

***NON-TRANSIENT, NON-COMMUNITY
PUBLIC WATER SYSTEM
MONITORING PLAN
TOOLKIT***

December, 2011
*Tri-County Health Department
6162 South Willow Drive, Suite 100
Greenwood Village, CO 80111*

Sanitary Surveys Background & Preparation Checklist

Definition of a Sanitary Survey

A sanitary survey is an on-site review of a public water system by the health department for the purpose of evaluating the adequacy of the facilities to produce and distribute safe drinking water. Sanitary surveys are required by Article 11 of the Colorado Primary Drinking Water Regulations (CPDWRs).

Frequency of a Sanitary Survey

Routine sanitary surveys are required for all non-community water systems every five years. Tri-County Health Department (TCHD) as well as the Colorado Department of Public Health and Environment (CDPHE) has the authority to conduct more frequent sanitary surveys based on water quality concerns or to follow-up on concerns from previous sanitary surveys.

Goals of a Sanitary Survey

- ✓ Establish working relationships between the water system, TCHD, and CDPHE
- ✓ Facilitate continuous improvement
- ✓ Accurately capture system inventory
- ✓ Identify system strengths
- ✓ Identify and address deficiencies
- ✓ Provide assistance as necessary

The Eight Elements of a Sanitary Survey

Element	Description
1. Monitoring, Reporting, & Data Verification	Review paperwork and plans <i>(e.g. monitoring plan, sample results, maps)</i>
2. System Management & Operation	Review paperwork and plans to maintain system compliance <i>(e.g. cross connection control, emergency response plan)</i>
3. Operator Compliance	Review system operator certifications to demonstrate compliance with the CPDWRs and Regulation 100
4. Water Source(s)	Evaluate source water protection
5. Treatment Facilities	Evaluate treatment processes, facilities, and components
6. Distribution System	Evaluate the adequacy, reliability, and safety of the distribution system
7. Finished Water Storage	Evaluate the adequacy, reliability, and safety of finished water storage
8. Pumps & Pump Facilities	Review operation and maintenance of water system pumps and pumping facilities

Who should attend the sanitary survey? The health inspector is going to be asking questions about general operations, management, security, and specific technical questions. Typically the owner of the system, the system's certified operator, and the administrative contact meet with the inspector for the sanitary survey.

How long will the sanitary survey take? The sanitary survey of a non-community water system typically take a few hours, although it can require several days depending on whether follow-up is needed.

How is the sanitary survey scheduled? If your system is scheduled to be inspected by TCHD, then an inspector will contact your facility to schedule a convenient time for all parties.

Sanitary Survey Preparation Checklist-Review Prior to Inspection Date

Perform a General Facility Check

- Are all facilities accessible (e.g. keys to buildings available, gates accessible, etc.)?
- Are all facilities safe for inspection attendees (e.g. no unexposed wiring, no un-covered pits)?
- Are all facilities operational (e.g. chemical feed pump working)?
- Are all facilities clean (e.g. floor swept, chemicals/spare equipment stored properly)
- Are there any obvious problems to correct (e.g. holes in tanks, sanitary well seals not in place, vents not screened with 24 non-corrosive mesh)?

General Paperwork Reviews

- Be prepared to discuss findings & resolution of deficiencies from previous sanitary survey reports
- Be prepared to discuss responses to CDPHE correspondence e.g. violation letters, notifications
- Review operator status to ensure the operator’s certification is current and at the appropriate level

Gather Water System Records and Paperwork (for recordkeeping retention periods—see below)

- Updated General Monitoring Plan
- Monitoring Schedule for current year
Note: Monitoring Plans differ from Monitoring Schedules and are typically provided annually by CDPHE
- Bacteriological Sampling Plan including System Map
- Chemical Sampling Plan, if applicable
- Emergency Response Plan/Security Plan
- Cross Connection Records
- Operation and Maintenance Plan
Note: This can include all technical manuals for system components including the storage, treatment, and distribution system. An example of a component of the operations and maintenance manual is the flushing and leak detection program for the distribution system.
- Water quality analyses/laboratory records
- Correspondence to/from CDPHE staff including violation letters and notifications
- Other paperwork (e.g. water hauling records, consecutive system agreement)
- Treatment Facility Wastewater Discharge Permit (if applicable)

Other items to have available:

- Well Permit (*Note: Well permits can be obtained from the Colorado Division of Water Resources*)
- Water testing equipment (e.g. chlorine analyzer, sampling bottles)
- Safety equipment

Recordkeeping Retention Periods for Analyses Results and Water System Records

Bacteriological analyses	5 years
Chemical analyses	10 years
Actions to correct violations	3 years
Sanitary Survey reports and any subsequent correspondence	10 years
Monitoring plans, cross-connection control plans, Emergency response plans, etc.	Indefinitely or until superseded
Water system information (e.g., “as-built” construction drawings, water studies, well permits)	Indefinitely or until superseded
CDPHE correspondence (e.g., current monitoring schedule, facility design approval letters)	Indefinitely or until superseded
Lead & Copper records (Non-Transient Non-Community NTNC)	12 years
Disinfectant/disinfection by products records (NTNC)	Up to 10 years
Stage 2 disinfection by-product rule information	3 to 10 years
If in doubt, keep a copy	

Table of Contents

SECTION 1: PUBLIC WATER SYSTEM SUMMARY, WATER SYSTEM INVENTORY	1-1
CONTACT INFORMATION.....	1-3
POPULATION TYPES AND SEASONS	1-4
WATER SOURCES DEFINITIONS	1-5
WATER SOURCE DETAILS	1-6
WATER TREATMENT CODES AND OBJECTIVES	1-8
WATER TREATMENT DETAILS.....	1-9
DISTRIBUTION SYSTEM DEFINITIONS.....	1-12
DISTRIBUTION SYSTEM DETAILS.....	1-13
ADDITIONAL INFORMATION	1-14
SECTION 2: COMPREHENSIVE REPORT	2-1
INSERT COMPREHENSIVE REPORT HERE	2-2
SDWIS CODE DEFINITIONS	2-3
FACILITIES CODES.....	2-4
SECTION 3: WELL PERMIT	3-1
INSERT WELL PERMIT HERE.....	3-2
SECTION 4: GENERAL MONITORING PLAN.....	4-1
TABLE OF CONTENTS.....	4-3
INTRODUCTION	4-4
PUBLIC WATER SYSTEM SUMMARY	4-6
CONTACT INFORMATION.....	4-7
POPULATION TYPES AND SEASONS	4-8
WATER SOURCES DEFINITIONS	4-9
WATER SOURCE DETAILS	4-10
WATER TREATMENT CODES AND OBJECTIVES	4-11
WATER TREATMENT DETAILS.....	4-12
DISTRIBUTION SYSTEM DEFINITIONS.....	4-15
DISTRIBUTION SYSTEM DETAILS.....	4-16
ADDITIONAL INFORMATION	4-17
RECORDS LOCATIONS	4-18
SCHEMATICS AND MAPS	4-19
TOTAL COLIFORM RULE AND RESIDUAL DISINFECTANT.....	4-21
INORGANIC AND ORGANIC RULES	4-26
DISINFECTANTS AND DISINFECTION BYPRODUCTS RULE.....	4-31
LEAD AND COPPER RULE	4-38
GROUNDWATER RULE	4-41

