Total Coliform Rule
Microbial Contamination Protection
Margie Evans
Bureau of Safe Drinking Water
Effective April 1, 2016

- **Change**
  - Coliform Detection Response
  - Repeat Monitoring Requirements
  - Month-after requirements
  - Quarterly Systems
- **New**
  - Sample Plan Review
  - Treatment Techniques and Triggers
  - Seasonal Start-Up Certification
Violations – 5 Types

- **MCL Exceedance – Tier 1**
  - *E. coli*
  - **No MCL for Total Coliform**

- **Treatment Technique – Tier 2**
  - seasonal start-up checklist
  - Assessment and corrections

- **Failure to Monitor – Tier 3**
  - Not taking Routine Samples
  - Not taking Repeat Samples
  - Not analyzing for *E. coli*
But Wait – There’s More Tier 3

- Failure to Report
  - E. coli
  - TC+
  - Treatment Technique Trigger

- Failure to Plan
  - No TCR Plan
  - No Seasonal Start-up SOP
  - Sample Plan Review
  - Maintain required records
Public Notice Requirements - Review

• Tier 1 Public Notice
  • Required within 24 hours
  • 2 methods of delivery
  • MCL Exceedance -- *E. coli*

• Tier 2 Public Notice
  • Required within 30 days
  • 2 methods of delivery
  • Not certifying seasonal start-up checklist
  • No completing Assessment and Corrections timely
Public Notice Requirements Review

• Tier 3 Public Notice
  • Completed within 1 year
  • 2 methods of delivery
  • Monitoring violations
  • Reporting and Recordkeeping violations
Quarterly Monitoring

• Non-Community
• Groundwater Only
• Serving 1,000 or less
RTCR Monitoring

- Systems Sample Quarterly
- If
  - Two Level 1 or 1 Level 2 assessment within 12 months
  - Exceed E. coli MCL
  - Coliform treatment technique violation
Return to Quarterly Monitoring

• 12 months of clean compliance history

• Within 12 months had:
  • 1. Sanitary Survey
    or
  • 2. Site Visit
    or
  • 3. Voluntary Level 2 Assessment

• Free of sanitary defects
Bottom Line

On Monthly Monitoring for at least a year
Sampling Plans
Compliance Monitoring

• With Approved Plan
  • You submit samples
    • Use sites specified and label accordingly
  • We accept samples
    • Verify sampling locations

• Compliance Confirmed

• Without Approved Plan
  • You submit samples
    • Taken at correct times
    • Sites, samples labeled
  • We receive samples
    • No approved plan on file
    • Samples cannot be accepted

• Violation Confirmed
**Monthly Plan Template**

- **Routine Sites**
- **Repeat Sites**
  - Origin
  - Upstream
  - Downstream
- OR
- **Origin**
- **Two other locations**
  that represent distribution system

<table>
<thead>
<tr>
<th>II. Monitoring Locations</th>
<th>Attach additional copies of this sheet if more room is needed.</th>
</tr>
</thead>
<tbody>
<tr>
<td>Routine Sites</td>
<td>Repeat Sites</td>
</tr>
<tr>
<td>Routine 1</td>
<td>Repeat 1 A</td>
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<tr>
<td></td>
<td>Repeat 1 B</td>
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<td></td>
<td>Repeat 1 C</td>
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<tr>
<td>Routine 2</td>
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<td>Repeat 2 B</td>
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<td>Repeat 2 C</td>
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<td></td>
<td>Repeat 3 B</td>
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<tr>
<td></td>
<td>Repeat 3 C</td>
</tr>
</tbody>
</table>
**Additional Sampling Requirements**

- **Systems sampling quarterly**
  - Sample same 3 repeat sites the month following a positive

- **Systems sampling monthly**
  - No additional sampling requirement for month following

- **No 5-sample set required the following month**
Current Plan Approved

<table>
<thead>
<tr>
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</thead>
<tbody>
<tr>
<td>Routine Sites#</td>
<td>Repeat Sites#</td>
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<tr>
<td>Routine 1</td>
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<tr>
<td>Repeat 1A</td>
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<td>Repeat 1C</td>
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<td>Repeat 1D</td>
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<td>Repeat 1E</td>
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<td>Repeat 1F</td>
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<tr>
<td>Routine 2</td>
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<td>Repeat 2F</td>
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<td>Routine 3</td>
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<td>Repeat 4C</td>
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<tr>
<td>Repeat 4D</td>
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</tbody>
</table>

<table>
<thead>
<tr>
<th>III. Ground Water Samples Required</th>
</tr>
</thead>
<tbody>
<tr>
<td>Sources Required</td>
</tr>
<tr>
<td>Source 1</td>
</tr>
<tr>
<td>Source 2</td>
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<tr>
<td>Source 3</td>
</tr>
</tbody>
</table>

In the month following a coliform positive sample, system is required to take 3 samples from distribution, including the location of the initial positive sample. Those sample locations are outlined below.

