

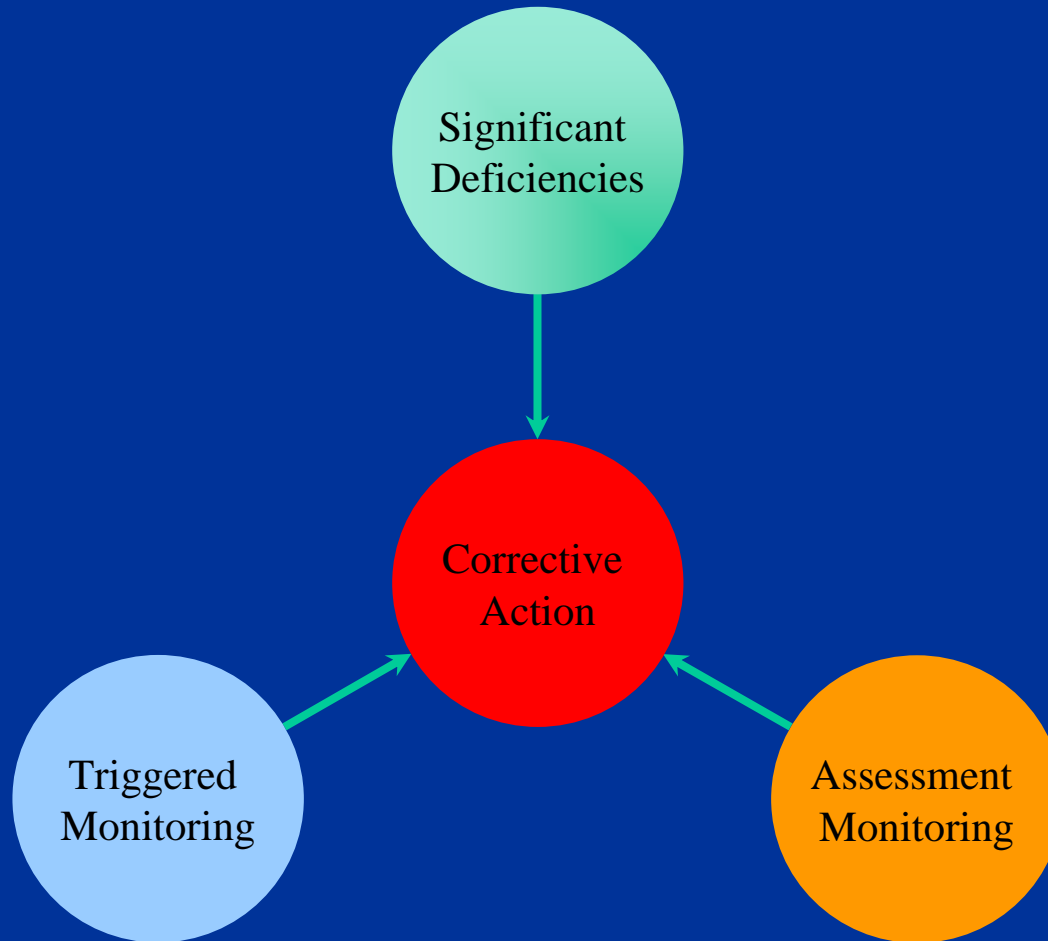
Triggered and Assessment Monitoring

Eric McPhee
Sanitary Engineer 3
DPH-Drinking Water Section



Drinking Water Section

The Gist of the GWR



Source Water Monitoring

Source Water Monitoring

Triggered Monitoring

Assessment Monitoring

Corrective Action



Source Water Monitoring

- 💧 GWR: “Source water monitoring is an effective tool to target at-risk systems that must take corrective action to protect public health.”
- 💧 “Indications of risk may come from total coliform monitoring, hydrogeologic sensitivity analyses, or other system-specific data and information.”

Source Water Monitoring

- 💧 GWR: “Fecal indicators typically are not harmful when ingested, their presence demonstrates that there is a pathway for pathogenic viruses and bacteria to enter groundwater sources.”

What are the Sources Monitored for?

- There are three EPA approved fecal indicators in the GWR:
 - E.coli
 - Coliphage
 - Enterococci
- Connecticut will normally require monitoring for e.coli using an EPA GWR approved methodology.



Source Water Monitoring

Source water samples are to be analyzed for e.coli (unless specified otherwise by DWS) using one of the following methodologies:

ANALYTICAL METHODS FOR SOURCE WATER MONITORING

Fecal indicator ¹	Methodology	Method citation
<i>E. coli</i>	Colilert ³	9223 B. ²
	Colisure ³	9223 B. ²
	Membrane Filter Method with MI Agar	EPA Method 1604. ⁴
	m-ColiBlue24 Test ⁵	
	E*Colite Test ⁶	
	EC-MUG ⁷	9221 F. ²
	NA-MUG ⁷	9222 G. ²



Source water monitoring

- 💧 Water systems that have a fecally contaminated source must immediately provide appropriate public notice. It is a Tier 1 Public Notice when a triggered source water sample is positive for a fecal indicator.