SECTION 5: MAPS.....5-1

 INSERT SKETCH OF WATER SOURCE HERE5-2

 INSERT PROCESS SCHEMATIC OF WATER TREATMENT PLANT HERE5-3

 INSERT MAP OF DISTRIBUTION SYSTEM HERE5-4

 INSERT MAP OF SAMPLING LOCATIONS HERE5-5

 EXAMPLE SYSTEM MAP 15-6

 EXAMPLE SYSTEM MAP 2.....5-7

SECTION 6: SAMPLING PLANS.....6-1

 WEEKLY CHLORINE SAMPLING PLAN6-2

 TOTAL COLIFORM BACTERIA SAMPLING PLAN6-5

 NITRATE AND NITRITE SAMPLING PLAN6-10

 OTHER SAMPLING PLANS.....6-13

SECTION 7: GROUNDWATER RULE COMPLIANCE7-1

 GROUNDWATER RULE FAQ’S7-2

SECTION 8: EMERGENCY RESPONSE.....8-1

 COLORADO EMERGENCY TELEPHONE LIST8-2

 PLANNING FOR AN EMERGENCY.....8-3

 EMERGENCY RESPONSE PLAN8-5

 WATER/WASTEWATER AGENCY RESPONSE NETWORK.....8-6

 COLORADO CONTACT INFORMATION FOR DRINKING WATER QUESTIONS8-7

SECTION 9: CROSS CONNECTION CONTROL PLAN9-1

 COLORADO CROSS-CONNECTION CONTROL PLAN9-2

 BACKFLOW PREVENTION ASSEMBLY REFERENCE CHART9-5

SECTION 10: OPERATIONS AND MAINTENANCE REFERENCE GUIDE.....10-1

 OPERATIONS AND MAINTENANCE REFERENCE GUIDE.....10-2

SECTION 11: SOURCE WATER PROTECTION.....11-1

 PLANNING FOR SOURCE WATER PROTECTION11-2

 INSERT SOURCE WATER ASSESSMENT REPORT HERE11-3

SECTION 12: OPERATOR CERTIFICATION.....12-1

 GENERAL INFORMATION.....12-2

 INSERT COPY OF OPERATOR LICENSE(S) HERE12-6

 INSERT OPERATOR IN RESPONSIBLE CHARGE REPORT HERE12-7

 INSERT COPIES OF TRAINING COURSE CERTIFICATES HERE12-8

SECTION 13: MONITORING SCHEDULE.....13-1

 INSERT MONITORING SCHEDULE HERE13-2

SECTION 14: LABORATORY RESULTS AND REPORTING FORMS14-1

 WEEKLY CHLORINE MONITORING RESULTS14-2

 TOTAL COLIFORM BACTERIA RESULTS.....14-4

 NITRATE, NITRITE, AND OTHER INORGANIC CHEMICALS RESULTS.....14-5

 TOTAL TRIHALOMETHANES, HALOACETIC ACID AND BROMATE AND/OR CHLORITE RESULTS14-6

Table of Contents

CORROSIVITY RESULTS	14-7
ORGANIC CHEMICALS RESULTS	14-8
RADIONUCLIDES RESULTS	14-9
OTHER LABORATORY RESULTS	14-10
SECTION 15: PAST SANITARY SURVEYS.....	15-1
INSERT PAST SANITARY SURVEYS HERE	15-2
SECTION 16: CORRESPONDENCE	16-1
INSERT CORRESPONDENCE HERE	16-2

Section 1: Public Water System Summary, Water System Inventory

Note:

File this form with the appropriate State agency whenever a change occurs in the system.

Public Water System Summary

System Name	
PWSID	
Date	

Introduction

Purpose of the Drinking Water System Inventory

The Drinking Water System Summary identifies all contacts, populations, sources, treatment and chemicals, and facilities used to produce finished drinking water.

In Colorado, Submit forms to:

Colorado Department of Public Health and Environment
Water Quality Control Division/Compliance Assurance Section
4300 Cherry Creek Drive South
Denver, CO 80246-1530
Fax: (303) 758-1398
Email: cdphe.drinkingwater@state.co.us

Revisions

Water systems are required to submit any changes related to the inventory to the Department within thirty (30) calendar days following the effective date of the change. Each part may be submitted separately, if only one part is affected by the change.

General Definitions

Public Water System Identification Number (PWSID) –The identification number assigned to a water system by the Colorado Department of Public Health and Environment.

The Department – The agency that oversees and enforces the State primary drinking water regulations in agreement with the US Environmental Protection Agency (EPA). In Colorado, this Department is the Colorado Department of Public Health and Environment.

Contact Information

Contact information completed by _____

Signature _____ Date _____

Revision? Actual date of changes described in this revision _____

System Mailing Address: _____

City: _____ County: _____ State: _____ Zip: _____

System Physical Address: _____

City: _____ County: _____ State: _____ Zip: _____

System Phone: _____ Ext: _____ Fax: _____

E-mail: _____

Administrative Contact Name: _____

(The administrative contact is the primary contact person for all Department mail or other communications regarding drinking water compliance.)

Mailing Address: _____

City: _____ State: _____ Zip: _____

Phone: _____ Ext: _____ Fax: _____

E-mail: _____

Owner/Legal Entity Contact Name: _____

(The legal owner is an individual, corporation, partnership, association, state or political subdivision thereof, municipality, or other legal entity.)

Mailing Address: _____

City: _____ State: _____ Zip: _____

Phone: _____ Ext: _____ Fax: _____

E-mail: _____

Emergency Contact Name: _____

(The emergency contact should be someone that the Department can contact in an emergency if the administrative contact is unavailable.)

Mailing Address: _____

City: _____ State: _____ Zip: _____

Phone: _____ Ext: _____ Fax: _____

E-mail: _____

Operator in Responsible Charge Name: _____

Certification Type: _____ Certification Level: _____ Expiration Date: _____

Mailing Address: _____

City: _____ State: _____ Zip: _____

Phone: _____ Ext: _____ Fax: _____

E-mail: _____

Population Types and Seasons

System Population Certification

Revision? Actual date of changes described in this revision _____

Resident Population means the average number of people whose primary residence is served by the system. The individual need not live at the residence for 365 days per year for it to be considered his/her primary residence.

