Coliform Sample Collection

Module 4
Learning Objectives

• Be able to take and explain how to take a good coliform sample
• Recognize the challenges in taking a good sample
Coliform Sampling – Why?

• Indicator of pathogen contamination

• Total Coliform (TC)
  – Not necessarily a health threat in itself; used to indicate other potentially harmful bacteria
  – A very common microbe
  – Should be absent if chlorine residual is adequate.

• E. coli
  – A subset of total coliform which indicates fecal waste contamination from mammals (humans, cows, etc)
  – *Found only in mammal feces*
Coliform Sampling – Best Practices

• Collecting total coliform samples correctly and properly is absolutely critical in protecting public health

• Improper sampling is the most common reason for positive results (false positive)
  – Repeated sampling requires extra effort, time, and money
  – May lead to unnecessary MCL violation and subsequent corrective measures
Sampling Procedures

1. Assemble sampling supplies
2. Go to sampling location(s) specified in the sampling plan
3. Remove any aerators, strainers, or hoses from the tap
4. Open the cold water tap for about 2 to 3 minutes before collecting the sample
5. Fill out label, tag, and lab form in waterproof ink
6. Adjust the flow to about the width of a pencil
Sampling Procedures, cont.

7. Remove the bottle cap
8. Fill the bottle to the shoulder or about ¼ inch from the top
9. Place the cap on the bottle and screw it down tightly
10. Turn the tap off and replace the aerator, strainer, or hose
11. Check the information on the label
12. Complete any additional lab forms that come with the sample bottle
13. Refrigerate or ice the samples; samples must reach the lab for processing within 30 hours of sample collection
1. Assemble Supplies

- 125 ml sterilized plastic bottles and bottle rack
- Dechlorination agent (do not rinse out bottle)
- Cooler with ice or dry ice
- Label and lab form (chain of custody form)
- Pen / Sharpee
Wash Your Hands!

THINK STERILE!
Assume your hands are dirty even after you wash them...

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Preparation and Handling

• Wear clean clothing, wash your hands and try to keep them bacteria free for the collection process.
• Watch for contamination sources:
  - nearby activities – soil disturbances- sewer lift stations – 
animals/manure
• Avoid talking and disturbing the air while collecting (sneezing/coughing).
• Smoking during sample collection is not advised. If it is TC+ it will be you who has to recollect.
2. Go to Location(s) in Sampling Plan - Sample Tap - Do’s

- Tap should be clean, in good shape, and free of attachments
- Sample cold water only
  - Valves that control hot and cold independently
  - Water heaters can be laden with bacteria
- Use a line directly connected to the main
- Sample indoors, when possible
Sampling Taps –DON’Ts

• Sample tap should NOT be:
  – Outdoors
  – Too close to the bottom of the sink
  – Swivel-type with a single valve for both hot and cold water
  – Leaking or on a leaky pipe
  – Threaded in the interior
  – Upward flowing (e.g. drinking fountains)
  – Located in a room of questionable sanitary conditions
  – Attached to any household point-of-entry or point-of-use devices (e.g. aerators)
  – Drinking fountains
What to Avoid

• Faucets to avoid:
  – Swivel-type faucets that have a single valve for hot and cold water.
What to Avoid

– Outdoor faucets
– Faucets close to or below ground level
What to Avoid

– Faucets that point upward
What to Avoid

– Faucets in places highly prone to contaminations (e.g. janitor’s closet, public rest rooms)
3. Remove Aerator, Strainer, or Hose

- Can trap sediment or particulates
- Biofilms can form in a hose
4. Open Cold Water for 2-3 Minutes

- Want to get water representative of conditions in the water main
- When temperature stabilizes is a good guide
5. Fill out Label, Tag, and Lab Form

- In waterproof ink
- Write clearly
- Write the Date and Time sample collected
6. Adjust Flow to Width of a Pencil

• You want a steady, controlled flow

• Don’t change the flow once you start sampling (could dislodge microbial growth)
7. Remove the Bottle Cap

• Be careful not to touch the inside of the bottle or bottle cap.

• Do not lay the cap down or put it in your pocket.

• STERILE, STERILE, STERILE!!!!
8. Fill Bottle to the Shoulder, $\frac{1}{4}$ Inch From the Top

Don’t rinse the bottle
9. Place Cap on Bottle and Screw it Down Tightly

Think, **STERILE**
10. Turn the Tap Off and Replace the Aerator, Strainer, or Hose
11. Check the Information on the Label
12. Complete any Additional Lab Forms

- Chain of custody
- Make sure to write clearly in ink
- Who Transported Sample
- Date and Time of Delivery/drop off
- Number of Samples dropped off
**CHAIN OF CUSTODY RECORD**

City of Chandler  
Water Treatment Plant Laboratory  
1475 E. Pecos Road  
Chandler, Arizona 85225  
Phone (480) 782-3655 or (480) 782-3659 or (480) 782-3656

- **Project Name:** TCR
- **Project Manager:** Anupa Jain
- **Sampled By:** Matt Dregely

### Client's Sample Identification and/or Sample Location
- **Location 1**
  - **Sampled By:** Matt Dregely
  - **Date/Time Sampled:**
  - **Matrix (Box #1):** DW
  - **Preservative (Box #2):** X
  - **No. of Containers:** 2 X

- **Location 2**
  - **Sampled By:** Matt Dregely
  - **Date/Time Sampled:**
  - **Matrix (Box #1):** DW
  - **Preservative (Box #2):** X
  - **No. of Containers:** 1 X

### Comments/Special Instructions:

### Laboratory Identification Number

### Remarks

### Total No. of Containers:

### Temperature:

### Samples received on ice? Yes No
13. Ice and Send to Lab for Processing Within 30 Hours

- Refrigeration recommended; Cooler with blue ice
- The quicker it gets to the lab the better
- Use a certified laboratory for analysis
Drinking Water

Return to Baton Rouge Reg Office

Study

Jul 4
Helpful Hints

• Sample early in the week or month

• If you feel something went wrong, resample
  – Bottles are cheap, but false positive samples
    are not
Common Issues that can lead to undesired results

Improper Sampling Techniques

- Not Flushing the Tap
- Improper Handling of Bags
- Exceed 30 Hour Holding Time
Avoid Sampling in the Rain
Keep your faucets maintained – no spray
Who’s Responsible??

- The WATER SYSTEM PERSONNEL are responsible for insuring that all water samples are collected during the correct compliance period.
- Utility responsible that the results go to the regulatory agency.
- Violation occurs if no sample taken or reported – Includes Public Notice and other measures.
Laboratory Results

• You will be notified by Region/District or Lab if you have a TC+ Sample

• Collect Repeats and Triggered Source samples within 24 hours or as scheduled

• May require corrective action be taken to resolve contamination
Colilert® Test

1. Collect proper sample
2. Add one sample pack
3. Cap and shake
4. Incubate at 35°C for 24 hours
5. Read results
   – Negative - Less yellow than comparator
   – Positive total coliform – Yellow equal or greater
   – Positive E. coli – yellow and fluorescence

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Online Resources

• A Small Systems Guide to the Total Coliform Rule
  http://www.epa.gov/ogwdw/disinfection/tcr/pdfs/small-tcr.pdf

• AWWA Video: Reliable Coliform Sampling for Water Systems
QUESTIONS???
LUNCH