Department of the Environment

The Revised Total Coliform Rule (RTCR)

A New Rule for All Public Drinking Water Systems

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Water Supply Program

MDE

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Topics

- Regulations and the Labs
- RTCR Monitoring
- RTCR Compliance
- The Ground Water Rule
- Data Submission to MDE - WSP

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Regulations and the Labs

- Definitions and Demographics
- Overall Monitoring Requirements

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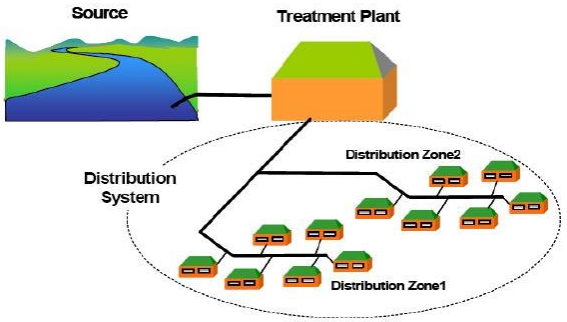
Definitions



- Private vs. Public (PWS)*

  25 people present, at least 60 d
- Community (CWS)

  15 residential connx or 25 residents “year-round”
- Noncommunity

  Nontransient (NTNC) vs. Transient (TNC)
  - NTNC - 25 same people, 4 hour/day 4 days/week, 6 months or more
  - TNC - 25 present for at least 60 days (not necessarily same people) [**minimum PWS*]

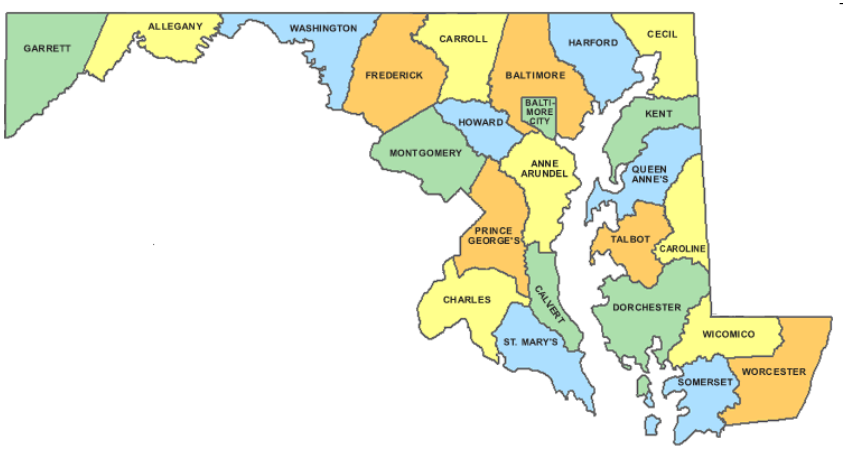
Maryland PWS Demographics

Total of MD PWS = 3346

- CWS = 474
- NCWS = 2872
  - NTNC = 538
  - TNC = 2334

    Delegated = 1716

    Non-delegated = 618



Overall Monitoring Requirements

Transient Noncommunity

- Only bacteriological, NO_2/NO_3, Cl_2 Residual
- Turbidity for SW or GWUDI Systems

Nontransient Noncommunity

- Everything but fluoride
- No DBP for systems not disinfecting (CWS)

Overall Monitoring Requirements [cont'd]

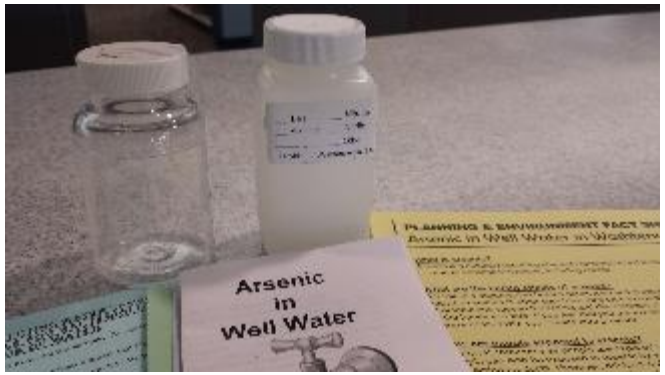
Frequencies for TNC

- Bacteriological - Q, A, or (M) with Cl_2 residual
- NO_2 - once
- NO_3 – A or Q (specified quarter option)
- Turbidity – daily or more frequently

Overall Monitoring Requirements [cont'd]

Frequencies for CWS & NTNC

- Bacteriological – Q or M with Cl_2 Residual
- Metals – full panel 3 → 9 years
- SOC & VOC – by state 3 to 9 years (SW >)
- DBP & Pb/Cu – schedules based on testing
- As, NO_3, & Gross - α – most likely increased