_____ **Number of year-round residents served by system**
_____ **Number of taps (buildings/houses) serving year-round residents**

Non-Transient Population means the average number of individuals served per day, during the year or normal operating period(s), who do not reside at the place served by the water system but have a regular opportunity to consume water produced by the system. Regular opportunity is defined as four or more hours per day, for four or more days per week, for six months or more per year.

_____ **Number of non-transients served by system**
_____ **Months in operation (example: May – September)**

Transient Population means the average number of individuals served per day during the year or annual operating period(s), who have an opportunity to consume water from the system but who do not meet the definition of either residents or non-transient customers. (Restaurant patrons are an example of transient consumers.)

_____ **Number of transients served by system**
_____ **Months in operation (example: May – September)**

Certification of Accuracy

“By signing this document, I hereby certify that the information above is true, accurate, and complete to the best of my knowledge and belief. I am aware that there are significant penalties for submitting false information, including the possibility of fines and imprisonment.”

Signature _____ Date _____

Department Use:
Classification

Water Sources Definitions

Water Types

Groundwater (GW) – Any water under the surface of the ground being neither “surface water” nor “groundwater under the direct influence of surface water.”

Surface water (SW) – Any water source that is open to the atmosphere and subject to surface runoff.

Groundwater under the direct influence of surface water (GWUDI or GU) – Any water beneath the surface of the ground with significant occurrence of insects or other macro-organisms, algae or large-diameter pathogens such as *Giardia lamblia* or *Cryptosporidium*; or significant and relatively rapid shifts in water characteristics such as turbidity, temperature, conductivity or pH that closely correlate to climatological or surface water conditions.

Purchased water (GWP, SWP or GUP) – Water that you receive (whether or not you purchase it) from another water system or water hauler.

Integration agreement – An agreement between two or more public water systems, one of which is a wholesale/supply system, whose distribution systems are physically connected. The systems agree to operate using a common set of standards that the wholesale system establishes for the purpose of maintaining and protecting drinking water quality. Integrated systems must submit their agreement to the Department for approval.

Availability

Permanent (P) – A primary water facility

Emergency (E) – A water facility that is used only as the result of extreme circumstances, and is otherwise kept offline. These facilities may be either connected or disconnected from a treatment plant/distribution system. This type of facility is most likely never used. Nitrate and total coliform samples would need to be obtained within 2 days after start-up. The division would need to be notified of start-up within 24-hours.

Interim (I) – A water facility that is either used as a result of high water demand or out of necessity to maintain water rights. The facility may be used once every few weeks or months or once every few years. These facilities may be either connected or disconnected from a treatment plant/distribution system. Routine Sampling will be required at the Entry Point to the Distribution System.

Seasonal (S) – A water facility that is typically used every year to aid a system in meeting high water demands. While a water system may not know when it will need a seasonal source, it is most often used every year. These also may be referred to as peaking facilities. Routine sampling will be required at the Entry Point to the Distribution System.

Other (O) – A facility that is no longer used for drinking water.

Water Source Details

Inventory of water sources completed by _____

Signature _____ Date _____
 Revision? Actual date of changes described in this revision _____

Groundwater Sources

ID (assigned by Department)	Source Name	Aquifer Name	Availability (P, E, I, S or O) If seasonal, include months anticipated to be in operation	Well Depth	First Draw	Latitude*	Longitude*

*Latitude and longitude data collection method GPS Map Google Earth Other Date _____

Surface Water Sources

ID (assigned by Department)	Source Name	Availability (P, E, I, S or O) If seasonal, include months anticipated to be in operation	Intake Latitude*	Intake Longitude*

*Latitude and longitude data collection method GPS Map Google Earth Other Date _____

Expand tables or add pages as needed for additional sources

Section 1 - Public Water System Summary Water System Inventory

System Name _____ PWSID# _____

Groundwater Under the Direct Influence of Surface Water Sources							
ID (assigned by Department)	Source Name	Aquifer Name	Availability (P, E, I, S or O) If seasonal, include months anticipated to be in operation	Well Depth	First Draw	Latitude*	Longitude*

*Latitude and longitude data collection method GPS Map Google Earth Other Date _____

Purchased Water Sources					
Name of Supplying Water System	Connection Location (cross-streets and/or latitude/longitude*)	Type (GW, SW or GU)	Do you receive treated or raw water?	Availability (P, E, I, S or O) If seasonal, include months anticipated to be in use	Approved Integration Agreement? Yes / No

*Latitude and longitude data collection method GPS Map Google Earth Other Date _____

Expand tables or add pages as needed for additional sources

Water Treatment Codes and Objectives

Treatment Codes -

The codes below are generated by the USEPA for the purpose of standardizing the treatment processes as they are cataloged and tracked within the federal and state database programs. Water systems should have individual process flow diagrams for treatment; from these diagrams, each process should have an associated code. If you struggle to understand the different treatment codes below, please contact the Division's Engineering Section for assistance.

DISINFECTION

401	Gaseous Chlorination (Primary or Post filtration)
403	Gaseous Chlorination, Pre filtration
421	Hypochlorination, Bleach, (Primary or Post filtration)
423	Hypochlorination, Bleach, Pre filtration
200	Ammonia (Chloramines)
220	Chlorine Dioxide
885	Chlorination – Calcium Hypochlorite (HTH)
887	Chlorination – Manual/Hand
825	Contact Time
541	Ozonation, Post filtration
543	Ozonation, Pre filtration
720	Ultraviolet Radiation

PRETREATMENT, COAGULATION AND SEDIMENTATION

520	Microscreening
840	Presedimentation
820	Aeration
240	Coagulation
600	Rapid Mix – mechanical mixing
830	In line static mixing
831	Hydraulic jet mixing
125	Activated Carbon, Powdered
560	Permanganate, Potassium or Sodium
360	Flocculation
880	Dissolved Air Flotation (DAF)
845	Upflow Clarifier
660	Sedimentation

FILTRATION

345	Filtration, Granular Media
344	Filtration, Pressure Sand
343	Filtration, Greensand
801	Filtration, Bag
810	Filtration, Bag - Roughing
341	Filtration, Cartridge
865	Filtration, Cartridge - Roughing
895	Filtration, Microfiltration (MF)
347	Filtration, Ultrafiltration
890	Filtration, Nanofiltration
640	Filtration, Reverse Osmosis
121	Filtration, Granular Activated Carbon
826	Natural or Riverbank Filtration (GWUDI)
835	Cation Exchange
836	Anion Exchange

OTHER FORMS OF TREATMENT

100	Activated Alumina
160	Algae Control
380	Fluoridation
815	Inhibitor/Sequestering Agent, Phosphate based
449	Inhibitor, Silicate based
847	pH Adjustment - suppression
848	pH Adjustment - elevation
580	Peroxide
620	Reducing Agent
700	Sludge Treatment

