Results of Varying the Baseline and Reduced Monitoring Provisions Assuming a Treatment Technique Approach

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This Presentation

Objectives

Provisions

System compliance

Improvement

Research

Baseline Monitoring Options

Objectives of Presentation

- Present preliminary analysis of number of systems qualifying for reduced monitoring
- Present analysis of baseline monitoring costs with several variations
  1. As written/implemented
  2. Using size categories and monitoring from Option 2
  3. Using size categories and monitoring from Option 2 with provisions for reduced monitoring based on compliance history
  4. Using size categories and monitoring from Option 3b
  5. Using size categories and monitoring from Option 3b with provisions for reduced monitoring based on compliance history

Reduced Monitoring Criteria

- Estimated percent of systems that would qualify for reduced monitoring under several variations of criteria
- Criteria considered from options discussed at Feb meeting
  - Historical incidence of TC+
  - Compliance history
  - Disinfection status
  - Sanitary survey results
  - Cross connection control program

Historical incidence of TC+

- Criteria:
  - System has no TC+ samples
- Time period:
  - past year or past two years
- Data Source:
  - 37 state dataset
- Assumptions:
  - 2005 data is representative

Compliance History

- Criteria:
  - System has no MCL or M&R violations
- Time period:
  - past two years
- Data Source:
  - SDWIS
- Assumptions:
  - 2004-2005 data is representative
  - Excluded Ohio, tribes, and territories
  - Same % systems for all size NCWS
  - Same % systems for GW <1,000 - disinfected and unknown disinfection status

Disinfection Status

- Criteria:
  - System disinfects
- Time period:
  - n/a
- Data Source:
  - GWR EA
    - CWS percent disinfecting from Third Edition of the Baseline Handbook, Table B1.3.3, except for systems serving >1 million people. The three ground water systems serving >1 million people all perform disinfection.
    - NTNCWS and TNCWS percent disinfecting derived from Ground Water Disinfection Practices in the United States
- Assumptions:
  - Several options proposed more specific criteria such as residual disinfectant concentrations, which we did not have data to evaluate

Sanitary Survey Results

- Criteria:
  - System has corrected all significant deficiencies from last sanitary survey
- Time period:
  - Within 120 days
- Data Source:
  - ASDWA feedback from states with electronic sanitary survey tracking that provides stats on deficiencies
- Assumptions:
  - Five states included are representative
  - Same % systems in each size category for GW and SW sources

Cross Connection Control Program

- Criteria:
  - System has a CCC program acceptable to the state
- Time period:
  - n/a
- Data Source:
  - State regulations (as posted online)
- Assumptions:
  - State regulations represent what is actually implemented at all systems

Combined Reduced Monitoring Criteria

- Used combinations proposed in option papers discussed at last meeting
- Assumed criteria are independent
  - % of systems that meet multiple criteria = product of % that meet all individual criteria
- For costing, determined minimum and maximum % systems that would qualify for reduced monitoring under these various scenarios
  - Example: NTNCW disinfected GW < 1,000
    - 41% to 89% of systems would qualify for reduced monitoring

Summary of Reduced Monitoring Criteria Analysis

System Category	Percentage of Systems that Might Qualify Under Criteria					
	TC+ 1 year	TC+ 2 year	No MCL or M&R	Disinf. Status	SS Result	CCC Prog.
TNCWS	80 - 90	70 - 78	71	0 - 100	86 - 100	0 - 100
NTNCWS	82 - 90	74 - 82	76	0 - 100	86 - 100	0 - 100
Undisinfected CWS < 1,000	72	60	73	0	97	64
Disinfected CWS < 1,000	83 - 90	72	73 - 80	100	97	52 - 64
CWS 1,001 – 4,100	90	NA	82 - 83	80 -100	86	58 - 60
CWS 4,001 – 33,000	90	NA	81 - 85	88 -100	100	62 - 63
CWS 33,001 – 96,000	90	NA	84 - 91	92 -100	100	72
CWS > 96,000	90	NA	88 - 90	97 -100	100	72 - 78

Variation 1 Baseline Monitoring Assumptions (Current Rule as Implemented)

- CWS < 1,000 takes 1 sample/month
  - If system has no history of coliform contamination in its current configuration and a sanitary survey within the last 5 years shows that the system is supplied by a protected groundwater source and has no sanitary defects, then the State may reduce monitoring to quarterly
- NCWS < 1,000 using SW or GWUDI takes 1 sample/month, same as CWS of same size
- NCWS < 1,000 using GW takes 1 sample/quarter
  - If sanitary survey shows system free of defects, the State may reduce the sampling frequency
- Other categories per current rule
- Other reduced monitoring allowed by States (as described in previous presentations)

Variation 2 Baseline Monitoring Assumptions

- NCWS of all sizes: 1 sample/month
- Non-disinfected CWS < 1,000: 2 samples/month
- Disinfected CWS < 1000: 1 sample/month
- All other CWS: Per current rule

