

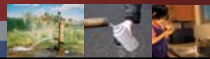
Monitoring



November 2015

Routine Monitoring

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PWS Serving > 1,000 People

- ALL systems serving more than 1,000 people must monitor **MONTHLY**
- Systems must collect samples at regular time intervals throughout the month
 - GW systems serving 4,900 or fewer people may collect all samples on a single day if taken from different sites

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40 CFR 141.853(a)(2) & 141.857(b)



PWS Serving > 1,000 People

TOTAL COLIFORM MONTHLY MONITORING FREQUENCY	
Population served	Min # of Samples/Mo
1,001 to 2,500	2
2,501 to 3,300	3
3,301 to 4,100	4
4,101 to 4,900	5
4,901 to 5,800	6
5,801 to 6,700	7
...etc...	x
3,960,001 or more	480

141.857(b)

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SW & GWUDI (Subpart H) Systems Serving ≤ 1000 People

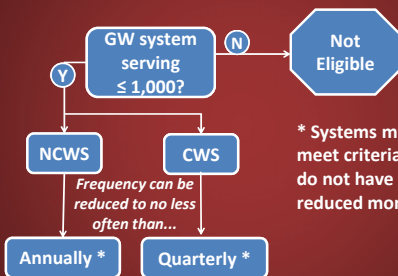
- Any system that has a SW, GWUDI, SW or GWUDI blended source(s) are considered surface water (Subpart H) for purposes of RTCR monitoring.
- One routine sample per month

40 CFR 141.856(c) & 141.857(c)

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GW Systems Serving ≤ 1000 People

1 sample per month or quarter; may be eligible for reduced monitoring.



* Systems must meet criteria. States do not have to allow reduced monitoring.

40 CFR 141.854(e) & 141.855(d)(1)

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GW Systems Serving ≤ 1,000 People

System Type	Increased	Baseline	Reduced	Transition to the RTCR
CWS	NA	1 / month	1 / quarter	Same frequency under the TCR
Non-Seasonal NCWS	1 / month	1 / quarter	1 / year	Same frequency under the TCR For annual – site visit or voluntary Level 2 assessment in 1 st & subsequent years
Seasonal NCWS	NA	1 / month	1 / quarter or 1 / year	For quarterly – identify vulnerable period for monitoring For annual – identify vulnerable period for monitoring & site visit or voluntary Level 2 assessment in 1 st & subsequent years

40 CFR 141.854(c)(1); 141.854(e); 141.854(f); 141.854(f)(2); 141.855(c)(1) & 141.855(d);

GW Systems Serving ≤ 1,000 People

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Non-Seasonal NCWS	1 / month	1 / quarter	1 / year	Same frequency under the TCR For annual – site visit or voluntary Level 2 assessment in 1 st & subsequent years

40 CFR 141.854(c)(1); 141.854(e); 141.854(f); 141.855(c)(1) & 141.855(d);

Reduced Monitoring Criteria – GW Systems Serving ≤ 1,000 People

Reduced Monitoring Criteria	CWS (from monthly to no less than quarterly)	Non-seasonal NCWS (from quarterly to no less than annually)
Meets certified operator requirements	Mandatory	N/A
Clean compliance history – 12 months	Mandatory	Mandatory
No sanitary defects in most recent sanitary survey (or corrected all sanitary defects)	Mandatory	Mandatory
Protected water supply	Mandatory	Mandatory
Meets approved construction standards	Mandatory	Mandatory
Annual site visit from state or Level 2 Assessment	Additional	Mandatory
Certified operator or regular visits by state certified circuit rider	N/A	N/A
Cross connection control program	Additional	N/A
Continuous disinfection entering distribution system and residual in distribution system in accordance with criteria specified by state	Additional	N/A
4-log treatment for viruses under GWR	Additional	N/A
Other equivalent enhancements approved by state	Additional	N/A

Return to Baseline Monthly Monitoring – GW CWS Serving ≤ 1,000 People

- Increases from quarterly to baseline monthly monitoring the month following any of these events:
 - Triggered Level 2 assessment or a 2nd Level 1 assessment in a rolling 12 months
 - E. coli* MCL violation
 - Coliform TT violation
 - Two RTCR monitoring violations in a rolling 12 months
 - System loses its certified operator

40 CFR 141.855(e)

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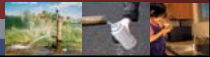


Increased Monitoring – Non-seasonal GW NCWS Serving ≤ 1,000 People

- Increases from annual to quarterly monitoring the quarter after the system has one RTCR monitoring violation
- Increases from quarterly or annual to monthly monitoring the month following any of these events:
 - Triggered Level 2 assessment or a 2nd Level 1 assessment in a rolling 12 months
 - E. coli* MCL violation
 - Coliform TT violation
 - For a system on quarterly monitoring, two RTCR monitoring violations, or one RTCR monitoring violation and one Level 1 assessment, in a rolling 12 months