Treatment Objective Codes

D	Disinfection
P	Particulate Removal
F	Iron Removal
M	Manganese Removal
I	Inorganic Chemicals Removal
O	Organic Chemicals Removal
R	Radionuclide Removal
T	Taste / Odor Control
S	Softening (Hardness Removal)
C	Corrosion Control
B	Disinfection Byproduct Control
E	Dechlorination
A	pH Adjustment

Water Treatment Details

Inventory of treatment plants completed by : _____

Signature _____ Date _____

Revision? Actual date of changes described in this revision _____

Treatment Plant Name and ID <small>(ID assigned by Department)</small>	
Contributing Sources	

Rated Capacity <small>Million Gallons per Day (MGD)</small>	Availability (P, E, I, S or O) <small>If seasonal, include months anticipated to be in operation</small>	Latitude*	Longitude*

Treatment Codes (from previous page) List in Order of Flow <small>(including descriptions of tanks used for disinfection contact time)</small>	Treatment Objective and Objective Codes <small>(from previous page)</small>
<i>Example: 421 Hypochlorination, Bleach, (Primary)</i>	<i>D - Disinfection</i>
<i>Example: 347 Filtration, Ultrafiltration</i>	<i>P – Particulate Removal</i>

*Latitude and longitude data collection method GPS Map Google Earth Other Date _____

Treatment Plant Name and ID (ID assigned by Department)	
Contributing Sources	

Rated Capacity Million Gallons per Day (MGD)	Availability (P, E, I, S or O) If seasonal, include months anticipated to be in operation	Latitude*	Longitude*

Treatment Codes (from previous page) List in Order of Flow (including descriptions of tanks used for disinfection contact time)	Treatment Objective and Objective Codes (from previous page)
<i>Example: 421 Hypochlorination, Bleach, (Primary)</i>	<i>D - Disinfection</i>
<i>Example: 347 Filtration, Ultrafiltration</i>	<i>P - Particulate Removal</i>

*Latitude and longitude data collection method GPS Map Google Earth Other Date _____

Treatment Plant Name and ID (ID assigned by Department)	
Contributing Sources	

Rated Capacity Million Gallons per Day (MGD)	Availability (P, E, I, S or O) If seasonal, include months anticipated to be in operation	Latitude*	Longitude*

Treatment Codes (from previous page) List in Order of Flow (including descriptions of tanks used for disinfection contact time)	Treatment Objective and Objective Codes (from previous page)
<i>Example: 421 Hypochlorination, Bleach, (Primary)</i>	<i>D - Disinfection</i>
<i>Example: 347 Filtration, Ultrafiltration</i>	<i>P - Particulate Removal</i>

*Latitude and longitude data collection method GPS Map Google Earth Other Date _____

Add pages as needed for additional treatment plants

Distribution System Definitions

Entry point – A sampling point after complete water treatment (after disinfection contact time) but before the first consumption tap. A water system may have multiple entry points, especially if it has multiple treatment plants. A water system may have multiple treatment plants but only one entry point if, for example, those treatment plants blend in a storage tank for disinfection contact time before distribution (in this example, a sampling point at the storage tank is the entry point).

Distribution system storage facility – Any finished water storage tank at the treatment plant or in the distribution system that is not considered part of disinfection contact time.

Booster treatment facilities – Any chemical booster stations after the treatment plant (such as disinfection or corrosion control chemical booster stations in the distribution system).

Consecutive connection – A master meter connection from your water system to another water system for purposes of supplying drinking water to the other system.

Integration agreement - An agreement between two or more public water systems, one of which is a wholesale/supply system, whose distribution systems are physically connected. The systems agree to operate using a common set of standards that the wholesale system establishes for the purpose of maintaining and protecting drinking water quality. Integrated systems must submit their agreement to the Department for approval.

Pump station – A facility used to pump water or increase water pressure. Pump stations are not used for chemical additions or other treatment and do not need to be reported on this form.

Distribution System Details

Inventory of distribution system completed by _____

Signature _____ Date _____

Revision? Actual date of changes described in this revision _____

Number of Distribution Systems

Does the water system have multiple distribution systems? No Yes; How many? _____

If yes, how are the distribution systems operated? (i.e. are they completely independent of each other or does water flow from one to another through operator-controlled valves, etc.) _____

Entry Points			
ID (assigned by Department)	Location Description and Contributing Treatment Plants (or Sources)	Latitude*	Longitude*

*Latitude and longitude data collection method GPS Map Google Earth Other Date _____

Storage Facilities & Other Finished Water Reservoirs					
ID (assigned by Department)	Storage Facility Name	Contributing Treatment Plants (or Sources)	Volume (gallons)	Latitude*	Longitude*

*Latitude and longitude data collection method GPS Map Google Earth Other Date _____

Booster Treatment Facilities (Post Entry-Point Treatment)				
ID (assigned by Department)	Facility Name	Treatment Codes (Refer to water treatment definitions)	Latitude*	Longitude*

*Latitude and longitude data collection method GPS Map Google Earth Other Date _____

Consecutive Connections Serving Another Water System					
Receiving PWSID	Receiving System Name	Do you supply treated or raw water?	Connection Latitude*	Connection Longitude*	Integrated Agreement? Yes / No

*Latitude and longitude data collection method GPS Map Google Earth Other Date _____

Expand tables or add pages as needed for additional facilities and connections

Additional Information

Include any additional information that would be helpful to understand

- The water source(s) and how the sources are operated within your overall production scheme;
- The treatment plants or processes; or
- The distribution system

Section 2: Comprehensive Report

Note:

The Comprehensive Report includes detailed information on the existing system as recorded with the State Regulator.

Insert Comprehensive Report Here

Notes:

- Contact the State Regulator for a copy of this report.
- In Colorado, Contact Laurie Findlay at (303) 692-3583.

Comprehensive Report SDWIS Code Definitions

Water System Status

A = Active
I = Inactive
P = Proposed

Fed Type

C = Community
NTNC = Non-transient/Non-community
NP = Non-public
TNC = Transient Non-community

Fed Primary Source

GW = Groundwater
GU = Groundwater under the influence of surface water
SW = Surface water

Any of the above followed by the letter “P” means the system purchases that type of water from another system.