<table>
<thead>
<tr>
<th>IV. Following Month Monitoring</th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>Temporary Routine Sites</td>
<td></td>
</tr>
<tr>
<td>Temp 1A</td>
<td></td>
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<tr>
<td>Temp 1B</td>
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<tr>
<td>Temp 2A</td>
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<td>Temp 2B</td>
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<tr>
<td>Temp 3A</td>
<td></td>
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<td>Temp 3B</td>
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<tr>
<td>Temp 4A</td>
<td></td>
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<tr>
<td>Temp 4B</td>
<td></td>
</tr>
</tbody>
</table>
Sanitary Survey Plan Review

- Resources
- System Classification
  - Changes in population or type
    - TNC
    - Community
    - NTNC
- Number of Samples
  - Frequency for non-community systems
    - Based on monthly population
  - Quantity
    - Based on average daily population
Treatment Techniques
Under RTCR
Relativity

Total Coliform (TC)
Total Coliform = non-acute contaminant

E. coli

E. Coli (EC) O157:H7
(acute contaminant)

Fecal Coliform
Fecal Coliform = E. coli = Fecal Contamination (acute contaminant)

E. coli
Terminology for Small Systems

- A Confirmed Coliform
  - TC+ and at least 1 TC+ repeat
- Triggers a Level 1 Assessment (Treatment Technique)
- An *E. coli* confirmed
  - TC+ and an EC+ repeat
  - EC+ and at least TC+ repeat
  - EC+ and failure to take repeats
- Triggers a Level 2 Assessment (Treatment Technique)
- Triggers a Tier 1 Public Notice (Boil Water Order)
Triggered

- Facility Manager and Rule Manager
  - Concerns and Considerations
  - Conference Call Consult
- Pre-Assessment Requirements
  - Disinfection?
  - Investigative samples?
  - Flushing?
  - Other Procedures???
Assessments

• Level 1 Assessment
  • Done by system
  • Following confirmed coliform
  • Phone assistance available
  • NvRWA assistance possible
## BUREAU OF SAFE DRINKING WATER

**Level 1 Assessment**

<table>
<thead>
<tr>
<th>PWS ID</th>
<th>PWS Name</th>
<th>City/Town</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

### Compliance Period (mm/yy):

### INSTRUCTIONS:

**Section A**: Review and evaluate the listed elements typically found in a PWS. Check (✓) yes or no on all elements reviewed. Check (X) “NA” if the section is not applicable to the PWS.

**Section B**: Description of Occurrence: Provide an explanation on any issues identified. Elaborate as needed.

**Section C**: Corrective Action: Provide corrective action(s) and completion dates for all sanitary defects identified.

Submit this form within 30 days of triggering a Level 1 Assessment Treatment Technique.

### Section A

#### 1. GENERAL [CHECK YES OR NO ON EACH ITEM]

- Have any of the following occurred at sample sites prior to collecting bacteria samples?
  - Yes/No
  - Low/inadequate disinfectant residual
  - Low/disinfectant residual
  - Operation/maintenance activities
  - Overloading/overloading hydrant
  - Over/overloading hydrant
  - Signs of vandalism/forced entry

#### 2. OPERATIONAL CHANGES [CHECK YES OR NO ON EACH ITEM]

- Potential source of contamination
  - Yes/No
  - New source added
  - Other:

#### 3. SAMPLING SITES [CHECK YES OR NO ON EACH ITEM]

- Unleaded or unsuitable sample tap
  - Yes/No
  - Change in conditions at sample site
  - Other:

#### 4. SAMPLING PROTOCOL [CHECK YES OR NO ON EACH ITEM]

- Improper sample container
  - Yes/No
  - Improper sample container
  - Improper hold time/storage temperature
  - Improper hold time/storage temperature
  - Other:

#### 5. TREATMENT PROCESS [CHECK YES OR NO ON EACH ITEM]

- Change in flow rates
  - Yes/No
  - Recent installation/repair
  - O & M procedures not followed
  - O & M procedures not followed
  - Other:

#### 6. DISTRIBUTION SYSTEM [CHECK YES OR NO ON EACH ITEM]

- Power loss
  - Yes/No
  - Operation of isolation valves resulting in breakage
  - Operation of isolation valves resulting in breakage
  - Other:

#### 7. STORAGE TANKS [CHECK YES OR NO ON EACH ITEM]

- Improper maintenance practices
  - Yes/No
  - Low/disinfectant residual
  - Other:

**NA** (not applicable) should be checked if PWS does not have that component (i.e., no springs).
### Section B - Description of Occurrence

Use this space to provide additional information that supports your findings (i.e., water quality and pressure monitoring data). Include corresponding dates with your findings.