Variation 3 Baseline Monitoring Assumptions

- NCWS of all sizes: 1 sample/month
- Non-disinfected CWS < 1,000: 2 samples/month
- Disinfected CWS < 1000: 1 sample/month
- All other CWS > 1,000: Per current rule

- Reduced monitoring for systems that qualify:
  - NCWS of all sizes: 1 sample/quarter
  - CWS < 1,000: 1 sample per quarter
  - CWS > 1,000: no reduced monitoring

Variation 4 Baseline Monitoring Assumptions

- NCWS, GW, with no DS, <1,000: 1 sample/month
- GW CWS < 1,000 or NCWS >1,000 with DS: 3 samples/month
- All SW, all other NCWS and CWS > 1,000: Per current rule

Variation 5 Baseline Monitoring Assumptions

- NCWS, GW, with no DS, <1,000: 1 sample/month
- GW CWS < 1,000 or NCWS >1,000 with DS: 3 samples/month
- All SW, all other NCWS and CWS > 1,000: Per current rule

- Reduced monitoring for systems that qualify:
  - NCWS, GW, with no DS, <1,000: 1 sample/quarter
  - GW CWS < 1,000 or NCWS >1,000 with DS: 2 samples/month
  - All SW, all other NCWS and CWS > 1,000: Per current rule

Cost Components for Baseline Monitoring Analysis

- Baseline monitoring (routine only)
  - Includes reduced monitoring in scenarios where applicable

- Repeat monitoring
- Follow-up monitoring (if applicable)
- Public Notification
- Investigation
- Correction

TWG was unable to complete this analysis, will be conducted by next meeting

Unit Costs used in Analysis

Size Category	Monitoring Costs per sample ($)	Contract	% in House
	In House		
≤1,000	$30.39	$86.30	0
1,001-4,100	$36.90	$88.90	0
4,101-33,000	$39.80	$90.10	0
33,001-96,000	$42.00	$91.00	50
>96,000	$44.20	$92.42	90

Note: Numbers have been taken from GWR analysis and may need to be updated

Cost Summary for TNCWS (Routine Samples)

Category / Cost ($)	Variation						
	1 (Current)	2	3		4	5	
			Min on red.	Max on reduced		Min on reduced	Max on reduced
Est. # Systems doing ≥ monthly Monitoring	29,276	85,260	78,983	10,231	85,260	78,983	10,231
# Samples per month Baseline	1/3 or 1	1	1	1	1 or 3	1 or 3	1 or 3
Est. # Systems doing < monthly Monitoring	63,999	NA	6,277	75,029	NA	6,277	75,029
# Samples per month Reduced	1/12	NA	1/3	1/3	NA	1/3 to 2	1/3 to 2
Est. Total Cost of Baseline Monitoring	$24.6M	$77.3M	$73.5M	$31.9M	$138M	$129M	$57.0M
Est. Total Cost per System	$288	$906	$862	$375	$1,614	$1,518	$669

Cost Summary for NTNCWS (Routine Samples)

Category / Cost ($)	Variation						
	1 (Current)	2	3		4	5	
			Min on red.	Max on reduced		Min on reduced	Max on reduced
Est. # Systems doing ≥ monthly Monitoring	9,154	19,045	16,544	2,285	19,045	16,722	2,285
# Samples per month Baseline	1/3 or 1	1	1	1	1 or 3	1 or 3	1 or 3
Est. # Systems doing < monthly Monitoring	9,099	NA	2,323	16,760	NA	2,323	16,760
# Samples per month Reduced	1/12	NA	1/3	1/3	NA	1/3 or 2	1/3 or 2
Est. Total Cost of Baseline Monitoring	$12.0M	$17.3M	$15.9M	$7.1M	$33M	$30M	$14M
Est. Total Cost per System	$628	$907	$834	$375	$1,737	$1,578	$741

Cost Summary for Undisinfected CWS <1,000 (Routine Samples)

Category / Cost ($)	Variation						
	1 (Current)	2	3		4	5	
			Min on red.	Max on reduced		Min on reduced	Max on reduced
Est. # Systems doing ≥ monthly Monitoring	7,262	9,518	9,518	2,189	9,518	9,518	2,189
# Samples per month Baseline	1	2	2	2	1 or 3	1 or 3	1 or 3
Est. # Systems doing < monthly Monitoring	2,256	NA	0	7,329	NA	0	7,329
# Samples per month Reduced	1/3	NA	1/3	1/3	NA	1 or 2	1 or 2
Est. Total Cost of Baseline Monitoring	$8.2M	$19.7M	$19.7M	$7.1M	$29.6M	$29.6M	$22M
Est. Total Cost per System	$863	$2,071	$2,071	$742	$3,107	$3,107	$2,309
Est. Total Cost per Household	$12.94	$31.07	$31.07	$11.13	$46.60	$46.60	$34.64