Owner Type

L = Local
F = Federal Government
M = Mixed (Public/Private)
N = Native American
P = Private
S = State Government

Population Type

R = Residential (year around)
NT = Non-Transient (for at least 180 day/year)
T = Transient
W = Wholesale

Contact Type

AC = Administrative Contact
DO = Designated Operator
EC = Emergency Contact
FC = Financial Contact
LC = Legal Contact
LE = Lead Engineer
OP = Operator
OT = Other
OW = Owner
PL = Physical Location Contact
SA = Sampler
UN = Utility Representative
RD = Ranger District

Facilities Codes

WSF Number – Water System Facility Number (In Colorado, this number is assigned by the WQCD Compliance Assurance Section (CAS))

Water System Facility (WSF) Name – Facility name (In Colorado, this number is assigned by the WQCD Compliance Assurance Section (CAS))

WSF Type

CS = Cistern
CW = Clear Well
CH = Common Headers
CC = Consecutive Connection
DS Dist System Zone
IG = Infiltration Gallery
IN = Intake
NN = Non-piped, non-purchased
NP = Non-piped, Purchased
OT = Other
PC = Pressure Control
PF = Pump Facility
RS = Reservoir
RC = Roof Catchment
SS = Sampling Station
SP = Spring
ST = Storage
SI = Surface Impoundment
TM = Transmission Main (manifold)
TP = Treatment Plant
WL = Well
WH = Well head

Constructed Date – typically not used but date facility was constructed/installed

WSF Status = Water system facility status

A = Active
I = Inactive
P = Proposed

Availability

P = Permanent
S = Seasonal
I = Interim
E = Emergency
O = Other

Water Type

GW = Groundwater
GU = Groundwater under the influence of surface water
SW = Surface water

Annual Operating Period = Time period that the system is active and operating

SAMPLE POINT CODES

Sample Point Type

DS = Distribution System

EP = Entry Point

FC = First Customer

MD = Mid Point in the Distribution system

MR = Point of Maximum Retention

RW = Raw

WS = Water System Facility

Sampling Point Status

A = Active

I = Inactive

P = Proposed

Sample Type Codes

RT = Routine

RP = Repeat

CO = Confirmation

SP = Special Purpose (not for compliance)

Section 3: Well Permit

Insert Well Permit Here

Note:

In Colorado, well permits are granted by the Colorado Division of Water Resources. A link to the well permit search can be found on the Tri-County Health Department's webpage at <http://www.tchd.org/water.htm>.

Section 4: General Monitoring Plan

Notes:

Non-Transient, Non-Community - A public water system that is not a community water system and that regularly serves at least twenty-five (25) of the SAME persons over six (6) months per year.

Using Groundwater - Any water under the surface of the ground, being neither “surface water” or “groundwater under the direct influence of surface water”.

**Public Water System
Monitoring Plan**

System Name _____

PWSID # _____

Date _____

This template is for public water systems classified as:

Non-Transient, Non-Community

Using Groundwater

Table of Contents

Introduction

General Requirements and Definitions

System Summary

Water Source Details

Water Treatment Details

Distribution System Details

Records Locations

Schematics and Maps

Individual Rule Sampling Plans

 Total Coliform Rule and Residual Disinfectant

 Inorganic and Organic Rules

 Disinfectants and Disinfection Byproducts Rules

 Lead and Copper Rule

 Groundwater Rule

Introduction

An unofficial copy of the *Colorado Primary Drinking Water Regulations*, 5 CCR 1003-1, can be accessed online at <http://www.cdphe.state.co.us/wq/drinkingwater/index.html>.

Purpose of the Individual Rule Sampling Plans

Each public water system must develop individual rule sampling plans. The plans show how a system intends to comply with the monitoring requirements of the *Colorado Primary Drinking Water Regulations*. The plans serve as a uniquely tailored road map for each specific system to demonstrate that the water quality self-monitoring performed by the system is representative of the water distributed to consumers and is consistent with regulatory requirements.

Submittal to the Department

In Colorado submit one (1) copy of the final individual rule sampling plans to:

Colorado Department of Public Health and Environment
Water Quality Control Division/Compliance Assurance Section
4300 Cherry Creek Drive South
Denver, CO 80246-1530
Fax: (303) 758-1398
Email: cdphe.drinkingwater@state.co.us

Revisions

Water systems are required to submit any changes related to the individual rule sampling plans to the Department within thirty (30) calendar days following the effective date of the change. Each plan may be submitted separately, if only one plan is affected by the change. Monitoring plans will be accepted electronically via Electronic mail.

General Requirements

How to choose a laboratory

Laboratories must be certified for the specific method/analysis. Laboratories can be certified by the EPA or the Department. For a list of certified labs in Colorado, see <http://www.cdphe.state.co.us/lr/certification/SDWlist.pdf>

Sample collection and analytical methods

Samples must be collected as described in the method. Contact the certified laboratory that will perform the analysis for direction on sample containers, sample collection, and preservation.

All analysis must be conducted using a Department-approved method. These may be found in 5 CCR 1003-1 Article 10.

Purpose of the Individual Rule Sampling Plans

Each public water system must develop individual rule sampling plans. The plans show how a system intends to comply with the monitoring requirements of the State. In Colorado, these requirements are defined in the *Colorado Primary Drinking Water Regulations*. An unofficial copy of these regulations can be accessed online at <http://www.cdphe.state.co.us/wq/drinkingwater/index.html>. The plans serve as a uniquely tailored road map for each specific system to demonstrate that the water quality self-monitoring performed by the system is representative of the water distributed to consumers and is consistent with regulatory requirements.

Submittal to the Department

In Colorado, submit one (1) copy of the final individual rule sampling plans to:

Colorado Department of Public Health and Environment
Water Quality Control Division/Compliance Assurance Section
4300 Cherry Creek Drive South
Denver, CO 80246-1530
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Revisions

Water systems are required to submit any changes related to the individual rule sampling plans to the Department within thirty (30) calendar days following the effective date of the change. Each plan may be submitted separately, if only one plan is affected by the change. Monitoring plans will be accepted electronically via Electronic mail.

General Requirements**How to choose a laboratory**

Laboratories must be certified for the specific method/analysis. Laboratories can be certified by the EPA or the Department.

For a list of certified labs in Colorado, see <http://www.cdphe.state.co.us/lr/pages/cert/SDWList.pdf>.

Sample collection and analytical methods

Samples must be collected as described in the method. Contact the certified laboratory that will perform the analysis for direction on sample containers, sample collection, and preservation.

All analysis must be conducted using a Department-approved method. In Colorado, these methods may be found in 5 CCR 1003-1 Article 10.

Public Water System Summary

System Name	
PWSID	
Date	

Introduction

Purpose of the Drinking Water System Inventory

The Drinking Water System Summary identifies all contacts, populations, sources, treatment and chemicals, and facilities used to produce finished drinking water.

In Colorado, Submittal forms to:

Colorado Department of Public Health and Environment
Water Quality Control Division/Compliance Assurance Section
4300 Cherry Creek Drive South
Denver, CO 80246-1530
Fax: (303) 758-1398
Email: cdphe.drinkingwater@state.co.us

Revisions

Water systems are required to submit any changes related to the inventory to the Department within thirty (30) calendar days following the effective date of the change. Each part may be submitted separately, if only one part is affected by the change.

Contact Information

Contact information completed by _____

Signature _____ Date _____

Revision? Actual date of changes described in this revision _____

System Mailing Address: _____

City: _____ County: _____ State: _____ Zip: _____

System Physical Address: _____

City: _____ County: _____ State: _____ Zip: _____

System Phone: _____ Ext: _____ Fax: _____

E-mail: _____

Administrative Contact Name: _____

(The administrative contact is the primary contact person for all Department mail or other communications regarding drinking water compliance.)

