

## Appendix 1 – Analysis of Five Implementation Options

Five options for implementing the Revised Total Coliform Rule in Wisconsin were analyzed for the potential economic impact they would cause. In all options:

- Level 2 Assessments are required for exceeding the *E. coli* MCL.
- “Boil water” notices are **not required** for total coliform positives.
- “Boil water” notices are **required** when exceeding the *E. coli* MCL.
- An assessment requirement is triggered by the confirmed detection of either total coliform or an *E. coli* MCL.

The options considered were:

1. Monthly Monitoring for All Systems – All public water systems perform monthly monitoring with no reduction in monitoring frequency, Level 1 Assessments for total coliform confirmations, and Level 2 Assessments for *E. coli* MCL exceedance or two consecutive total coliform confirmations in a rolling 12-month period. Annual site visits, for the purpose of achieving reduced monitoring frequencies, would not be performed.
2. RTCR as Written – Follow the RTCR verbatim, allowing all provisions for reduced monitoring, requiring Level 1 Assessments for total coliform confirmations and Level 2 Assessments for *E. coli* positives or two consecutive total coliform confirmations. This is the only option that would allow reduced monitoring for municipal, other than municipal (OTM) and NN systems. Annual site visits would be required for any system on reduced monitoring. Increased monitoring would occur if any Level 2 Assessment trigger occurred, or if two Level 1 assessment triggers occurred in a rolling 12-month period.
- W1. Equivalent Protection W1 – All systems remain on routine monitoring without reduction; no annual site visits required. All NNs and TNs undergo Level 2 Assessments for confirmed total coliform detections and do not go on increased monitoring following two Level 1 assessment triggers in a rolling 12-month period.
- W2. Equivalent Protection W2 – TNs within the County Contract Program undergo annual site visits and are eligible for annual (reduced) monitoring. TNs that do not participate in the County Contract Program do not undergo annual site visits and remain on quarterly (routine) monitoring. OTMs, NNs and municipal (MC) systems remain on their respective routine monitoring frequencies. All NNs and TNs will undergo Level 2 Assessments for confirmed total coliform detections, and do not go on increased monitoring following two Level 1 assessment triggers in a rolling 12-month period.<sup>1</sup>
- W3. Equivalent Protection W3 – The annual site visit requirement and a more rigorous assessment process at TNs will be done to remain eligible for annual (reduced) monitoring. OTMS, NNs and MC systems remain on their respective routine

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monitoring frequencies. All NNs and TNs will undergo Level 2 Assessments for confirmed total coliform detections, and do not go on increased monitoring following two Level 1 assessment triggers in a rolling 12-month period.<sup>2</sup>

### Notes

<sup>1</sup> The County Contract Program is a cooperative agreement between the DNR and local county health departments by which the DNR pays participating counties to perform sanitary surveys and collect drinking water samples at TNs.

<sup>2</sup>W3 was the option selected.

### **The Current TCR**

The current TCR, promulgated in 1989, remains effective until March 31, 2016. It allows annual and quarterly reduced monitoring for eligible systems without requiring annual site visits.

To retain its primacy to administer the SDWA in Wisconsin, the department needs to comply with the requirements of the RTCR starting April 1, 2016; the department does not have the option of retaining the TCR after that date.

The TCR does not require Level 2 Assessments after an *E. coli* or repeated confirmed total coliform positives; however, the department conducts thorough investigations of systems that chronically exceed bacterial MCLs or that show an established pattern of noncompliance. Those investigations may meet the rigor of a Level 2 Assessment and their estimated cost is what is included in the fourth column for the “Currently” row of data in Table 1.

Currently, all systems with confirmed total coliform positives in excess of the non-acute MCL or confirmed *E. coli* are required to issue “boil water” notices or initiate emergency chlorination.

### **Monthly Monitoring for All Systems**

This option requires all systems, regardless of their size to collect a required number of samples each month. The option is arguably the one offering the most public protection by ensuring timely, consistent monitoring. It is also the most costly option, mainly resulting from the costs of analyzing samples at the highest allowable frequency. It would most likely, also trigger the most monitoring violations.

The uniformity provided by this option would make it relatively easy to administer. This option also allows the department to have accurate, comprehensive profiles of the drinking water quality of all regulated public water systems.

This option eliminates the requirement for issuing “boil water” notices for confirmed total coliforms, but requires the notices for *E. coli* MCL exceedances. It also eliminates any requirement for annual site visits, as those are only necessary when reduced monitoring is allowed.

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### **RTCR as Written**

This option, although the second most expensive, would make Chapter NR 809 mirror Federal requirements. The cost of performing annual site visits to allow systems to remain on reduced monitoring is the principal contributor to the overall cost.

This option would increase more accurate, comprehensive drinking water quality profiles of a substantial number of regulated public water systems while allowing highly compliant systems some relief by qualifying for reduced monitoring. However, completing a substantially increased number of yearly site visits may not be achievable and would result in reverting systems to routine or increased monitoring.

