Questionable Practices and the Impact to Data Quality

2017 Railroad Environmental Conference

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Agenda

- Introduction
- Falsification – *Not* What this Presentation is About
- Blunders – *aka* Activities Affecting Data Quality
  - Field Blunders
  - Laboratory Blunders
- Conclusion

Introduction

- Many steps involved in producing analytical data
- Many individuals involved in the various aspects of generating analytical data
- Field and laboratory activities can have impact on data quality

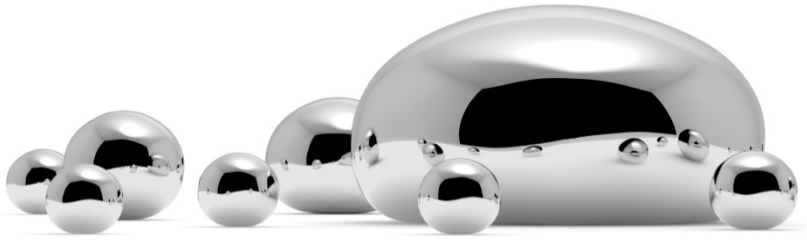
Introduction

- Field and laboratory personnel strive to do their best
- Unintended consequences from an action
- Communication, training, and planning are important to avoid pitfalls

Falsification

- April 28, 2011: Environmental testing laboratory company and owner charged with falsifying test results
- US EPA-funded air-quality researcher's laboratory caught up in $120 million science falsification case
- Mississippi laboratory operator found guilty of falsifying records on industrial wastewater
- DEP revokes accreditation for environmental laboratory
- 13 former employees were indicted by a federal grand jury in Dallas and charged with up to 30 counts of fraud and lying to the government

Field Blunders



"Mercury Boots"

- Surface soil sampling in and around mercury metering station
- Beads of elemental mercury strewn across floor in metering station room
- Field Team Leader walked the extent of the floor
- Outside, used heel of boot to mark surface soil sampling locations to determine extent of mercury contamination

Field Blunders

"The Lowes Hose"

- 16 residential wells sampled weekly
- 4 wells contained consistent PAHs
- Laboratory blanks clean, bottles certified for PAHs
- No field blanks collected because samples were collected directly into bottles (according to the SAP)
- Field Team members stated they purchased additional hose to fill bottles because spigot was too large to fit bottles under to fill

Field Blunders

"Heavy Weights"

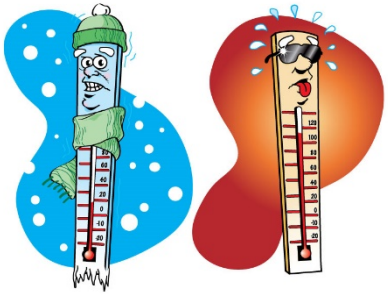
- Surface water sampling for metals
- Consistent detection for lead in all samples, but not in blanks
- Sampling oversight observed lead weight was used to hold the sampling device in place

Field Blunders

Quick Snippets

- Filling VOA vials on the tailgate of a running pickup truck
- Using off-the-shelf, store-bought distilled water
- Writing sample IDs on bag containing sample bottles, but not directly on the bottles
- Outlet end of sample tubing (sample port) placed directly on ground surface

Laboratory Blunders



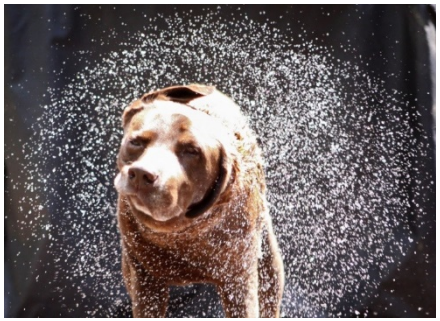
"Overlooked department"

- VOCs received and documented to be < 6ºC and then left on cart at room temperature for hours
- COC requested "volatile organic analysis." Samples logged for full TCL list VOCs. Previous data reported only BTEX. Many additional detections for compounds not previously reported.
- Samples logged for "J" flag reporting. Previous data was RL reported. Many additional analytes were detected.

Laboratory Blunders

"Shake, shake, shake"

- Blind PE samples revealed very low recoveries of high-ring PAHs
- Whole-volume PE samples were prepared using 1-L amber bottles, and spike was added via syringe into the neck of bottle
- Investigation revealed PE samples were not optimally prepared AND
- Laboratory extraction procedure did not adequately solvent rinse the bottles
- More vigorous rinsing and shaking improved recoveries on average of 40%, all PAHs acceptable



Laboratory Blunders

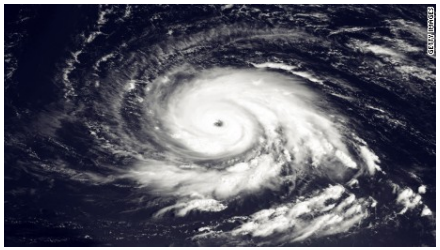
Quick Snippets

- Sub-contracting considerations: Samples may need to be sub-contracted due to certifications, methods, or capacity. Does the sub-contract laboratory meet all of your requirements and specifications?
- Ultra-trace DI water used for field blanks. Verified clean to metals DLs. Shipped to laboratory in amber bottles, but NOT certified clean for trace metals.
- 40-mL HCL-preserved vials used for samples analyzed for glycols, MBs utilized unpreserved vials. Samples had detects for glycols, but MBs clean. Tracking lot number of vials verified HCl was the source of glycol contamination.
- During audit, observed samples for metals analysis in digestion block. One sample capped, all others uncapped. When asked by Auditor, Analyst stated that was the MB and they were capped “because we need these to pass.”

Laboratory Blunders

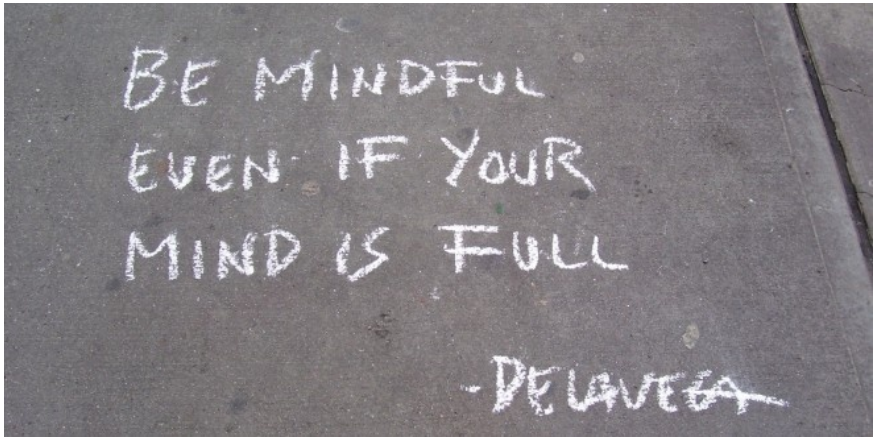
Not a blunder, rather changes to a laboratory

- Frequent consolidation and ownership changes in analytical services industry
  - Can cause staffing changes or change in quality plans and implementing new procedures
- Natural disasters – hurricanes, floods, fires
- Cyber attacks
- Impacts to consistency in protocols, interruption in service, reporting delays, confusion



Conclusions

- Communication
- Teamwork
- Oversight
- Training
- Planning
- Thoughtful Actions



Thank You

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