40 CFR 141.854(f)

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Reduced Monitoring Criteria – GW Systems Serving ≤ 1,000 People

Reduced Monitoring Criteria	Non-seasonal NCWS (RETURNING to quarterly)	Non-seasonal NCWS (RETURNING to annually)
Clean compliance history – 12 months	Mandatory	Mandatory
Sanitary survey, site visit, or Level 2 Assessment within last 12 months and free of sanitary defects	Mandatory	Mandatory
Protected water supply	Mandatory	Mandatory
Annual site visit from state or Level 2 Assessment	N/A	Mandatory
Certified operator or regular visits by state certified circuit rider	N/A	Additional
Cross connection control program	N/A	Additional
Continuous disinfection entering distribution system and residual in distribution system in accordance with criteria specified by state	N/A	Additional
4-log treatment for viruses under GWR	N/A	Additional
Other equivalent enhancements approved by state	N/A	Additional

Additional Routine Monitoring

TCR	RTCR
<p>PWS taking < 5 routine samples per month (PWS serving $\leq 4,100$)</p> <ul style="list-style-type: none">• Must take at least 5 routine samples in the month after a TC+ sample.	<p>No longer a requirement for systems that monitor at least monthly.</p> <p>PWSs taking samples less frequently than once per month (i.e., quarterly or annually)</p> <ul style="list-style-type: none">• Must take at least 3 routine samples in a month after a TC+ sample.

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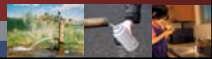


Special Monitoring Evaluations

- Must be conducted for all GWSs serving $\leq 1,000$ with each sanitary survey
- Determines whether the following are appropriate:
 - Monitoring frequency
 - # of samples per monitoring period
 - Vulnerable or critical times/sites for sample collection at seasonal systems
- Ensures that the distribution system is evaluated in sufficient detail

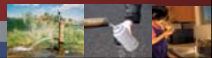
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40 CFR 141.854(c)(2) & 141.855(c)(2)



Repeat Monitoring

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Repeat Monitoring – # of Samples

TCR	RTCR
<p>PWS serving ≤1,000: 4 repeat samples for every TC+ routine sample.</p> <p>PWS serving >1,000: 3 repeat samples for every TC+ routine sample.</p>	<ul style="list-style-type: none"> All PWSs must take 3 repeat samples for every TC+ routine sample regardless of whether PWS has already triggered an assessment. Also must take additional repeats for TC+ repeat samples until TT trigger (including EC MCL) reached and system notifies the state.

40 CFR 141.21(b) & 141.858(a)

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Repeat Monitoring – Locations

TCR	RTCR
<p>Repeat samples must be collected from the original TC+ site, at least one at a tap within 5 service connections upstream, & at least one at a tap within 5 service connections downstream</p>	<p>PWS can collect repeat samples using the same procedure as in the TCR, or</p> <p>PWS can specify in their sample siting plan either fixed alternative locations or criteria for selecting sites on a situational basis via a standard operating procedure</p>

40 CFR 141.853(a)(5)

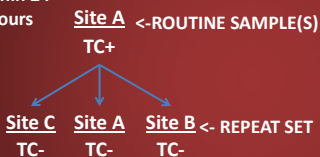
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Follow-up Monitoring for TC+ ROUTINE Sample(s)



Within 24 hours



- For every routine sample that is TC+:
 - Collect 3 repeat samples
- All TC+ samples must be tested for *E. coli*

Systems must collect a set of repeat samples for EACH routine TC+ sample, even if a TT exceedance has occurred

40 CFR 141.858(a)(3) & 141.858(b)(1)

Follow-up Monitoring for TC+ REPEAT Sample(s)

Site A TC+

Within 24 hours

- For each routine TC+ sample, when there are multiple TC+ repeat samples in a set:
 - Collect one set of 3 repeat samples until either:
 - TC are not detected in one complete set of repeats
- OR
- System determines that a TT trigger has been exceeded and notifies the state

In this example, there are a total of 9 repeat samples at 3 sites.

40 CFR 141.859(a)(3)

Repeat Monitoring Timing

- System has 24 hours after learning about TC+ routine sample to take repeat samples
- Must collect all repeats on same day
 - 3 repeat samples are needed for each TC+ routine sample
- State may allow systems with single service connection to:
 - Collect over a 3-day period
 - Collect a larger volume container(s) of any size as long as the total volume collected is at least 300ml

40 CFR 141.858(a)(1) & (2)

Key Provisions

MCL

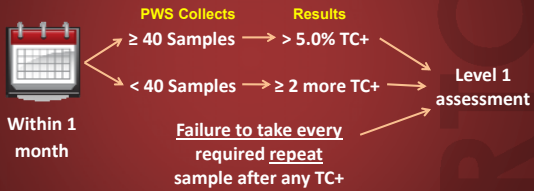
- Establishes an *E. coli* MCL

<i>E. coli</i> MCL Violation Occurs with Any of These Sampling Result Combinations	
ROUTINE	REPEAT
EC+	TC+
TC+	EC+
EC+	Any missing repeat sample
TC+	TC+ (but no <i>E. coli</i> analyzed)

Key Provisions

Monitoring

- Results of all ROUTINE and REPEAT sampling included in determination of whether an Assessment is triggered.

