Water Testing Best Practices

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Know your regulations

- Do you need Certified Analysis?
  - Are results going to be sent to a regulatory agency?
    - What regulations are you trying to meet?
      - Safe Drinking Water Act
      - Clean Drinking Water Act
      - FHA/VA or HUD
  - Are results potentially going to be used in litigation?
- Informational Testing
  - Needed to determine treatment options
  - Troubleshooting

Laboratory certification

- EPA Certification
  - Cryptosporidium
  - UCMR
- State Certification
  - Direct
  - Reciprocal
- NELAP Accreditation
  - 14 States
- ISO Accreditation
  - International Organization for Standardization
- Categories of Certification
  - Safe Drinking Water Act
  - Clean Water Act
  - Clean Air Act
  - Underground Storage Tanks
  - Resource Conservation and Recovery Program

Certification requirements

- Time Commitment
  - Labs that have never been certified takes 12-18 months
- Written Laboratory Quality Manual
- Onsite Inspection
- Proficiency Testing
  - Performance Evaluation Samples
  - Initially performed to show analyst capability of providing accurate results for each method/analyte
  - Ongoing testing to maintain certification
- Payment of Fees

Approved methods

- Environmental Protection Agency (EPA)
- Standard Methods
- American Society for Testing and Materials
- United States Geological Survey
- Resource for method information
  - www.nemi.gov

Chain of Custody

- Definition
  - Chronological record of who has been in possession of the samples and what analyses have been performed on them.

- Guidelines
  - Keep number of people handling samples and data to a minimum.
  - Always document the transfer of samples or data from one person to another.
  - Give samples and data positive identification at all times that is legible and written with permanent ink.

Example of Chain of Custody

CLIENT/COMPANY NAME:			SAMPLE TYPE	# OF CONTAINERS	TEST(S) REQUESTED PER SAMPLE (X)										
CLIENT COMMENTS:		TYPES OF SAMPLES: DRINKING WATER = D SOIL SAMPLE = S GROUND WATER = G SLUDGE/WASTE = W POOL WATER = P OTHER TYPE = O													
TIME SAMPLE #	COLLECTION DATE	SAMPLE SITE DESCRIPTION													LAB #

RECEIVER SIGNATURE CONFIRMS THAT THE BOTTLES RECEIVED ARE CONSISTENT WITH THE REQUIRED TESTING PROTOCOL.	RELINQUISHED BY: (Signature) (4)	LABORATORY COMMENTS:
SAMPLED BY: (Signature) (1)	RECEIVED BY: (Signature) (5)	
SHIPPED BY: (Signature) (2)	RELINQUISHED BY: (Signature) (6)	
RECEIVED BY: (Signature) (3)	RECEIVED BY: (Signature) (7)	

What to test

- Microbiological
  - Bacteria
  - Parasites
  - Viruses
- Inorganics
  - Metals/Minerals
  - Compounds : nitrates, nitrite, chlorides, fluorides, sulfates
- Volatile Organics
- Semi-Volatile Organics
- Radiologicals

Proper Sample Collection

- Sampling Containers
  - Glass
  - Plastic
  - Amber
- Size of sampling containers
  - Enough water to run analysis
  - Regulation driven
- Preservation
  - Temperature protection
  - Chemical
    - Dechlorination
    - Acidification
- Holding times

What to test for? What does your client need?

- Certified/Compliance Testing
  - Regulations will dictate what is required
- Informational Testing
  - Diagnosis Treatment Needs
  - Address client's health concerns
  - Testing after to equipment to show client water improvement

Where to test

- Pre/Post Treatment
  - Raw Water
  - Troubleshooting
- Regulation Driven
  - PWTA
  - Public Water Supplies
    - Lead and Copper Rule
    - THM/HAA
- QAPP Quality Assurance Project Plan
  - written document that provides a blueprint for the entire project and each specific task to ensure that the project produces reliable data that can be used to meet the project's overall objectives and goals.

Microbiological Testing

- Which sink is better for sampling?