Under this option, systems perform a Level 1 Assessment when they encounter a confirmed total coliform positive and a Level 2 Assessment when they exceed the *E. coli* MCL or have two consecutive Level 1 Assessment triggers. The conditions triggering a Level 2 Assessment also result in monthly (increased) monitoring.

This option eliminates the requirement for issuing “boil water” notices for confirmed total coliforms, but requires issuing the notices for *E. coli* MCL exceedances.

### **Three Equivalent Protection Options**

The three options under consideration leverage increased scrutiny during assessments against escalating monitoring and costs. The three equivalent options require performing a Level 2 Assessment at non-community systems, instead of the less rigorous Level 1 Assessment required by the RTCR, at the first instance a system encounters a confirmed total coliform positive. This is in lieu of increasing monitoring frequency to monthly. This feature of each of the options presumes that a more thorough investigation at the onset of contamination is likely to identify causes and fix problems in a timely manner and provide public health protection equivalent to or exceeding a monthly monitoring frequency.

During some Level 2 Assessments, the department will collect large-volume ultrafiltration samples to be analyzed for *E. coli* or additional microbiological contaminants. A single large volume sample would be equivalent to collecting a thousand samples at a public water system, thus providing enhanced public health protection. This additional measure would help identify recalcitrant or initially not attributable microbial contamination in systems, in harmony with a more protective “find and fix” approach.

All three equivalent protection options eliminate the requirement for issuing “boil water” notices for confirmed total coliforms, but require issuing notices for *E. coli* MCL exceedances.

### **Equivalent Protection Option W1**

Option W1 keeps all systems under routine monitoring and thus, does not require any annual visits. Performing Level 2 Assessments, in instances where the RTCR calls for a Level 1

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Assessment allows systems to remain on routine monitoring without having to perform increased, monthly monitoring following multiple Level 1 Assessment triggers in a rolling 12-month period.

The monitoring costs of analyzing four times more samples for TNs makes W1 the costliest equivalent protection option.

### **Equivalent Protection Option W2**

Option W2 allows TNs covered by the County Contract Program to remain on annual (reduced) monitoring by undergoing annual site visits performed by county personnel. TNs not covered by the County Contract Program will be placed on quarterly (routine) monitoring.

Both types of TNs will perform Level 2 Assessments when they encounter confirmed total coliform positives or *E. coli* MCL exceedances without having to perform monthly (increased) monitoring. OTMs, NNs and MCs remain at their respective routine monitoring frequencies: quarterly for NNs, and monthly for MCs and OTMs.

W2 is the “middle cost” equivalent protection option. This option requires approximately a third of the TNs to monitor quarterly. This reduces monitoring costs compared with Option W1, but the cost of the annual visits performed by county personnel negates some of the savings achieved by the reduction in monitoring and implementation costs.

### **Equivalent Protection Option W3**

Option W3 allows all TNs to remain on annual (reduced) monitoring by undergoing annual site visits, and more rigorous Level 2 Assessments in place of Level 1 Assessments. Both types of TNs will require Level 2 Assessments when encountering confirmed total coliform positives or *E. coli* MCL exceedances. They would not increase to monthly monitoring unless *E. coli* was present. OTMs, NNs and MCs remain at their respective routine monitoring frequencies: quarterly for NNs, and monthly for MCs and OTMs.

W3 is the least costly equivalent protection option in spite of requiring Level 2 Assessments for Level 1 Triggers. The annual (reduced) monitoring frequency allowed by this option reduces monitoring and implementation costs significantly.

### **Comparison of Salient Features of RTCR Implementation Options**

Table 2 summarizes allowable monitoring frequencies under the RTCR. Tables 3 to 6 summarize how each of the options under consideration addresses four salient features:

- Minimum Monitoring Frequency
- Start-Up Procedures
- Assessment Level Type for Single Confirmed Total Coliform Positive Trigger
- Assessment Level Type for *E. Coli* MCL Exceedance or Multiple Confirmed Total Coliform Positive Triggers

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**Table 1**  
**Cost of Five Options for Implementing the RTCR Compared to the TCR**