- [ ] Check if PWS did not find any causes for the contamination.

### Section C - Corrective Action

Use this space to describe corrective action taken or proposed corrective action with corresponding dates.

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**Return this form to the Bureau of Safe Drinking Water Program within 30 days of notification of a Level 1 Assessment Trigger.**

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**AGENCY USE ONLY:** Date received: [ ]

Agency Reviewer: [ ]
Assessment Methodology

1. Sample Site
   a. Changes in use
   b. Clean
   c. New sampling personnel

2. Distribution and Storage
   a. System tight
   b. Tank turnover
   c. Biofilms

3. Treatment Process
   a. Flow rate changes
   b. Calibration needed
   c. New product used

4. Sources

5. Operations
Timeline

- Completed and returned to Agency within 30 days of trigger
  - Include Defects found, corrective actions planned/completed
  - If no defect found, ask questions

- Sanitary Defects corrected within 30 days of trigger
  - Corrective Action Plan in place if repairs can’t be corrected in timeframe

- Failure to follow these steps and complete timely is a violation requiring public notice.
Level 2 Assessment

- **Triggered by:**
  - 2 or more coliform events within 12 month period
  - A confirmed E. coli (acute condition)
- **Searching for Sanitary Defects**
  - Atypical events
  - Recent repairs, losses of pressure
  - Sample Site issues
  - Treatment
  - Distribution
  - SOPs, O&M
Search for Sanitary Defects

- Much Greater Detail
  - Consideration
  - Investigation
  - Hydraulic flow
  - Changes to pressure regime across zones?
- Water quality parameters changing?
  - pH, Nitrate, turbidity?

- Question Everything
  - Disinfectant residual maintenance
  - Pressure Management
  - Main breaks/repairs
  - Water age and flushing
  - Storage facilities
  - Cross-connections

- Verification Samples
### Example

<table>
<thead>
<tr>
<th>Item #</th>
<th>Defect and Corrective Action Required</th>
<th>Date Due</th>
<th>Date Corrected</th>
<th>Corrective Action Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>1a, 3i</td>
<td>Pressure gauge on well discharge not functioning. Repair/replace pressure gauge in order to ensure consistent pressure across the system. Pressure must not be less than 20 psi or greater than 100 psi.</td>
<td>7/15/16</td>
<td>7/10/16</td>
<td>Pressure gauge replaced, and pressure readings are within the appropriate range. See attached photo and log of pressure readings</td>
</tr>
<tr>
<td>Item #</td>
<td>Defect and Corrective Action Required</td>
<td>Date Due</td>
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</tr>
<tr>
<td>--------</td>
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</table>

(Attach additional sheets if necessary)

I certify under penalty of law that the information contained herein is true, accurate and complete to the best of my knowledge and belief.

Name of PWS Owner/Representative: (Please Print)

PWS Owner/Representative: X

Date: ______________________

AGENCY USE ONLY: Date received: ______________________ Agency Reviewer: ______________________

State Agency Designee Lead Assessor: (Approved)

To return to compliance, the above named public water system is required to correct the sanitary defects outlined in this document. Failure to comply will result in a violation.
What if nothing is found?

- It is possible that even after conducting an assessment, the cause of the positive sample cannot be conclusively linked to a given sanitary defect due to the complexity of the distribution system configuration and transport of contaminants throughout the system. In this case, water systems must document this conclusion in their assessment form. The primacy agency may require that the system provide them with supporting documents to back up its conclusion.
Best Available Technologies (BATs)

- Actions to ensure public health protection
  - generally do not involve major construction or capital improvement
- Long-term sustainability
- Public Health Protection
Best Available Technologies

- To Name a Few
  - Source protection
    - Fencing around collection area
  - Distribution protection
    - Flushing programs
    - Disinfection (increase residual?)
    - Repair and replace schedules
  - Sampling
    - Evaluate sample sites
    - Remedial staff training on proper sampling procedures
    - Collecting additional investigative samples (non-compliance)
Wrapping it Up

- Completed by Agency Designee
  - Qualified NDEP or County Contracted Personnel
- Additional Staff
  - Nevada Rural Water Association
  - Independent 3rd Party Professional
- Assignment criteria developed for Primacy Package
- Cost of Level 2 Assessment
  - NDEP or County Staff do not charge
  - Cost to water system
    - Additional samples
    - Independent professionals may charge
    - Contract operator time on-site
Seasonal Systems
Under RTCR
Seasonal System Definition

• Non-Community System
• Not operated as a PWS year-round

• Example: JJ’s Mini golf
  • Owners/managers live on-site
  • Open to public from May to November
  • Other months are NOT a public water system
Example

• JJ’s Mini golf
  • Owners/managers live on site year-round
  • Open to public from May to November
  • Other months December through April, closed to the public

• Camp Fleur de Lis
  • June to September 24-7 operation full service
  • October to April “casual operation”
    • Facility available to public
    • No water provided.