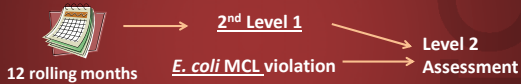


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Key Provisions

Monitoring

- Results of all ROUTINE and REPEAT sampling included in determination of whether an Assessment is triggered.



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RTCR & GWR – Dual Purpose Samples

- GW systems with one well serving $\leq 1,000$ people wishing to take dual purpose samples
 - State provides written approval of use of single sample to meet both rules
 - Must take other required repeat samples at locations specified in the RTCR
 - Must use *E. coli* as a fecal indicator for source water monitoring, as approved by the state
 - EC+ sample results in RTCR *E. coli* MCL and more GWR requirements (corrective action or additional monitoring)

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40 CFR 141.853(a)(5)(i)



Analytical Methods

TCR	RTCR
PWS must conduct analyses in accordance with the methods listed in 40 CFR 141.21(f)	Changes to methods, include: <ul style="list-style-type: none">• Change in holding time definition• Requiring de-chlorination agent• Requiring autoclaving of MF funnel Revised & clarified the methods table (40 CFR 141.852)

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40 CFR 141.852



Invalidation of Samples

- State may invalidate a sample if:
 - Lab establishes that improper sample analysis caused the TC+
 - State determines from repeat sample results that the TC+ was caused by domestic or other non-distribution system plumbing problem
 - State finds that the TC+ is a result of something that does not reflect water quality in the distribution system

Documentation of Sample Invalidation

- ✓ Rationale for invalidation
- ✓ Cause of TC+
- ✓ Action to correct problem

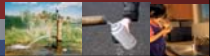
State Signature

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South Town PWS - Profile

- CWS
- Ground Water only; 2 wells
- Disinfects (<4 log)
- Serves 1100 persons
- Monitors monthly for Total Coliform
- 2 samples/month required

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South Town PWS – Case Scenario

April 2016

Routine Sample Results:

Site A: TC+/EC+

Site B: TC+/EC-

How many repeat samples are required?

How many routine samples will be required next month?

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South Town PWS – Case Scenario

April 2016

Routine Sample Results:

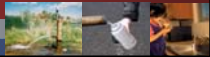
Site A: TC+/EC+

Site B: TC+/EC-

How many repeat samples are required? **6**

How many routine samples will be required next month? **2**

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South Town PWS – Case Scenario

April 2016

Routine Sample Results:

Site A: TC+/EC+

Site B: TC+/EC-

If one of the repeat samples associated with Site A is TC+...

Has an MCL violation occurred?

Has an assessment been triggered?

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South Town PWS – Case Scenario

April 2016
Routine Sample Results:
Site A: TC+/EC+
Site B: TC+/EC-

If one of the repeat samples associated with Site A is TC+...

Has an MCL violation occurred? **Yes**
Has an assessment been triggered? **Yes – Level 2**

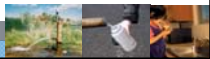
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Implementing Monitoring Provisions

- Will state include reduced monitoring provisions in its RTRC?
 - What categories of systems will be allowed to reduce monitoring?
 - What reduced monitoring will be allowed?
 - What are the mechanisms for addressing the criteria?
 - Which of the additional criteria will be evaluated

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Implementing Monitoring Provisions

- HOW will meeting **mandatory** and **additional** criteria be demonstrated?
 - **Protected water supply**
 - **Cross-connection control program**
 - **Continuous disinfection entering distribution system**
 - **Other equivalent enhancements**

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Implementing Monitoring Provisions

- **Special Monitoring Evaluations**
 - Determining whether system is on appropriate monitoring schedule (annual, quarterly, monthly)
 - Documentation of decisions to reduce monitoring frequency – copy must be provided to system
 - Appropriate number of samples?
 - Appropriate locations?
 - Seasonal system monitoring during appropriate time period?

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Implementing Monitoring Provisions

- **Extending 24-hour period for collecting repeat or invalidated samples**
 - Will you allow water systems to waive the time limit based on criteria?
 - Case-by-case extensions
- **Do you anticipate granting waivers from requirement for 3-additional routine samples from systems that do not monitor monthly and experience a TC+ result?**

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