBs – One of the most persistent organic pollutants

- PCBs are manmade chemicals that have fire resistant properties
- Comprised of 209 congeners
- Used in transformers, oil, hydraulic systems, paint, caulk, and insulation
- Manufactured in the U.S. until 1977 then banned



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PCBs – One of the most persistent organic pollutants

- Like OCPs and metals, PCBs tend to bond strongly to soil
- Remediation for PCBs is usually excavation and disposal for impacted soil
- Risk-based corrective action for large areas of impacted soil or groundwater
- Regulated by state agencies and EPA TSCA!!!

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Petroleum

Petroleum – Last but not least…now with oxygenates!

- Service stations are a common target of petroleum investigations
- Oxygenates are fuel additives to enhance performance and were later introduced to reduce emissions as far back as 1923 (tetraethyl lead) to as recently as 1979 (MTBE)
- FDEP estimated the average cost to assess and clean up a petroleum site at $400,000

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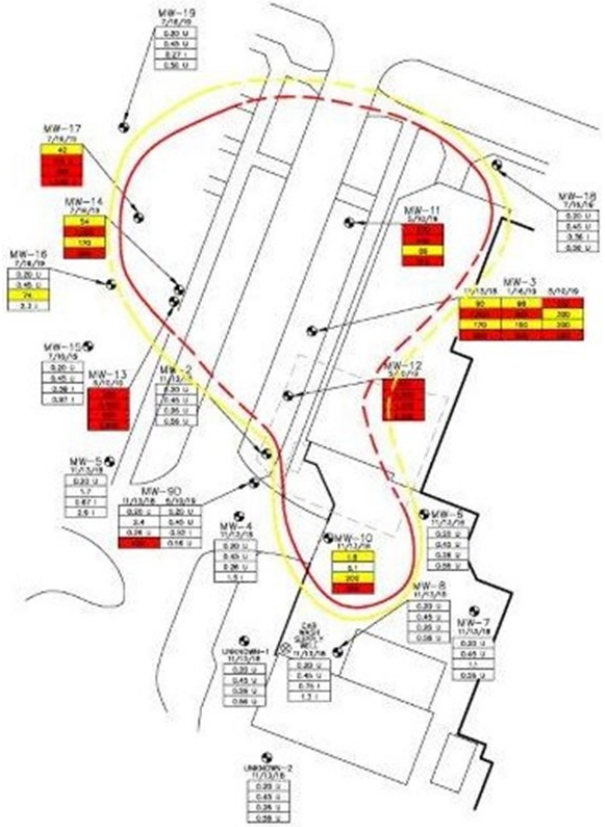
Petroleum – Last but not least…now with oxygenates!



- Petroleum plumes are generally “floaters” on the top of a water table
- Petroleum remediation usually involves removing the source (fuel systems and contaminated soil) then dissolved plume treatment
- Dissolved plumes of petroleum generally do not extend more than 200-ft from the source
- Dissolved plumes can be oxidized by amendment injection or monitored for natural attenuation

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Petroleum – Last but not least…now with oxygenates!

- Free product is petroleum that floats on top of the water table because petroleum is lighter than water
- The mobility of free product can be evaluated using LNAPL transmissivity tests
- Recovering free product (skimmers, pneumatic pumps, manually bailing, sorbent socks, French drains) can be expensive

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Direct Push Drilling (DPT)

- DPT is basically a jack-hammer mounted on the back of a truck or a track
- Soil samples are collected in an acetate liner; and groundwater monitoring wells can be installed using DPT
- More versions – dual purpose (DPT and hollow-stem auger) and difficult access rigs (DPT mounted on a hand cart)
- DPT drilling is well-suited to environmental work, usually used in the top 25-ft bls, but DPT boreholes have been advanced over 100-feet

Site Closure and Conclusions

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Closing an Environmental Project

- Meet RBCA – Risk-Based Corrective Action

Not all closures are created equal!!!