Mailing Address: _____

City: _____ State: _____ Zip: _____

Phone: _____ Ext: _____ Fax: _____

E-mail: _____

Owner/Legal Entity Contact Name: _____

(The legal owner is an individual, corporation, partnership, association, state or political subdivision thereof, municipality, or other legal entity.)

Mailing Address: _____

City: _____ State: _____ Zip: _____

Phone: _____ Ext: _____ Fax: _____

E-mail: _____

Emergency Contact Name: _____

(The emergency contact should be someone that the Department can contact in an emergency if the administrative contact is unavailable.)

Mailing Address: _____

City: _____ State: _____ Zip: _____

Phone: _____ Ext: _____ Fax: _____

E-mail: _____

Operator in Responsible Charge Name: _____

Certification Type: _____ Certification Level: _____ Expiration Date: _____

Mailing Address: _____

City: _____ State: _____ Zip: _____

Phone: _____ Ext: _____ Fax: _____

E-mail: _____

Population Types and Seasons
System Population Certification

Revision? Actual date of changes described in this revision _____

Resident Population means the average number of people whose primary residence is served by the system. The individual need not live at the residence for 365 days per year for it to be considered his/her primary residence.

_____ **Number of year-round residents served by system**
_____ **Number of taps (buildings/houses) serving year-round residents**

Non-Transient Population means the average number of individuals served per day, during the year or normal operating period(s), who do not reside at the place served by the water system but have a regular opportunity to consume water produced by the system. Regular opportunity is defined as four or more hours per day, for four or more days per week, for six months or more per year.

_____ **Number of non-transients served by system**
_____ **Months in operation (example: May – September)**

Transient Population means the average number of individuals served per day during the year or annual operating period(s), who have an opportunity to consume water from the system but who do not meet the definition of either residents or non-transient customers. (Restaurant patrons are an example of transient consumers.)

_____ **Number of transients served by system**
_____ **Months in operation (example: May – September)**

Certification of Accuracy

“By signing this document, I hereby certify that the information above is true, accurate, and complete to the best of my knowledge and belief. I am aware that there are significant penalties for submitting false information, including the possibility of fines and imprisonment.”

Signature _____ Date _____

Department Use:
Classification

Water Sources Definitions

Water Types

Groundwater (GW) – Any water under the surface of the ground being neither “surface water” nor “groundwater under the direct influence of surface water.”

Surface water (SW) – Any water source that is open to the atmosphere and subject to surface runoff.

Groundwater under the direct influence of surface water (GWUDI or GU) – Any water beneath the surface of the ground with significant occurrence of insects or other macro-organisms, algae or large-diameter pathogens such as *Giardia lamblia* or *Cryptosporidium*; or significant and relatively rapid shifts in water characteristics such as turbidity, temperature, conductivity or pH that closely correlate to climatological or surface water conditions.

Purchased water (GWP, SWP or GUP) – Water that you receive (whether or not you purchase it) from another water system or water hauler.

Integration agreement – An agreement between two or more public water systems, one of which is a wholesale/supply system, whose distribution systems are physically connected. The systems agree to operate using a common set of standards that the wholesale system establishes for the purpose of maintaining and protecting drinking water quality. Integrated systems must submit their agreement to the Department for approval.

Availability

Permanent (P) – A primary water facility

Emergency (E) – A water facility that is used only as the result of extreme circumstances, and is otherwise kept offline. These facilities may be either connected or disconnected from a treatment plant/distribution system. This type of facility is most likely never used. Nitrate and total coliform samples would need to be obtained within 2 days after start-up. The division would need to be notified of start-up within 24-hours.

Interim (I) – A water facility that is either used as a result of high water demand or out of necessity to maintain water rights. The facility may be used once every few weeks or months or once every few years. These facilities may be either connected or disconnected from a treatment plant/distribution system. Routine Sampling will be required at the Entry Point to the Distribution System.

Seasonal (S) – A water facility that is typically used every year to aid a system in meeting high water demands. While a water system may not know when it will need a seasonal source, it is most often used every year. These also may be referred to as peaking facilities. Routine sampling will be required at the Entry Point to the Distribution System.

Other (O) – A facility that is no longer used for drinking water.

Water Source Details

Inventory of water sources completed by _____

Signature _____ Date _____

Revision? Actual date of changes described in this revision _____

Groundwater Sources							
ID (assigned by Department)	Source Name	Aquifer Name	Availability (P, E, I, S or O) If seasonal, include months anticipated to be in operation	Well Depth	First Draw	Latitude*	Longitude*

*Latitude and longitude data collection method GPS Map Google Earth Other Date _____

Purchased Water Sources					
Name of Supplying Water System	Connection Location (cross-streets and/or latitude/longitude*)	Type (GW, SW or GU)	Do you receive treated or raw water?	Availability (P, E, I, S or O) If seasonal, include months anticipated to be in use	Approved Integration Agreement? Yes / No

*Latitude and longitude data collection method GPS Map Google Earth Other Date _____

Expand tables or add pages as needed for additional sources

Water Treatment Codes and Objectives

Treatment Codes –

The codes below are generated by the USEPA for the purpose of standardizing the treatment processes as they are cataloged and tracked within the federal and state database programs. Water systems should have individual process flow diagrams for treatment; from these diagrams, each process should have an associated code. If you struggle to understand the different treatment codes below, please contact the Division's Engineering Section for assistance.

DISINFECTION

401	Gaseous Chlorination, (Primary or Post filtration)
403	Gaseous Chlorination, Pre filtration
421	Hypochlorination, Bleach, (Primary or Post filtration)
423	Hypochlorination, Bleach, Pre filtration
200	Ammonia (Chloramines)
220	Chlorine Dioxide
885	Chlorination – Calcium Hypochlorite (HTH)
887	Chlorination – Manual/Hand
825	Contact Time
541	Ozonation, Post filtration
543	Ozonation, Pre filtration
720	Ultraviolet Radiation

FILTRATION

345	Filtration, Granular Media
344	Filtration, Pressure Sand
343	Filtration, Greensand
801	Filtration, Bag
810	Filtration, Bag - Roughing
341	Filtration, Cartridge
865	Filtration, Cartridge - Roughing
895	Filtration, Microfiltration (MF)
347	Filtration, Ultrafiltration
890	Filtration, Nanofiltration
640	Filtration, Reverse Osmosis
121	Filtration, Granular Activated Carbon
826	Natural or Riverbank Filtration (GWUDI)
835	Cation Exchange
836	Anion Exchange