Option	Range	Monitoring Costs	Estimated Total Cost of Triggered Level 2 Assessments	Estimated Total Cost of Site Visits to Remain on Reduced Monitoring	Estimated Start-up Procedure Costs	Estimated Boil Water Costs	Estimated Total Costs	Difference from Current	Percent Difference from Current
<b>Currently</b>	Lowest	\$1,866,159	\$9,734	N/A	N/A	\$53,250	\$1,929,143	N/A	N/A
	Median	\$1,866,159	\$19,469	N/A	N/A	\$106,500	\$1,992,128	N/A	N/A
	Highest	\$1,866,159	\$38,938	N/A	N/A	\$177,500	\$2,082,597	N/A	N/A
<b>Monthly All Systems</b>	Lowest	\$4,848,336	\$82,461	N/A	\$125,150	\$19,389	\$5,075,336	\$3,146,193	263%
	Median	\$4,848,336	\$164,922	N/A	\$500,600	\$38,779	\$5,552,637	\$3,560,509	279%
	Highest	\$4,848,336	\$329,844	N/A	\$1,251,500	\$64,631	\$6,494,312	\$4,411,715	312%
<b>RTCR As Written - - Reduced Monitoring When Possible</b>	Lowest	\$1,612,818	\$8,801	\$799,974	\$125,150	\$1,966	\$2,548,709	\$619,566	132%
	Median	\$1,612,818	\$17,603	\$1,599,947	\$500,600	\$3,933	\$3,734,900	\$1,742,773	187%
	Highest	\$1,612,818	\$35,205	\$3,199,894	\$1,251,500	\$6,554	\$6,105,972	\$4,023,375	293%
W1	Lowest	\$2,619,972	\$148,217	N/A	\$125,150	\$6,605	\$2,899,943	\$970,800	150%
	Median	\$2,619,972	\$296,433	N/A	\$500,600	\$13,210	\$3,430,215	\$1,438,087	172%
	Highest	\$2,619,972	\$1,276,759	N/A	\$1,251,500	\$22,016	\$5,170,247	\$3,087,650	248%
W2	Lowest	\$2,093,310	\$64,299	\$161,675	\$125,150	\$2,278	\$2,446,713	\$517,569	127%
	Median	\$2,093,310	\$128,599	\$161,675	\$500,600	\$4,556	\$2,888,740	\$896,612	145%
	Highest	\$2,093,310	\$553,814	\$161,675	\$1,251,500	\$7,594	\$4,067,893	\$1,985,296	195%
W3	Lowest	\$1,893,915	\$46,488	\$250,979	\$125,150	\$1,887	\$2,318,419	\$389,276	120%
	Median	\$1,893,915	\$92,976	\$250,979	\$500,600	\$3,774	\$2,742,245	\$750,117	138%
	Highest	\$1,893,915	\$400,371	\$250,979	\$1,251,500	\$6,291	\$3,803,055	\$1,720,459	183%

**\*W1:** No monitoring reduction for all systems. No annual site visits.

**\*\*W2:** Monitoring reduction only at county contract TNs. Annual site visits at county contract TNs.

**\*\*\*W3:** Monitoring reduction for all TNs.

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**Table 2**

<b>Allowable Monitoring Frequencies under the RTCR</b>					
<b>SYSTEM TYPE</b>	<b>MC</b>	<b>OTM</b>	<b>NN</b>	<b>TN</b>	<b>SEASONAL</b>
<b>ROUTINE</b>	<b>Monthly</b>	<b>Monthly</b>	<b>Quarterly</b>	<b>Quarterly</b>	<b>Monthly</b>
<b>REDUCED</b>	<b>Quarterly</b>	<b>Quarterly</b>	<b>Annually</b>	<b>Annually</b>	<b>Annually</b>
<b>INCREASED</b>	<b>Monthly</b>	<b>Monthly</b>	<b>Monthly</b>	<b>Monthly</b>	<b>Monthly</b>

**Table 3**

<b>Minimum Monitoring Frequency</b>				
	<b>MC</b>	<b>OTM</b>	<b>NN</b>	<b>TN</b>
Currently	Monthly	Quarterly	Quarterly	Annually
Monthly	Monthly	Monthly	Monthly	Monthly
RTCR	Quarterly	Quarterly	Annually	Annually
W1	Monthly	Monthly	Monthly	Annually
W2	Monthly	Monthly	Quarterly	Annually
W3	Monthly	Monthly	Quarterly	Annually

**Table 4**

<b>Start-Up Procedures</b>					
	<b>MC</b>	<b>OTM</b>	<b>NN Year-Round</b>	<b>TN Year-Round</b>	<b>TN and NN Seasonal</b>
Currently	N/A	N/A	N/A	N/A	N/A
Monthly	N/A	N/A	N/A	N/A	Yes
RTCR	N/A	N/A	N/A	N/A	Yes
W1	N/A	N/A	N/A	N/A	Yes
W2	N/A	N/A	N/A	N/A	Yes
W3	N/A	N/A	N/A	N/A	Yes

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**Table 5**

<b>Assessment Level for Single Confirmed TC+ Trigger</b>				
	MC	OTM	NN	TN
Currently	N/A	N/A	N/A	N/A
Monthly	L1	L1	L1	L1
RTCR	L1	L1	L1	L1
W1	L1	L1	L2	L2
W2	L1	L1	L2	L2
W3	L1	L1	L2	L2

**Table 6**

<b>Assessment Level for EC MCL Exceedance or</b>				
<b>Multiple Confirmed TC + Triggers</b>				
	MC	OTM	NN	TN
Currently	N/A	N/A	N/A	N/A
Monthly	L2	L2	L2	L2
RTCR	L2	L2	L2	L2
W1	L2	L2	L2	L2
W2	L2	L2	L2	L2
W3	L2	L2	L2	L2