

Drinking Water Quality Sampling

The Why, Where, When, and How

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What's Covered Today?

- Why we take samples
- Where are they collected
- When are they collected
- How are samples collected
 - ✓ Bottle type
 - ✓ Fill procedures
 - ✓ Handling instructions
 - ✓ Other supplies needed
 - ✓ Paperwork



Why Do We Collect Samples?

- Meet Drinking Water Regulations
- Assist with Operation of System
- New Main and Facility Disinfection
- Customer Complaints
- Special Studies
- Other

TCR

Rads

SOCS

SWTR

LCR

IOCs

VOCS

DBPs

UCMR

Where Are Samples Collected?

- Source Water
- Finished Water
- After Treatment Processes
- Entry Point to the Distribution System (EPTDS)
- Distribution System
- Customers' Homes

Where Are Samples Collected (2)?

- Dip Samples from rivers, reservoirs, storage facilities
- Flowing taps
- Sinks
- Hose Bibs
- Dedicated Sample Stands
- Meter Boxes
- Hydrants
- Valve Vaults
- Temporary Taps



When Are Samples Collected?

- Frequency Depends on Parameter
 - Continuously
 - Several Times per Day
 - Daily
 - Weekly
 - Monthly
 - Quarterly
 - Annually
 - Once Every Few Years (3, 6, 9)

When Are Samples Collected (2)?

- Time of Day Depends on Many Factors
 - ❑ Regulatory Requirements
 - ❑ Laboratory Requirements
 - ❑ Pump Cycles
 - ❑ Water Usage
 - ❑ First Flush Requirements
 - ❑ Shipping Needs
 - ❑ Route Schedule



How Are Samples Collected?

- Determined by Parameter
 - Bacteriological
 - Raw Water
 - Finished Water
 - General Chemistry
 - VOCs and TTHMS/HAA_s
 - Lead and Copper Tap Sampling
 - SOCs
 - IOCs
 - Cryptosporidium and Giardia

Bacteriological Sampling

- Raw Water

- Needs to be representative of the source, prior to any treatment or chemical addition
- Avoid surface scum (Use a pole or picker)
- Using tap off raw water pipe is best
- Flush tap thoroughly
- Fill bottle to fill line, do not over top
- Must be transported on ice, and arrive at the lab at less than 10 °C. (but must not be frozen)
- Analysis must start within 8 hours of collection if used for SWTR compliance



Bacteriological Sampling

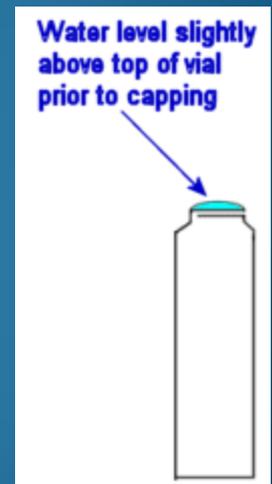
- Finished Water – Total Coliform Rule Compliance
 - Do not open bottle until ready to sample, and use bottles specifically for bacteriological sampling
 - Fill out bottle label with waterproof ink
 - Do not overflow bottle. Do not rinse out preservative.
 - Remove bottle seal, open bottle, and fill to 100mL mark. Keep lid from being contaminated.
 - Do not touch lid or bottle to sample tap.
 - Replace cap securely
 - Measure Chlorine Residual (required) and Temperature (Optional), record data
 - If you drop the lid, or think you may have contaminated the sample, collect another sample and discard the first one.

General Chemistry Sample

- Usually collected in 250 mL to 1 L HDPE plastic
- Size depends on how many tests will be conducted
- Flush Sample Tap Thoroughly
- Reduce Flow to pencil width for sample collection
- Rinse bottle with sample water 3 times
- Fill container to base of neck
- Secure lid
- Transport on ice

VOC and TTHM Samples

- VOCs and TTHMs are collected in duplicate, no rinse
- Both have a dechlorinating agent already in bottle. VOC bottle will also have acid (HCl) to add in the field
- Both need to be filled without overflowing, and must not have air bubbles
- Both should be filled slowly, reducing aeration of the water
- Both will travel with a trip blank (not opened in the field)
- Water forms a dome at top before putting lid on



Lead and Copper Sampling

- Usually collected from kitchen tap of single family residences
- Must be first flush sample (water standing in pipes for at least 6 hours, but less than 12)
- Bottle is 1 liter plastic, acid washed
- No need to rinse the bottle
- Position bottle under tap before turning on water
- Always sample from cold water tap
- Fill bottle to 1 Liter line, or near the neck
- May be easier to let homeowner fill the bottle

SOC Sampling

- Many SOC methods, most use 1 liter amber glass
- Each method may require multiple bottles
- Most bottles will have some type of preservative already in bottle
- Do not rinse or overflow bottle
- Some SOCs require field acidification, use proper protective gear
- Be careful to protect glass bottles for transport
- Transport with ice
- Do not fill near sources of contamination

Inorganic Chemicals (IOCs)

- If used for regulatory sampling, bottle should be acid washed, size may vary
- Rinse bottle 3 times with sample water
- Thoroughly flush tap
- Fill to shoulder of bottle
- Transport on ice

Crypto and Giardia Sampling

- Sample raw or finished water sources
- Can either collect 10 liters and send water to lab
- Or purchase equipment necessary to field filter
- Advantage of field filtering: less shipping cost, can filter a larger volume to reduce the detection limit, will know ahead of time if filter has clogging issues, don't have to pay lab to filter the sample



Sample Handling and Delivery

- Make sure label is filled in and lid is tight
- Be careful not to drop the bottle
- Place samples upright in a cooler for transport. Ice necessary for most types of samples
- Complete Chain of Custody Record