RTCR Monitoring

- Background
- Laboratory Testing
- Monitoring Requirements
- Bacteriological Sample Siting Plan
- Confirmation

Coliform Bacteria

- Total Coliform (TC)
  - Common microbes
  - Not threat itself
  - Potential pathogens
  - Disinfection residual
- *E. coli (Escherichia coli)*
  - Species of TC
  - Pathogenic strains
  - Fecal waste
  - Mammals & birds

Sources of Microbial Contamination

- Source water
  - Soil runoff (agricultural)
  - Sewer and septic

- Treatment & storage
  - Open/faulty storage
  - Damage (accidental/vandalism)

- Distribution system issues

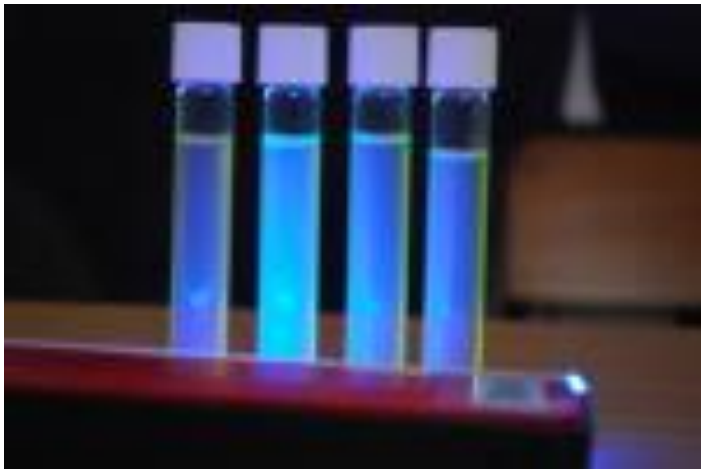
Revised Total Coliform Rule (RTCR)

- TCR Promulgated 1989
- RTCR effective April 1, 2016
- Changes [40 CFR 141(§) – Subpart Y]
  - Fecal → *E. coli*
  - TC Violation → Assessments
  - Fewer Samples
  - "Potential pathways of contamination…"

Laboratory Testing

Procedures

- Volume of 100 mL
- Incubation max. 30 hrs
- Absence/Presence
- TC & EC
- Enzyme-based



Laboratory Testing [cont'd]

Colilert Method Issues

- Listing the inferences (ATCC) in SOP invalidates
- No protocol for (positives) sample disposal
- Missing start and finish incubation date/time

Laboratory Testing [cont'd]

General Problems

- Temperature records
  - o Outside required range
  - o Missing notations
  - o Corrective actions not documented
- Procs./prots. missing in QA manual or SOPs
- Annual reviews of QA manuals and SOPs
- Potential cross-contamination during storage