PRETREATMENT, COAGULATION AND SEDIMENTATION

520	Microscreening
840	Presedimentation
820	Aeration
240	Coagulation
600	Rapid Mix – mechanical mixing
830	In line static mixing
831	Hydraulic jet mixing
125	Activated Carbon, Powdered
560	Permanganate, Potassium or Sodium
360	Flocculation
880	Dissolved Air Flotation (DAF)
845	Upflow Clarifier
660	Sedimentation

OTHER FORMS OF TREATMENT

100	Activated Alumina
160	Algae Control
380	Fluoridation
815	Inhibitor/Sequestering Agent, Phosphate based
449	Inhibitor, Silicate based
847	pH Adjustment - suppression
848	pH Adjustment - elevation
580	Peroxide
620	Reducing Agent
700	Sludge Treatment

Treatment Objective Codes

D	Disinfection
P	Particulate Removal
F	Iron Removal
M	Manganese Removal
I	Inorganic Chemicals Removal
O	Organic Chemicals Removal
R	Radionuclide Removal
T	Taste / Odor Control
S	Softening (Hardness Removal)
C	Corrosion Control
B	Disinfection Byproduct Control
E	Dechlorination
A	pH Adjustment

Water Treatment Details

Inventory of treatment plants completed by _____

Signature _____ Date _____

Revision? Actual date of changes described in this revision _____

Treatment Plant Name and ID (ID assigned by Department)	
Contributing Sources	

Rated Capacity Million Gallons per Day (MGD)	Availability (P, E, I, S or O) If seasonal, include months anticipated to be in operation	Latitude*	Longitude*

Treatment Codes (from previous page) List in Order of Flow (including descriptions of tanks used for disinfection contact time)	Treatment Objective and Objective Codes (from previous page)
<i>Example: 421 Hypochlorination, Bleach, (Primary)</i>	<i>D - Disinfection</i>
<i>Example: 347 Filtration, Ultrafiltration</i>	<i>P – Particulate Removal</i>

*Latitude and longitude data collection method GPS Map Google Earth Other Date _____

Treatment Plant Name and ID (ID assigned by Department)	
Contributing Sources	

Rated Capacity Million Gallons per Day (MGD)	Availability (P, E, I, S or O) If seasonal, include months anticipated to be in operation	Latitude*	Longitude*

Treatment Codes (from previous page) List in Order of Flow (including descriptions of tanks used for disinfection contact time)	Treatment Objective and Objective Codes (from previous page)
<i>Example: 421 Hypochlorination, Bleach, (Primary)</i>	<i>D - Disinfection</i>
<i>Example: 347 Filtration, Ultrafiltration</i>	<i>P – Particulate Removal</i>

*Latitude and longitude data collection method GPS Map Google Earth Other Date _____

Treatment Plant Name and ID (ID assigned by Department)	
Contributing Sources	

Rated Capacity Million Gallons per Day (MGD)	Availability (P, E, I, S or O) If seasonal, include months anticipated to be in operation	Latitude*	Longitude*

Treatment Codes (from previous page) List in Order of Flow (including descriptions of tanks used for disinfection contact time)	Treatment Objective and Objective Codes (from previous page)
<i>Example: 421 Hypochlorination, Bleach, (Primary)</i>	<i>D - Disinfection</i>
<i>Example: 347 Filtration, Ultrafiltration</i>	<i>P – Particulate Removal</i>

*Latitude and longitude data collection method GPS Map Google Earth Other Date _____

Add pages as needed for additional treatment plants

Distribution System Definitions

Entry point – A sampling point after complete water treatment (after disinfection contact time) but before the first consumption tap. A water system may have multiple entry points, especially if it has multiple treatment plants. A water system may have multiple treatment plants but only one entry point if, for example, those treatment plants blend in a storage tank for disinfection contact time before distribution (in this example, a sampling point at the storage tank is the entry point).

Distribution system storage facility – Any finished water storage tank at the treatment plant or in the distribution system that is not considered part of disinfection contact time.

Booster treatment facilities – Any chemical booster stations after the treatment plant (such as disinfection or corrosion control chemical booster stations in the distribution system).

Consecutive connection – A master meter connection from your water system to another water system for purposes of supplying drinking water to the other system.

Integration agreement - An agreement between two or more public water systems, one of which is a wholesale/supply system, whose distribution systems are physically connected. The systems agree to operate using a common set of standards that the wholesale system establishes for the purpose of maintaining and protecting drinking water quality. Integrated systems must submit their agreement to the Department for approval.

Pump station – A facility used to pump water or increase water pressure. Pump stations are not used for chemical additions or other treatment and do not need to be reported on this form.

Distribution System Details

Inventory of distribution system completed by _____

Signature _____ Date _____

Revision? Actual date of changes described in this revision _____

Number of Distribution Systems

Does the water system have multiple distribution systems? No Yes; How many? _____
 If yes, how are the distribution systems operated? (i.e. are they completely independent of each other or does water flow from one to another through operator-controlled valves, etc.) _____

Entry Points			
ID (assigned by Department)	Location Description and Contributing Treatment Plants (or Sources)	Latitude*	Longitude*

*Latitude and longitude data collection method GPS Map Google Earth Other Date _____

Storage Facilities & Other Finished Water Reservoirs					
ID (assigned by Department)	Storage Facility Name	Contributing Treatment Plants (or Sources)	Volume (gallons)	Latitude*	Longitude*

*Latitude and longitude data collection method GPS Map Google Earth Other Date _____

Booster Treatment Facilities (Post Entry-Point Treatment)

ID (assigned by Department)	Facility Name	Treatment Codes (Refer to water treatment definitions)	Latitude*	Longitude*

*Latitude and longitude data collection method GPS Map Google Earth Other Date _____

Consecutive Connections Serving Another Water System

Receiving PWSID	Receiving System Name	Do you supply treated or raw water?	Connection Latitude*	Connection Longitude*	Integrated Agreement? Yes / No

*Latitude and longitude data collection method GPS Map Google Earth Other Date _____

Expand tables or add pages as needed for additional facilities and connections

Additional Information

Include any additional information that would be helpful to understand

- the water source(s) and how the sources are operated within your overall production scheme;
- the treatment plants or processes including a process flow diagram; or
- the distribution system.

Records Locations

These records must be made available for inspection for Department staff during site visits.