Other Sampling Considerations

- Sample Transport – overnight shipping usually required, unless dropping off at lab
- Be aware of lab's business hours
- Some labs restrict drop off days for certain tests (no Fridays for example)
- The only samples that do NOT require shipment on ice are lead and copper samples, and TCR (although it's recommended)
- Consider need for proper QA/QC (duplicates, field blanks, trip blanks, spikes)

Other Sampling Supplies

- Sample Bottles, plus extras (not expired)
- Field test kits with reagents (like chlorine)
- Chain of Custody record
- Waterproof pen
- Map of locations or addresses
- Keys to Sample Stands or other locations
- Thermometer and watch(both optional)
- Cooler with ice
- Disinfectant (chlorine, alcohol, flame)
- Tools to remove hoses, aerators, filters, etc...
- Clean paper towels or wipes
- Sterile gloves (optional, but not a bad idea)
- Identification (City or employee ID)



Chain of Custody Record

- Water System ID number
- Water System Name
- Collection Date and Time
- Type of Sample (Routine, Repeat, or other)
- Sample Location
- Initials or name of collector
- Note anything unusual
- Field readings (if done)

Getting the Results

- Some tests take 24 hours or less to complete
- Results with potentially serious acute health effects should be relayed to the water purveyor the same day the result is available
- Other tests have long holding times, and may take weeks for results to be available
- Compliance samples have reports sent to DOH directly (usually) (be sure to ask)
- Lab reports can be complicated

Typical Lab Report



City of Seattle Public Utilities
Water Quality Laboratory
 800 South Stacy Street Seattle, WA 98134 (206) 684-7834
Drinking Water Disinfection By Products Report
Source/Point of Entry - Report of Analysis rptAnalysisD

Date Collected: 02/11/2010	System Group Type: A
Water System ID Number: 77050	System Name: Seattle Public Utilities DOH Source #: 092
Lab -- Sample Number: 074-03241	County: King
Sample Location: A-3 N 150TH ST & WALLINGFORD AVE N	Source: Toit Source Type: Surface
Sample Purpose: (Check appropriate Box) <input checked="" type="checkbox"/> RC - Routine/Compliance on monitoring requirements <input type="checkbox"/> C - Confirmation (confirmation of chemical results) <input type="checkbox"/> I - Investigative (does not satisfy monitoring requirements) <input type="checkbox"/> O - Other (specify)	Date Received: 02/11/2010 Date Reported: 03/01/2010
Sample Composition: (Check Appropriate Box) <input type="checkbox"/> S - Single Source <input type="checkbox"/> B - Blended <input type="checkbox"/> C - Composite <input checked="" type="checkbox"/> D - Distribution sample.	COMMENTS: Routine Monitoring Stage 1
	Sample Type: (Check one) <input type="checkbox"/> Pre-Treatment/Raw <input checked="" type="checkbox"/> Post-Treatment/Finished <input type="checkbox"/> Unknown
	Sample Collected by: (Name) ATORA (A100420401) Phone Number:

EPA/STATE REGULATED

Trihalomethanes (THM)

DOH #	ANALYTE	RESULTS	UNITS	SRL	MCL	MCL Exceeded? (Check only if YES)	Date Analyzed	Method	Analyst initials
0027	CHLOROFORM	24.5	ug/L	0.25			2/25/2010	EPA 524.2	RR
0028	BROMODICHLOROMETHANE	1.6	ug/L	0.50			2/25/2010	EPA 524.2	RR
0029	DIBROMOCHLOROMETHANE	U	ug/L	0.50			2/25/2010	EPA 524.2	RR
0030	BROMOFORM	U	ug/L	0.50			2/25/2010	EPA 524.2	RR
0031	TOTAL TRIHALOMETHANE	26.0	ug/L	1.75	80		2/25/2010	EPA 524.2	RR

Haloacetic Acids (HAA)

DOH #	ANALYTE	RESULTS	UNITS	SRL	MCL	MCL Exceeded? (Check only if YES)	Date Analyzed	Method	Analyst initials
0411	MONOCHLOROACETIC ACID	U	ug/L	1.5			2/18/2010	EPA 562.2	RR
0413	TRICHLOROACETIC ACID	13.9	ug/L	0.5			2/18/2010	EPA 562.2	RR
0412	DICHLOROACETIC ACID	14.9	ug/L	1.0			2/18/2010	EPA 562.2	RR
0414	MONOBROMOACETIC ACID	U	ug/L	1.0			2/18/2010	EPA 562.2	RR
0415	DIBROMOACETIC ACID	U	ug/L	0.5			2/18/2010	EPA 562.2	RR
0416	HAA(S)	28.8	ug/L	4.5	60		2/18/2010	EPA 562.2	RR
0417	BROMOCHLOROACETIC ACID	U	ug/L	1.0			2/18/2010	EPA 562.2	RR

 Jim Dunn
 Water Quality Analyst Supervisor

NOTES:

SRL (State Reporting Level): The minimum reporting level established by the Washington State Department of Health (DOH).
 Trigger Level: DOH Drinking Water response level. Systems with compounds detected at concentrations in excess of this level may be required to take additional samples or monitor more frequently. Please contact your DOH drinking water regional office for further information.
 MCL (Maximum Containment Level): If the containment amount exceeds the MCL, please contact your regional DOH office to determine follow-up actions.
 NA (Not Analyzed): In the results column, indicates this compound was not included in the current analysis.
 U (Under): In the results column, indicates this compound was analyzed and not detected in a level greater than or equal to the SRL.

COMMENTS:

Questions?



Thank You!!!