Monitoring Requirements

General Requirements

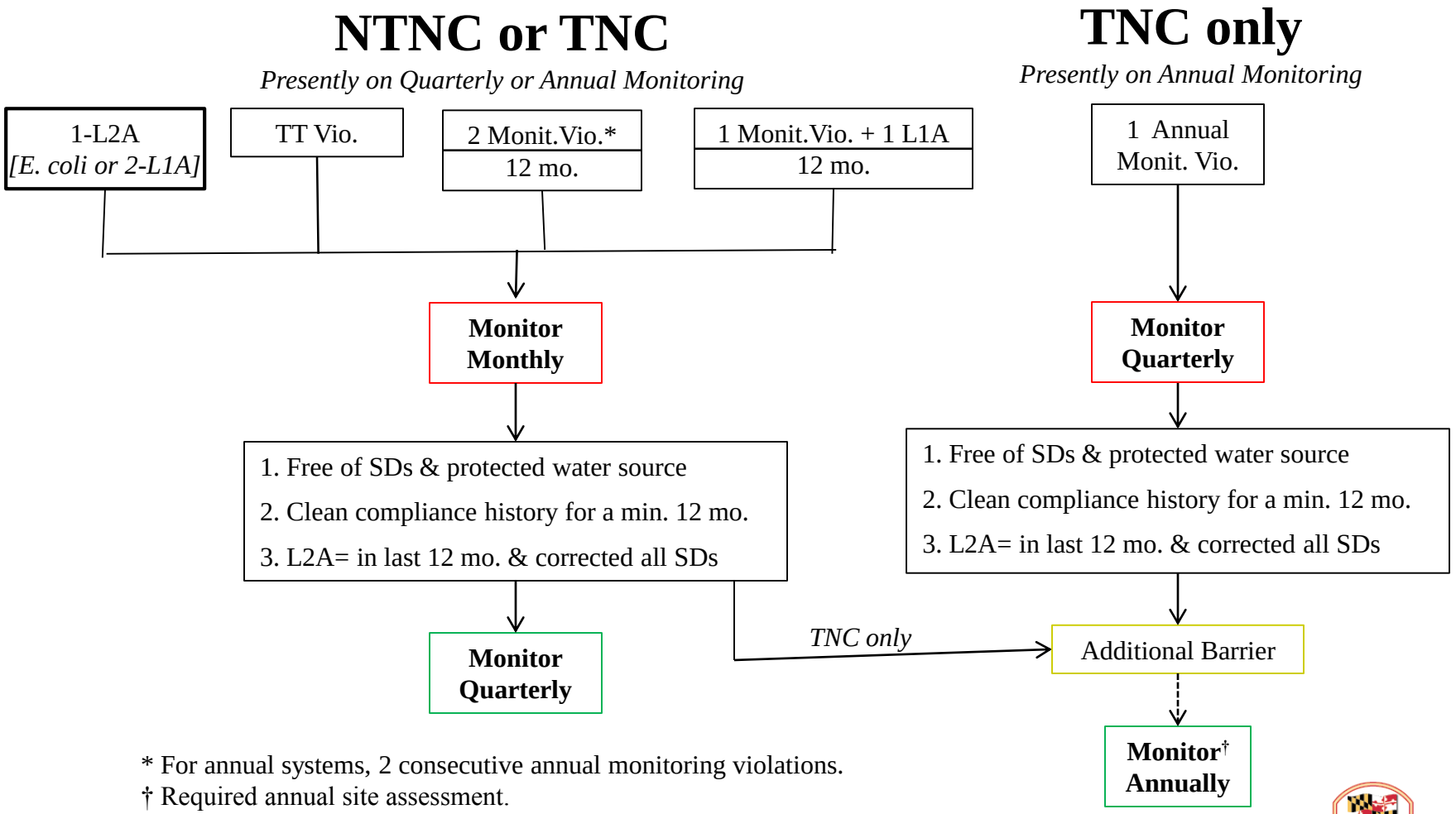
- Routines by population
- 3 repeats per routine
- Collect minimum
- 3 next-month routines?
- Integrated with GWR
- Routine Frequency
  - Community: monthly (rarely Q)
  - Noncommunity: quarterly (TNC to A)

Monitoring Requirements

- Seasonal Systems
  Site-specific BSSP
  Monitoring timing -
  highest demand
  or vulnerability

- Start-up procedure
  - Sample prior to serving public
  - Sample during peak visitors
  - Exempt if pressurized year-round

Monitoring Frequency Requirements



* For annual systems, 2 consecutive annual monitoring violations.
† Required annual site assessment.
SD=Sanitary Defects; L1A=Level 1 Assessment; L2A=Level 2 Assessment

Make-up Samples

- Quarterly only
- Extra routine(s) Q after sample missed
- Collect additional sample ASAP in current monitoring period
- A 2nd sample, a following week, for current monitoring period routine
- System remains on Q, but system still receives a monitoring violation

Bacteriological Sample Siting Plan (BSSP)

- Representative of distribution
- Alternative sample locations
- A & Q: 3 next-month routines
- M: 0 additional next-month routines

E. coli Confirmation

E. coli present, notify State by the EoB *same day notified*

- If TC+, must analyze for *EC*
- Forgo, assume EC+

E. coli [Acute] MCL (*Maximum Contaminant Level)*

- Failure to collect all repeats after a EC+
- EC+ ←TC+; TC+ ← EC+
- Failure to test for *E. coli*

Questions so far…?

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RTCR Compliance

- Treatment Technique Trigger
- Assessments
- Sanitary Defects
- Violations

Treatment Technique Trigger (TTT)

- Level 1 TTT (TC – MCL)
  - 2 or > TC+ same mo., or >5%, if 40 +/month
  - Failure, ALL SMR, TC+
- Level 2 TTT
  - *E. coli* MCL violation
  - 2nd L1 TTT, rolling 12-mo. (unless id'd & corrected 1st Level 1 cause)

Assessment Requirements

- "Systems ensures…"