Cost Summary for Disinfected CWS <1,000
(Routine Samples)

Category / Cost ($)	Variation						
	1 (Current)	2	3		4	5	
			Min on red.	Max on reduced		Min on reduced	Max on reduced
Est. # Systems doing ≥ monthly Monitoring	20,829	25,774	15,913	25,774	25,774	15,913	3,351
# Samples per month Baseline	1	1	1	1	1 or 3	1 or 3	1 or 3
Est. # Systems doing < monthly Monitoring	4,945	NA	9,861	NA	NA	9,861	22,423
# Samples per month Reduced	1/3	NA	1/3	1/3	NA	1 or 2	1 or 2
Est. Total Cost of Baseline Monitoring	$23.1M	$26.7M	$19.9M	$11.2M	$70M	$61.7M	$51M
Est. Total Cost per System	$895	$1,036	$771	$435	$2,724	$2,395	$1,989
Est. Total Cost per Household	$7.91	$9.15	$6.81	$3.84	$24.06	$21.15	$17.57

Cost Summary for CWS 1,001- 4,100
(Routine Samples)

Category / Cost ($)	Variation						
	1 (Current)	2	3		4	5	
			Min on red.	Max on reduced		Min on reduced	Max on reduced
Est. # Systems doing ≥ monthly Monitoring	9,405	9,405	9,405	9,405	9,405	6,620	1,599
# Samples per month Baseline	2	2	2	2	2	2	2
Est. # Systems doing < monthly Monitoring	NA	NA	NA	NA	NA	2,785	7,806
# Samples per month Reduced	NA	NA	NA	NA	NA	1	1
Est. Total Cost of Baseline Monitoring	$24.4M	$24.4M	$24.4M	$24.4M	$24.4M	$24.4M	$24.4M
Est. Total Cost per System	$2,592	$2,593	$2,593	$2,593	$2,593	$2,593	$2,593
Est. Total Cost per Household	$3.16	$3.16	$3.16	$3.16	$3.16	$3.16	$3.16

Cost Summary for CWS 4,100 – 33,000
(Routine Samples)

Category / Cost ($)	Variation						
	1 (Current)	2	3		4	5	
			Min on red.	Max on reduced		Min on reduced	Max on reduced
Est. # Systems doing ≥ monthly Monitoring	6,216	6,216	6,216	6,216	6,216	3,945	1,055
# Samples per month Baseline	12	12	12	12	12	12	12
Est. # Systems doing < monthly Monitoring	NA	NA	NA	NA	NA	2,271	5,161
# Samples per month Reduced	NA	NA	NA	NA	NA	1	1
Est. Total Cost of Baseline Monitoring	$79.4M	$79.4M	$79.4M	$79.4M	$79.4M	$79.4M	$79.4M
Est. Total Cost per System	$12,780	$12,780	$12,780	$12,780	$12,780	$12,780	$12,780
Est. Total Cost per Household	$2.92	$2.92	$2.92	$2.92	$2.92	$2.92	$2.92

Cost Summary for CWS 33,001 – 96,000

(Routine Samples)

Category / Cost ($)	Variation						
	1 (Current)	2	3		4	5	
			Min on red.	Max on reduced		Min on reduced	Max on reduced
Est. # Systems doing ≥ monthly Monitoring	1,018	1,018	1,018	1,018	1,018	660	113
# Samples per month Baseline	57	57	57	57	57	57	57
Est. # Systems doing < monthly Monitoring	NA	NA	NA	NA	NA	358	905
# Samples per month Reduced	NA	NA	NA	NA	NA	1	1
Est. Total Cost of Baseline Monitoring	$46.5M	$46.5M	$46.5M	$46.5M	$46.5M	$46.5M	$46.5M
Est. Total Cost per System	$45,630	$45,630	$45,630	$45,630	$45,630	$45,630	$45,630
Est. Total Cost per Household	$2.22	$2.22	$2.22	$2.22	$2.22	$2.22	$2.22

Cost Summary for CWS > 96,000 (Routine Samples)

Category / Cost ($)	Variation						
	1 (Current)	2	3		4	5	
			Min on red.	Max on reduced		Min on reduced	Max on reduced
Est. # Systems doing ≥ monthly Monitoring	408	408	408	408	408	346	42
# Samples per month Baseline	144	144	144	144	144	144	144
Est. # Systems doing < monthly Monitoring	NA	NA	NA	NA	NA	62	366
# Samples per month Reduced	NA	NA	NA	NA	NA	1	1
Est. Total Cost of Baseline Monitoring	$34.7M	$34.7M	$34.7M	$34.7M	$34.7M	$34.7M	$34.7M
Est. Total Cost per System	$84,963	$84,963	$84,963	$84,963	$84,963	$84,963	$84,963
Est. Total Cost per Household	$0.70	$0.70	$0.70	$0.70	$0.70	$0.70	$0.70