- Closure to unrestricted land use (including residential)
- Closure to restricted land use (deed restricted to commercial/industrial land use)
- Closure with conditions (engineering controls with ongoing obligations – monitoring and/or maintenance)

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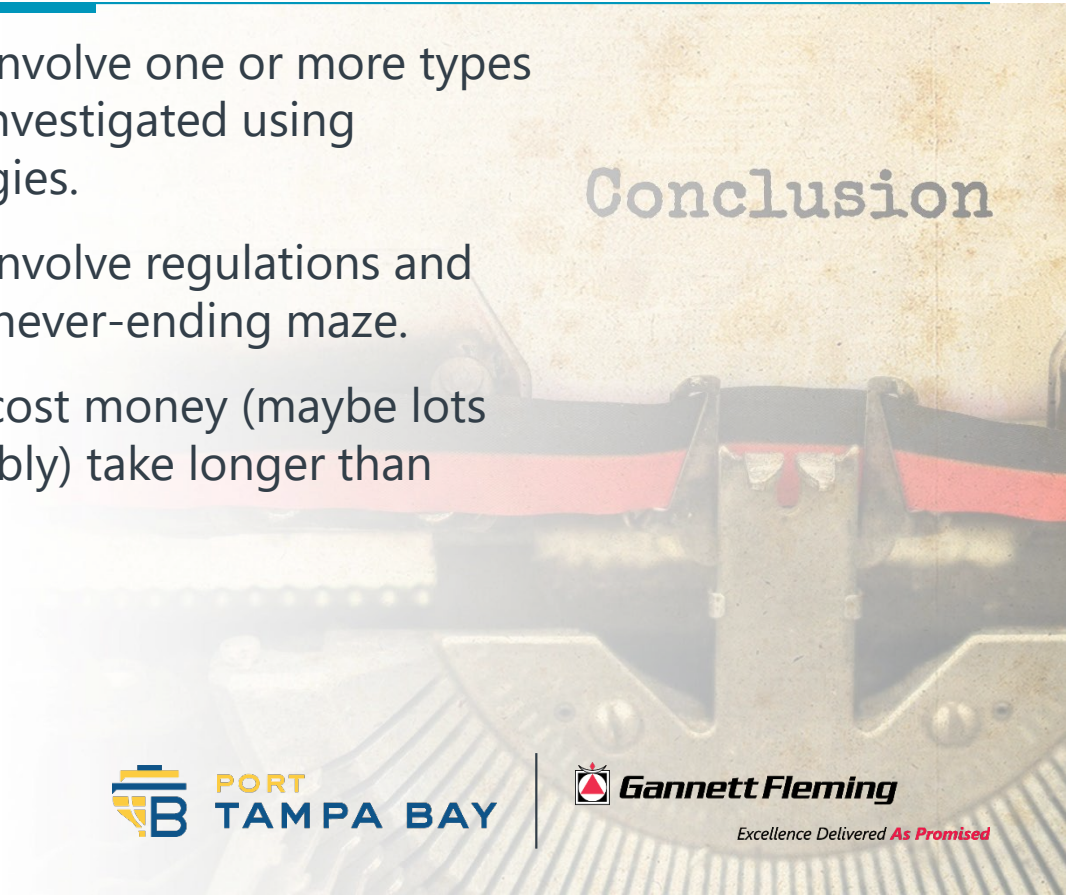
Conclusions – Here is what to expect!

- An environmental project will involve one or more types of contamination that will be investigated using different assessment technologies.
- An environmental project will involve regulations and guidance that can seem like a never-ending maze.
- An environmental project will cost money (maybe lots of money) and may (will probably) take longer than expected to complete.



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SOLVE-ITs

- Maximizing Sustainability Reporting
  - August 11, August 18
  - IMPACT: August 26-27
  - Sept. 1, Sept. 8

Collaborating with Peers & Industry Experts to Solve EHS&S Management Challenges

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Great Monthly Webinars on EHS&S Management

Linking Employee Wellness and a Culture of Health with ESG Reporting
September 9

The Role of EHS&S Performance Validation in Risk, Resilience and Sustainable Financing
September 23

Secrets of Successful Source Emission Test Programs
November 4

NAEM

Upcoming Conferences

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Virtual

EHS&S Management Forum

Oct 19-22
Tucson, AZ

Thank you for Attending!

A recording will be available in 3-4 days. You will receive an email once it's posted to our site.

Have a safe & healthy day!