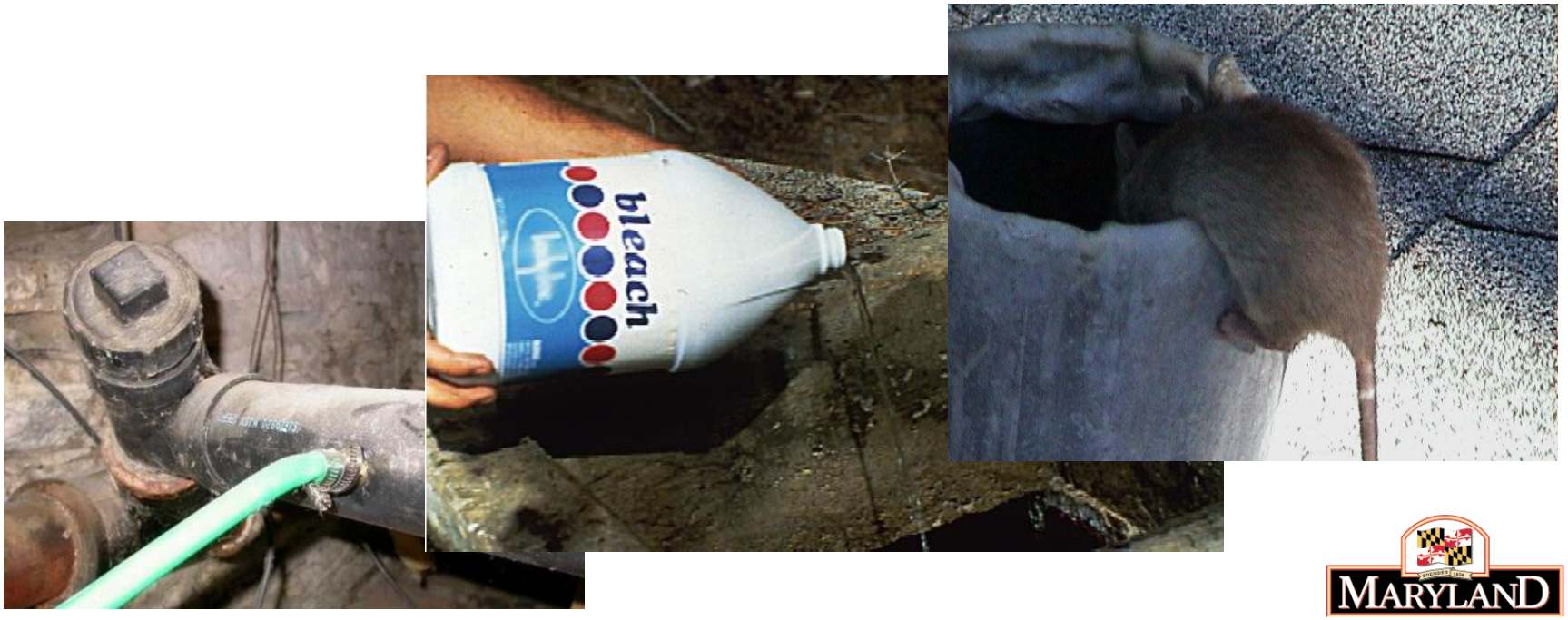
- Level 1 – "self"
  - System completes check list
  - Report 30 days (+) *corrective action*
  - No SD reported?

- Level 2 Assessment - State

  Same as above, but covering more detail

Sanitary Defects (SD)

"A defect that could provide a pathway of entry for microbial contamination into the distribution system, or that is indicative of a failure or imminent failure in a barrier that is already in place"



Invalidations

- Specifics in RTCR
- *E. coli* & TTT
- O/S bibs!$!$!
- Documentation: approved & signed
  - Site visit by end next month
  - Determine why the sample was TC+
  - Corrective action by end next month

Violations

Acute [Tier 1 PN]

- Notify State by EoB
- PN within 24 hrs
- State requirements
- “Boil Water” notice or alternative water supply
- Small systems, deliver or post

Violations [cont'd]

Treatment Technique Violation [Tier 2]

- Failure to conduct assessment or start-up
- Notify State by end of next business day
- Public Notice
  No later than 30 days
- Small systems deliver to each residence (posted)

Violations [cont'd]

- Monitoring [Tier 3]
  - Insufficient routines
  - Insufficient repeats
  - Failure to analyze for *E. coli*
- Reporting [Tier 3]
  - Late monitoring report
  - Late/absent assessment
  - Failure to report EC+ by EoB

Consumer Confidence Report (CCR)

In Summary: What's new in the RTCR?