Microbiological Testing

- Remove Aerator/Screen other devices attached to faucets
- Disinfect Faucet
  - Isopropyl Alcohol
  - Flame
  - Chlorine
- Only Use Sterilized Bottles
  - Do not use if seal if broken
- Take Care not to Contaminate Your Sample
  - Do not touch inside bottle or cap
  - Do not set the cap down
- Fill the bottle to appropriate Fill Line
- Preservation
  - Sodium Thiosulfate needed for chlorinated source
  - Samples should arrive at the lab at ≤ 10°C
- Short Holding Times
  - Regulation dependent
  - 6 Hours – 30 hours

Metals Analysis

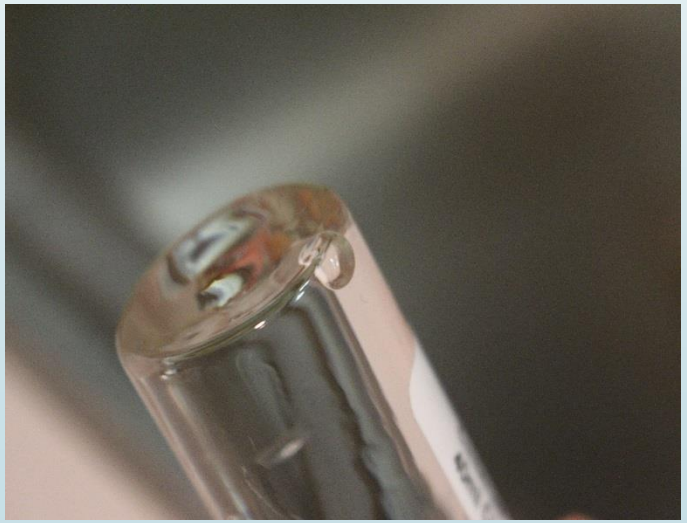
- What is the purpose of the testing?
  - Lead and Copper Rule
  - Lead/Copper Concerns
- To remove the Aerator or Not?
- Plastic Bottles
- Preservation
  - Acidification
- Holding Times
  - 14 days with acidification
  - 6 months once acidified

Other Inorganic testing

- Common Inorganics
  - Nitrate, Nitrite, Chloride, Fluoride, Sulfate, Bromate, Bromide, Chlorate, ortho-phosphate
- Various Bottle Requirements
- Preservation
  - None
  - Samples should arrive at the lab between 2 – 6 °C
    - Nitrate, nitrite, ortho-phosphate and sulfate
  - Ethylenediamine (EDA)
    - Bromate, chlorate, and chlorite
- Holding Times
  - 48 hours –nitrate, nitrite & phosphate
  - 14 days – chlorite
  - 28 days – chloride, fluoride, sulfate, bromate, bromide & chlorate

VOCs
Volatile Organic Compounds

- Sample Collection Vials
  - 40 ml Vials
  - Teflon lined Septum
- Headspace
  - Slightly overfill forming a meniscus
  - No air bubbles
- Preservation
  - Sodium Thiosulfate/Ascorbic Acid
  - Hydrochloric – Field Acidification
- Holding Times
- Trip Blanks



Semi-Volatiles

- Organic compounds that volatilize slowly at standard temperature
- Sample Bottles
  - Varies based on method
  - Glass
  - Amber Glass
- Preservatives
  - Misc
  - Hydrochloric Acid
- Holding Times
  - Extraction
  - Runs

Radiologicals

- Gross Alpha & Beta, Radium 226 & 228, Strontium-90
- Sample Bottles
  - Plastic
  - Volume based upon test
- Preservation
  - Acidification within 14 days of collection
- Holding Times
  - Based upon half life of radiological

Testing best practices

- Determine if tests need to certified or if informational is applicable
- Determine what needs to be tested
- Order Bottles from Laboratory
- Review Laboratory Instructions for proper sampling before going to collect the sample
  - Confirm you have everything you need to collect sample
- Collect samples according to procedures provided
- Deliver or ship samples to the lab
  - Ensure samples will arrive at the lab within proper holding time
  - Ensure sample to arrive within proper temperature.

Questions?

Thank you for attending

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