Public Notification Requirements

TABLE IV-4.—SUMMARY OF GWR PUBLIC NOTIFICATION REQUIREMENTS

Systems must comply with the following notification requirements when . . .	Reference
Tier 1 Public Notification	
Triggered source water monitoring sample or assessment source water monitoring sample is positive for <i>E. coli</i> , enterococci, or coliphage (and is not invalidated).	§ 141.402(g).
Tier 2 Public Notification	
<p>A system fails to take corrective action following:</p> <ul style="list-style-type: none"> ■ State direction to take corrective action for a fecal indicator-positive sample, ■ Receipt of laboratory notice of fecal indicator-positive ground water source sample as a result of triggered source water monitoring under § 141.402(a)(3), or ■ Receipt of State written notice of significant deficiency. 	§ 141.404(d).
A system fails to comply with a State-approved schedule and plan (including interim measures) related to correcting a significant deficiency and/or eliminating fecal contamination in a ground water source.	§ 141.404(d).
A system that elects to provide such treatment in lieu of triggered source water monitoring fails to maintain 4-log treatment of viruses [NOTE: There is no violation and public notification required if the system restores 4-log treatment within four hours.].	§ 141.404(d).
Tier 3 Public Notification	
A system fails to conduct triggered source water monitoring or assessment source water monitoring.	§ 141.403(d).
A system fails to conduct monitoring to demonstrate compliance with 4-log treatment requirement.	§ 141.403(d).

Triggered Source water monitoring



Triggered Source water monitoring

- 💧 Triggered source water monitoring will target and identify ‘at-risk’ systems by requiring them to test their wells for the presence of fecal indicators (*E. coli*).

Triggered monitoring

- 💧 TCR monitoring does not change, but...
- 💧 A groundwater system must sample all groundwater sources within 24 hours following a total coliform-positive routine sample under Total Coliform Rule sampling in the distribution system.



Starts with TCR Monitoring

- Any positive TCR sample is the “trigger” to test all active well(s) at the source for fecal contamination...

...Unless...

- 💧 GWS provides 4-log virus treatment for the source(s)
- 💧 Sample is invalidated due to lab error
- 💧 Sample is deemed to be caused by a distribution system deficiency per DWS criteria
- 💧 Sample is collected at a location that meets predetermined DWS criteria for distribution system conditions that will cause total coliform-positive samples.

Representative Locations

- 💧 A provision in the GWR allows triggered monitoring from “representative” sources.
- 💧 Systems will be required to submit a revised sampling site plan that indicates the representative source(s) for each TCR sampling point.
- 💧 Explained in afternoon presentation

Triggered monitoring

- 💧 When the triggered source water sample is positive for a fecal indicator, the water system must either:
 - 💧 collect 5 additional source water samples within 24 hours, or
 - 💧 Take immediate corrective action if required by the state.

Triggered monitoring

- 💧 States may extend the 24 hour time limit on a case by case basis (weekend).
- 💧 Triggered monitoring does not apply if the water system provides at least 4-log virus inactivation/removal before the first customer.

Triggered Monitoring

- 💧 If it confirmed that a groundwater source is fecally contaminated, the public water system will be required to take corrective action:
 - 💧 Alternate source of supply
 - 💧 Remove source of pollution
 - 💧 Correct deficiency that caused contamination
 - 💧 Install treatment



Triggered Monitoring Preparation

- 💧 What steps should water systems and operators take now?



Triggered Monitoring Preparation

- 💧 Contact your water system(s), operators, and/or certified laboratory to inform them of the new rule.
- 💧 Establish a plan to conduct source sampling **IN ADVANCE**.



Triggered Monitoring Preparation

- It is very important that the sample collector has enough knowledge of the system to ensure that the appropriate source samples are collected within the appropriate timeframe. Groundwater systems and their laboratories and/or sample collectors need to interact **before** December 1, 2009, to ensure that this occurs.

The following issues should be resolved:



Triggered Monitoring Preparation

- 💧 Does the sample collector know where the groundwater source(s) is/are located?
- 💧 Does the sample collector know where the appropriate sampling taps are located for the groundwater source(s) (pumphouse, basement, sample enclosure)? Are the taps accurately labeled?
- 💧 Does the sample collector have access to the raw water sampling tap(s) within 24 hours of the TCR positive? (property accessibility, weekends, locked gates, building accessibility (locks, alarms), etc.)



Triggered Monitoring Preparation

- 💧 Is the sample collector able to collect a true source sample? This typically cannot be accomplished without a sample tap located directly on the well discharge line and a verification that the well pump is pumping water through the discharge line at the time the sample is collected.
- 💧 The well's meter should be checked to verify that flow through the pipe on which the sample tap is located is coming only from the well.
- 💧 Ideally, a check valve should be installed immediately downstream of the raw water sample tap to ensure that the sample collected can only be from the source.
- 💧 It is imperative that the required source of supply sample is truly representative of **ONLY** the appropriate well source.