- *E. coli only* – no fecal method or violation
- Requirements for invalidations
- Alternative repeat monitoring
- 3 SMR per Sample >> TTT
- Level 1 & 2 Assessments
- Violations: No TC+; new TT & M/R separate

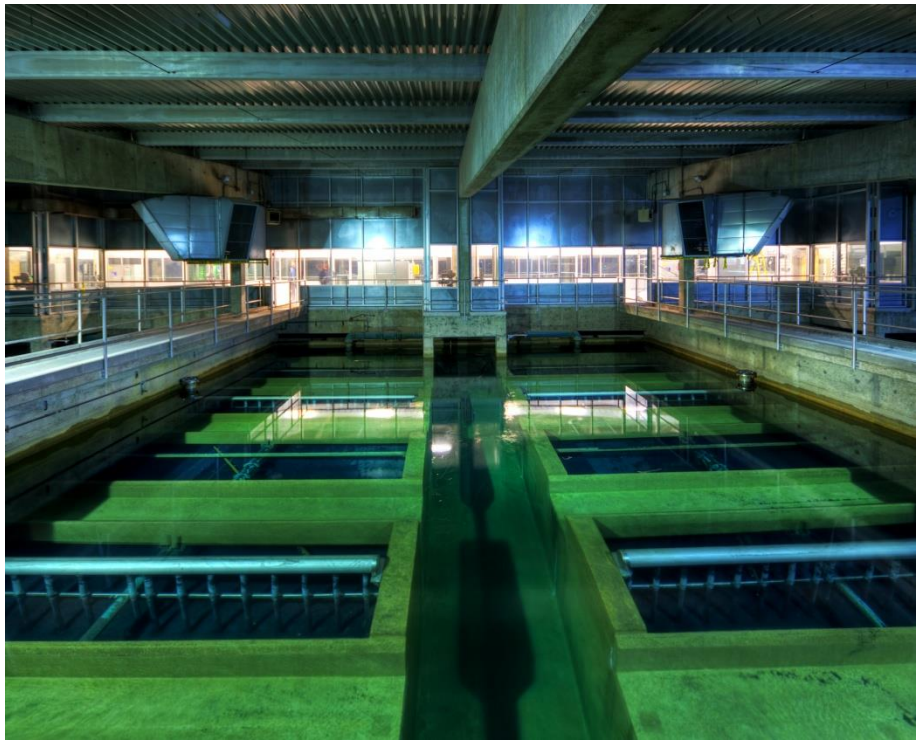
The Ground Water Rule

- 4-log Inactivation
- Triggered Source Water Monitoring
- Continued Source Water Monitoring

Ground Water Rule (GWR)

4-log Disinfection

- Virus Inactivation
- 99.99%
- Contact Time (CT)
- GWUDI & Surface Water Systems



Ground Water Rule (GWR) [cont'd]

Triggered Source Water Monitoring TSWM)

- Before <u>all</u> treatment
- Back-flow prevention
- By-pass technique
- Test each well, *E. coli*
- Invalid: Cl_2 residual <u>or</u> no Cl_2 testing

- NO treatment, use sample nearest source

Ground Water Rule (GWR) [cont'd]