Seasonal Systems?
How About

• Partial shutdown
  • All but 1 campground loops closed
  • Satellite restrooms closed
  • Camping on Loop A still open. Distribution system supplying water to one restroom and some hydrants but closed loops and depressurized satellite restrooms to protect from freezing.
Seasonal Systems

Federal Regulation 141.854(i)
• Procedure for startup of operation
• Certification
• Regulatory Approval

Primacy Requires:
• Start-up SOP to address
  • Significant Deficiencies or CAP
  • Current on monitoring
  • Confirmation sample(s)
How it Works

Once

Submit SOP to Agency → Agency Review and Approve

Every Year Before Start-up

Submit Forms to Agency

Start-up Checklist

Confirmation Samples

Water System Opens → Agency Review and Approve
Seasonal Start-up Procedure

- May Use Template
- Must Address
  - Outstanding Deficiencies
  - Monitoring Compliance
  - Flushing
  - Inspection
    - Source
    - Storage
    - Treatment
    - Distribution
Seasonal Start-up Procedure

• Must Address
  • Disinfection
    • How will disinfection be accomplished if needed
  • Compliance Sampling
    • Systems maintaining pressure year-round – 1 coliform sample
    • Systems depressurizing – 2 coliform samples (minimum)
      • Taken on consecutive days
  • Annual Checklist Submission
    • Include coliform results
• May Include Season-End Shutdown
  • Recommended
Start-up Checklist

• Follow SOP
• Comments
  • Meter Readings
  • Repairs/Corrections
  • System Modifications
  • Disinfection (if needed)
• Signature certifies that approved SOP was followed
• Submit to Agency with Coliforms
Pressurized Systems

- **Must Address**
  - Significant Deficiencies
  - Current Monitoring
  - 1 clean sample prior to opening, taken at Routine location.

- **Specific to PWS**
  - Flush → Inspect → Repair → Sample → Submit
  - Obtain Agency concurrence.

- **Yearly Submit Checklist and Coliform Results**
  - Open with agency approval.
  - Sample monthly throughout the operating season.
De-Pressurized Systems

- **Must Address**
  - Significant Deficiencies
  - Current Monitoring
  - Clean samples on 2 consecutive days, taken at designated location(s).

- **Specific to PWS**
  - Flush → Disinfect → Inspect → Repair → Sample → Submit
  - Obtain Agency concurrence.

- **Yearly Submit Checklist and Coliform Results.**
  - Open with agency approval.
  - Sample monthly throughout the operating season.
Year-Round -- Limited Operations

- Loss of Pressure Regulation
  - Not Seasonal due to 12-month Operating Period
- Flush → Disinfect → Inspect → Repair → Sample
- 2 consecutive days of clean samples.
  - FM decides locations of clean samples.
- No Tracking Process
- Compliance determined by Facility Manager
Wait for Agency Approval

- Do not assume!
- May open facility if water unavailable
- Water distribution prior to receiving approval is a violation.

- Seasonal Systems All Sample Monthly
  - No exceptions.
  - Every month serving water
Compliance Recap

Are We Good?
Sample Compliance

- Two total coliform hits or 5% of total monthly samples
  - Treatment Technique
    - Assessment
    - Corrective Action
    - NTNC and CWS Report in Consumer Confidence Report

- One total coliform + one E. Coli (received in any order)
  - Acute MCL Violation
    - Boil Water Order
    - Level 2 Assessment
    - Violation on Record
    - NTNC and CWS Report in Consumer Confidence Report
Treatment Technique Compliance

• Assessment – Find and Fix Approach
  • Corrective Actions
  • Communicate
  • Submit to Regulator

• Start-up
  • Follow Procedure
  • Collect Samples
  • Checklist to Regulator
  • Await Approval
Contact

- [http://ndep.nv.gov/bsdw/index.htm](http://ndep.nv.gov/bsdw/index.htm)
- Bureau of Safe Drinking Water
  - 775-687-9521
- Margie Evans, RTCR Rule Manager
  - mevans@ndep.nv.gov
- Your Facility Manager