Triggered Monitoring Preparation/Sampling taps

- ◆ Systems will be required to have the capability of collecting samples from each source individually.
- ◆ A dedicated sampling tap shall be installed for each source of supply. The tap shall be located prior to any treatment system or storage tanks. The tap shall be pointed downward and free of any obstructions to allow easy access with an adequate clearance for sampling containers. It should be of the chrome, threadless type or equivalent.
- ◆ If there is not already an instantaneous and totalizing flow meter and a check valve on the well discharge line, the sampling tap installation would be a good time to install them.

Assessment Monitoring



Assessment Monitoring

- 💧 GWR indicates that “triggered source water monitoring may not be timely or frequent enough to identify systems with intermittent fecal contamination.”
- 💧 Assessment monitoring will target high-risk systems and help identify if they are susceptible to fecal contamination.



Assessment Monitoring

- 💧 Connecticut is developing an assessment monitoring program.
- 💧 It allows an evaluation of potentially higher-risk sources without citing a significant deficiency and requiring corrective action.

Identification

💧 DWS is developing criteria to identify potential high-risk systems. Criteria may include:

- History of e.coli or coliform MCLs
- Existing regulatory separating distance violations (septic, sewer) that do not constitute significant deficiencies
- Hydrogeologic Sensitivity Assessment indicates higher-risk
- Systems that disinfect at less than 4-log virus inactivation/removal



Identification

- 💧 PWSs that use chlorine, ozone or UV treatment that does not provide 4-log virus inactivation will likely be required to conduct additional monitoring to ensure that the treatment is not masking microbial pathogen contamination.
- 💧 E.coli is easily inactivated by low doses of chlorine/UV light, many of the bacterial and viral pathogens that cause illness are not so readily inactivated.



Identification of Higher Risk Sources for AM

- 💧 Most likely would be identified through the sanitary survey process
- 💧 Could also be identified through review of hydrogeologic sensitivity assessments, source water assessments, wellhead protection plans and past water quality monitoring results

What is a Hydrogeologic Sensitivity Assessment?

- 💧 Hydrogeologic Sensitivity Assessment (HSA) means a determination of whether ground water systems obtain water from hydrogeologically sensitive settings. HSAs are determined using hydrogeologic data from the surrounding area.



New Term: Hydrogeologic Sensitivity Assessment

- 💧 The Rule requires GWSs, if requested by the state, to provide the information necessary to the state for the state to perform an assessment.

Hydrogeologic Sensitivity Assessment

- 💧 The first step in an HSA is to identify the aquifer from which the ground water system is drawing its water. Required data will include: the depth of the well, a record of the geologic strata encountered during the drilling, and an indication of the type and depth of well casing, grouting, and well screen installed.
- 💧 The second step in assessing the sensitivity of a system is to characterize the hydrogeology of the source aquifer (i.e., if the aquifer is in a karst, gravel, or fractured bedrock).



New Term: Hydrogeologic Sensitivity Assessment

- 💧 The next step is to determine if the aquifer has a hydrogeologic barrier that would prevent the vertical movement of microbial contaminants from the surface into the aquifer, such as a confining layer.
- 💧 The final step involves making a determination of the sensitivity of the well based upon the available information and to document this finding in an assessment report.



Assessment Monitoring

- 💧 Sources that were deemed to be at a higher-risk for fecal contamination would be tested for the DWS specified fecal indicator(s) once per month, typically for 12 months.
- 💧 Monitoring could be continued indefinitely if there is continued risk of contamination.

Source Water Monitoring

Source Water Monitoring

Triggered Monitoring

Assessment Monitoring

Corrective Action

When does Source Water Monitoring Lead to Corrective Action?

Assessment
Monitoring



Confirmed fecal contamination as a result of assessment monitoring or triggered monitoring will require corrective action.

Triggered
Monitoring



The corrective action process will be the same as when a significant deficiency is identified.

When does Source Water Monitoring Lead to Corrective Action?

Two scenarios:

1. PWS has a TC+ routine distribution sample under TCR Rule.



Source sample positive for e.coli during GWR monitoring



And then has a repeat source sample positive for e.coli

Assessment
Monitoring

Triggered
Monitoring

When does Source Water Monitoring Lead to Corrective Action?

Assessment
Monitoring

Triggered
Monitoring

Two scenarios:

2. PWS is required to do assessment monitoring after a determination that the source is at an elevated risk of contamination.

↓
PWS then has a monthly source sample positive for fecal indicator under assessment monitoring plan.

↓
and then has a repeat source sample positive for same fecal indicator.

What should I do now?

- 💧 Review historic water quality data.
- 💧 Minimize opportunity for bacterial contamination of sources/distribution system. Address violations cited in the last sanitary survey report.
- 💧 Install a dedicated sampling tap for every source of supply. It is very important that the sample you take is representative of the source.



Questions?

Drinking Water Section