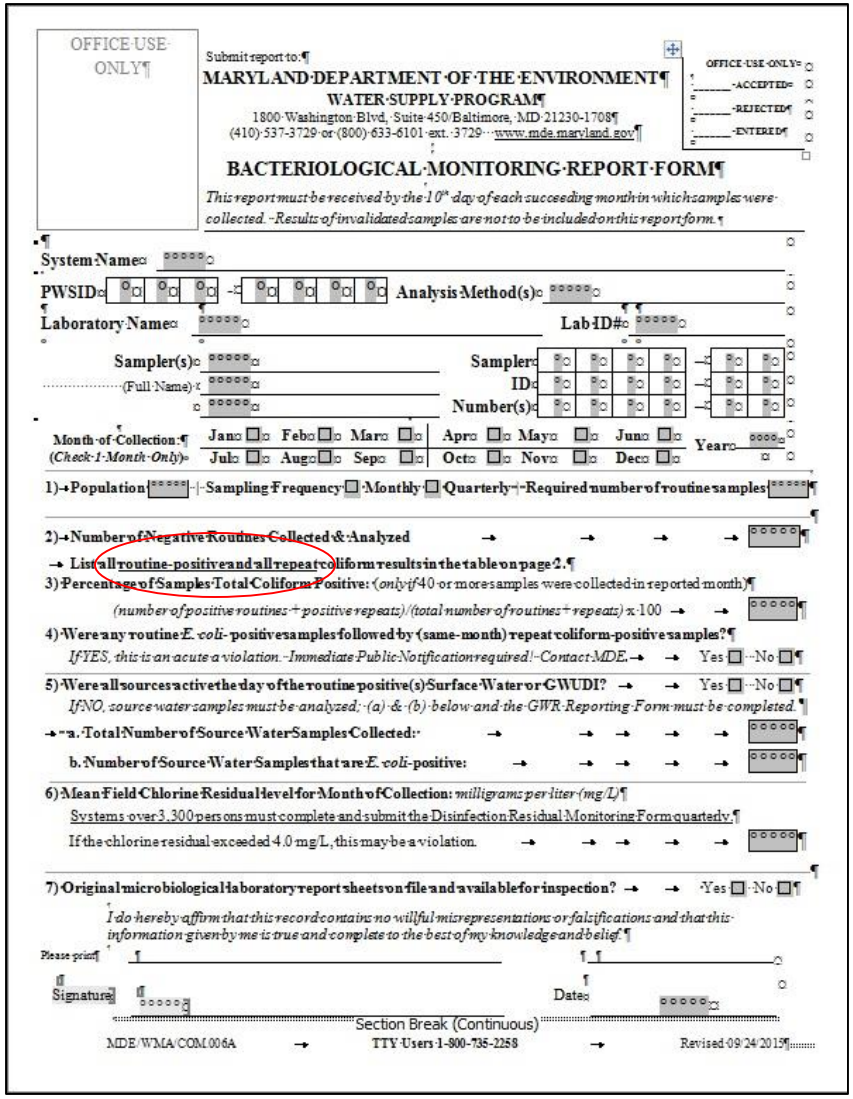
If TSWM tests for *E. coli*

- Tier 1 PN!
  Not a Violation,
  if treated water is EC-
- Repeat TSWM
  5 samples
- Repeat TSWM EC+,
  contact MDE
- Ground Water Rule Monitoring Report

Data Submission to MDE - WSP

- Bacteriological Reporting Form
- Electronic Data Submission

Completing the Bacteriological Form



OFFICE USE ONLY

Submit report to:

MARYLAND DEPARTMENT OF THE ENVIRONMENT
WATER SUPPLY PROGRAM
1800 Washington Blvd, Suite 450 Baltimore, MD 21230-1708
(410) 537-3729 or (800) 633-6101 ext. 3729 www.mde.maryland.gov

OFFICE USE ONLY
ACCEPTED
REJECTED
ENTERED

BACTERIOLOGICAL MONITORING REPORT FORM

This report must be received by the 10th day of each succeeding month in which samples were collected. Results of invalidated samples are not to be included on this report form.

System Name
PWSID
Analysis Method(s)
Laboratory Name
Lab ID#
Sampler(s) (Full Name)
Sampler ID Number(s)
Month of Collection: (Check 1 Month Only) Jan Feb Mar Apr May Jun Jul Aug Sep Oct Nov Dec
Year

1) Population | Sampling Frequency: Monthly Quarterly | Required number of routine samples

2) Number of Negative Routines Collected & Analyzed

→ List all routine-positive and all repeat coliform results in the table on page 2.

3) Percentage of Samples Total Coliform Positive: *(only if 40 or more samples were collected in reported month)*

(number of positive routines + positive repeats) / (total number of routines + repeats) x 100

4) Were any routine *E. coli*-positive samples followed by (same-month) repeat coliform-positive samples?

If YES, this is an acute a violation. Immediate Public Notification required! Contact MDE. Yes No

5) Were all sources active the day of the routine positive(s) Surface Water or GWUDI? Yes No

If NO, source water samples must be analyzed: (a) & (b) below and the GWR Reporting Form must be completed.

a. Total Number of Source Water Samples Collected:

b. Number of Source Water Samples that are *E. coli*-positive:

6) Mean Field Chlorine Residual Level for Month of Collection: *milligrams per liter (mg/L)*

Systems over 3,300 persons must complete and submit the Disinfection Residual Monitoring Form quarterly.

If the chlorine residual exceeded 4.0 mg/L, this may be a violation.

7) Original microbiological laboratory report sheets on file and available for inspection? Yes No

I do hereby affirm that this record contains no willful misrepresentations or falsifications and that this information given by me is true and complete to the best of my knowledge and belief.

Please print

Signature

Date

Section Break (Continuous)

MDE/WMA/COM.006A TTY Users 1-800-735-2258 Revised 09/24/2015

Completing the Bacteriological Form [cont'd]

Page 2 PWSID -

Positive Bacteriological Samples Results

This table should be completed, with original positive and all repeats, when there are positive bacteriological samples for the monitoring period.

Collection Date/Time	Lab Sample#	Field Cl_2 Residual (mg/L)	Sample[1] Type	Repeat[2] Location	TC[3] (A)bsent or (P)resent	EC[3] (A)bsent or (P)resent	Count	Laboratory[4] Rejection (code)	Analysis Date/Time	Sample Point Location/Remarks

[1]**Sample Type**: RT = Routine; RP= Repeat; TG = Triggered for Ground Water Rule
[2]**Repeat Location:** OR = original sample location; UP = upstream within 5 connections of OR; DN = downstream within 5 connections of OR; OT = other
[3]**TC** (total coliform)/**FC** (fecal coliform)/**EC** (E.coli): The (A)bsence [negative (-)] and (P)resence [positive (+)] indicators; used to indicate the existence of coliform in the sample.
Count: (optional) This field is only available if total coliform is found to be present.
[4]**Rejection:** For a TCR result that may be invalidated. TBD by the State or laboratory.
Rejection codes: TNTC – Too numerous to count CNFG – Confluent Growth TCNG – Turbid culture, no gas

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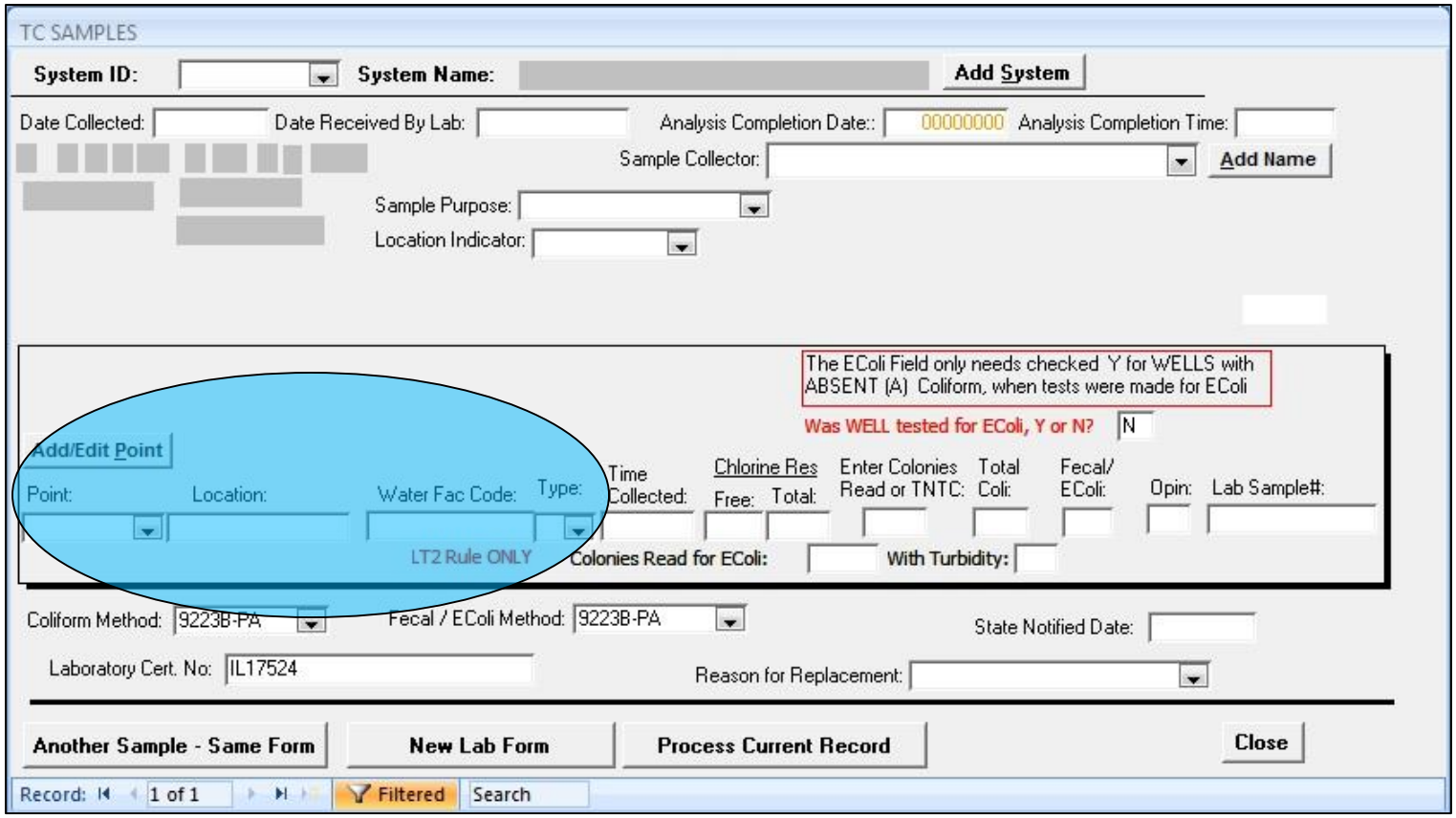
Electronic Data Submission

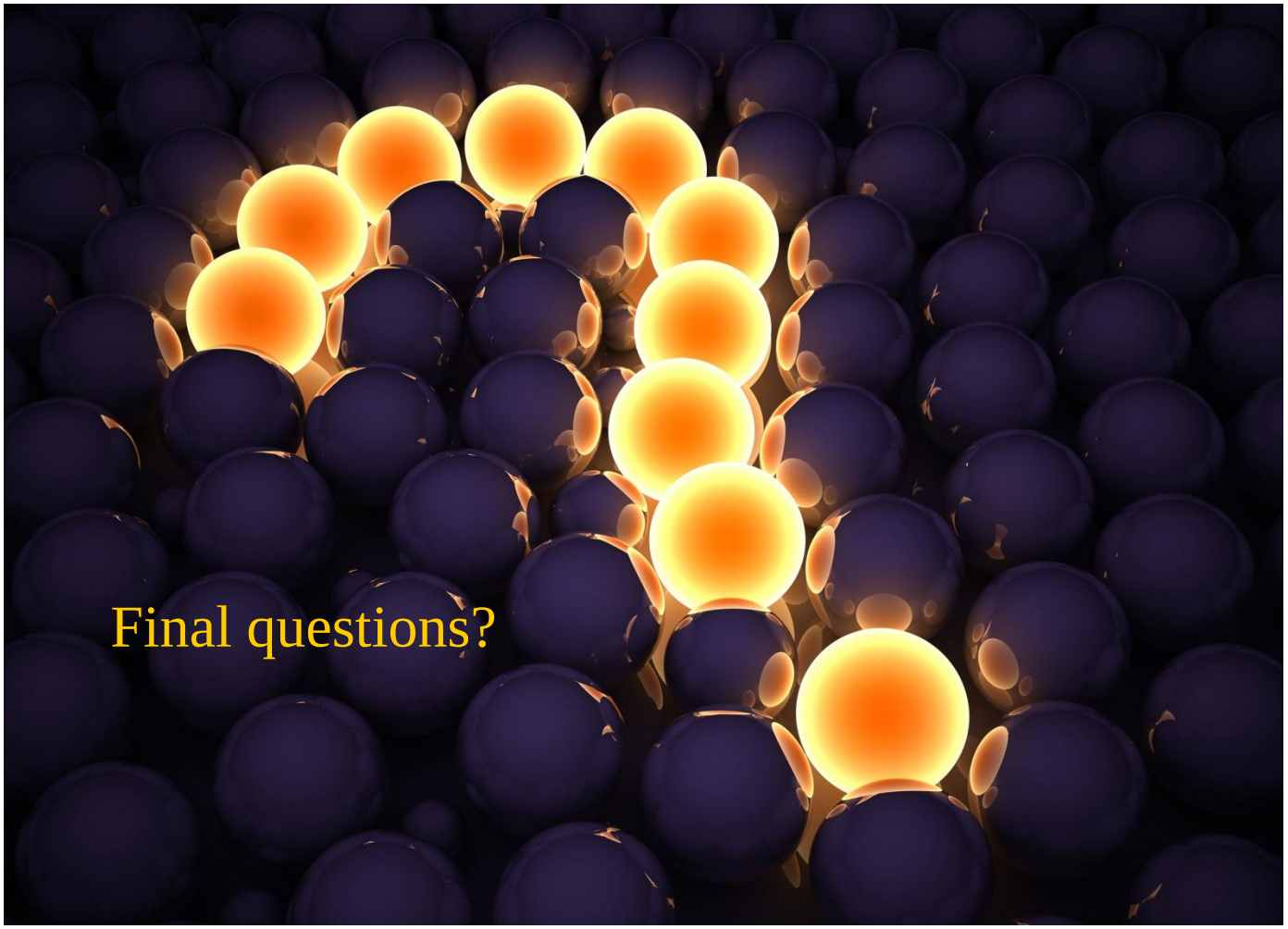
- SDWIS – state
- EEMS – “kaput”
- Files Submission
  - XML
  - CVS
- System
  - LIMS, etc.
  - Microsoft Access
  - Microsoft Excel
- Pricing?

Microsoft Access Data Entry



Required Reporting Fields

- Collection date and time (24 hour)
- Laboratory number (unique for year)
- Field chlorine residual (mg/L)
- Sample type
- Repeat location
- (Results) absent or present
- *Count*
- Laboratory rejection code
- Analysis start date and time
- *Analysis completion date and time*
- Sample location/remarks


Final questions?

Contact Water Supply Program

EMERGENCY after hours
866 MDE GO TO
1-886-633-4686

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Ground Water Appropriations 410-537-3714/3590

www.mde.maryland.gov

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