Type of Record	Location Address	Retain no less than...
Total Coliform and Fecal Coliform/ <i>E. coli</i> results AND distribution system residual disinfection monitoring results		5 years
Chemical analyses results		10 years
Violations of the State regulations, including corrective action (In Colorado, <i>Colorado Primary Drinking Water Regulations</i>)		3 years after corrective action is completed
Sanitary surveys, including any written reports, summaries or correspondences		10 years
Variances or exemptions granted by the Department		5 years after expiration
Public notices including certification		3 years
Individual rule sampling plans		10 years
Corrective actions taken for the Groundwater Rule		10 years
Invalidation of fecal indicator-positive groundwater source samples for the Groundwater Rule		5 years
For consecutive systems, documentation of notification to the wholesale system(s) of total coliform-positive samples		5 years
For systems conducting compliance monitoring for the Groundwater Rule <ul style="list-style-type: none"> • Department-specified minimum disinfectant residual 		10 years
For systems conducting compliance monitoring for the Groundwater Rule <ul style="list-style-type: none"> • Lowest daily disinfectant residual, date and any failure to maintain the Department-specified minimum disinfectant residual for a period of more than 4 hours • Department-specified compliance requirements for membrane filtration, date and duration of any failure to meet those requirements for more than 4 hours 		5 years

Schematics and Maps

Sketch of Water Sources

Include a schematic, diagram or sketch depicting how the flow from each source is connected to the treatment plant and/or the distribution system. Indicate all applicable sample sites described in the individual rule sampling plans.

Process Schematic of Water Treatment Plants

Provide a process flow diagram for each treatment plant. Include locations (in the process) of all chemical additions, chemical storage, monitors/meters, piping and physical components of the treatment plant. Designate water flow direction throughout the schematic. All components must be clearly labeled. Indicate all applicable sample sites, and include parameters measured at each site described in the individual rule sampling plans.

Map of Distribution System

Provide a map of the distribution system showing locations of all storage facilities, booster treatment facilities, consecutive connections and entry points as well as all applicable sample sites described in the individual rule sampling plans. You may provide this detail all in one map or in several different maps. Clearly indicate if there are multiple distribution systems and if those distribution systems are connected to each other. If applicable, include an evaluation and description of the extent to which zones of influence from each source overlap.

Note: A sketch of the water sources, a process schematic of the water treatment plant(s), and a map(s) of the distribution system can be found in Section 5: Maps.

INDIVIDUAL RULE SAMPLING PLANS

Total Coliform Rule and Residual Disinfectant

In Colorado, the Total Coliform Rule may be found in 5 CCR 1003-1, Article 5.
Residual disinfectant requirements may be found in 5 CCR 1003-1, Articles 7 and 13.

I, _____ have reviewed this Total Coliform Rule and Residual Disinfectant sampling plan, and that the provided information is true and correct to the best of my knowledge.

Signature _____ Date _____ Revision?

Laboratory Information

Preferred lab: _____

Address: _____

Phone: _____

Alternate lab: _____

Address: _____

Phone: _____

Routine Monitoring Requirement

Number of routine total coliform samples required: _____ Monthly or Quarterly

Is the system operated seasonally? Yes No (If seasonal, the system must obtain a **safe** total coliform result approximately 10 days prior to opening for the season.)

Total Coliform Sample Sites Identify each routine sample site with its respective upstream and downstream repeat sample sites (within five service connections)

	Site Location Identifier (if used on map)	Site Name	Site Address
Routine #1			
Repeat # 1 Upstream			
Repeat #1 Downstream			
Routine #2			
Repeat # 2 Upstream			
Repeat #2 Downstream			
Routine #3			
Repeat # 3 Upstream			
Repeat #3 Downstream			
Routine #4			
Repeat # 4 Upstream			
Repeat #4 Downstream			
Routine #5			
Repeat # 5 Upstream			
Repeat #5 Downstream			

Expand table or add pages as needed for additional sampling sites

Sample site distribution and rotation: The routine samples must represent the entire distribution system and should be rotated to different locations within the system if possible. This method allows for coverage of the distribution system without increasing the need for additional samples. Explain sample site rotation method representing the entire distribution system below:

Sample site schedule: A public water system must collect samples at regular time intervals throughout the month, except that a system using only groundwater (except groundwater under the direct influence of surface water) and serving 4,900 or fewer people may collect all required samples on a single day if they are taken from different sites. It is recommended that samples be taken early in the week and early in the month, so if repeat samples are needed, they can be taken before the end of the week or month. Explain sample schedule below:

Repeat Monitoring

A system that collects one routine sample per month or fewer must collect no fewer than four repeat samples for each total coliform-positive sample found. A system required to collect more than one routine sample per month must collect no fewer than three repeat samples for each total coliform-positive sample found.

Number of repeat samples required per positive routine sample: Three or Four

- All repeat samples must be taken within 24 hours of notification of a positive routine sample;
- One repeat sample is required to be taken from the same tap as the original sample;
- Two repeat samples must be taken within five taps of the original, one upstream and one downstream;
- If a fourth sample is required, it may be taken anywhere in the distribution system that may help identify a potential problem. If a fourth repeat sample is required, describe the sampling location. If that location is not specifically designated, explain how that location will be chosen: _____
- The Department may allow a system that serves a single building to collect the required set of repeat samples over a two- to four-day period. These systems must consult with the Department for this allowance;
- Repeat sample process must be repeated until either:
 - (1) a complete set of repeat samples are total coliform negative, or
 - (2) the system has exceeded the MCL for total coliform and notifies the state.

Note: For systems using groundwater and serving 1,000 people or fewer, the fourth repeat total coliform sample may be used to satisfy the Groundwater Rule triggered source water monitoring requirements if the sample is from the source, prior to disinfection and *E. coli* is the fecal indicator used. See the Groundwater Rule section for details.

Non-Acute MCL Compliance Determination

The total coliform MCL is exceeded for this system if there are

- More than 1 positive sample in a calendar month
- More than 5% positive samples in a calendar month (only applies to systems collecting 40 or more samples per month)

A public water system that has exceeded the MCL for total coliform must report the violation to the Department within 24 hours.

Fecal Coliform or *E. coli* Testing and Acute MCL Compliance Determination

- Any positive total coliform sample will be analyzed for fecal coliform or *E. coli*.
- If fecal coliform or *E. coli* is present, the system must notify the Department within 24 hours.
- If fecal coliform or *E. coli* is present, this may represent an acute violation of the MCL for total coliform, and may represent an acute risk to public health.
- Public notification may be required within 24 hours.

Any fecal coliform or *E. coli*-positive repeat sample or any total coliform-positive repeat sample following a fecal coliform or *E. coli*-positive routine sample constitutes an acute violation of the MCL for total coliform. All acute violations or situations require immediate consultation with the Division.

**In Colorado, for Acute Total Coliform Rule Violations
Contact the Colorado Department of Public Health and Environment
Phone Number 303-692-3308 or 303-692-3541
Or After-Hours Incident Reporting: 1-877-518-5608**

Routine Monitoring After a Positive Sample

If a system collecting fewer than five routine samples per month has one or more total coliform-positive samples, it must collect at least five routine samples during the next month the system provides water to the public. Number of routine samples required in the month following a total coliform positive:

Five or Return to routine monitoring requirement

Investigation of Total Coliform-Positive Samples

After repeat samples are taken, the system must investigate the cause of the positive sample. The results of the investigation must be available at the time repeat sample results are available. The investigation results may be used by the Department in the event that the system has an acute maximum contaminant level violation.

A template for this investigation may be found at

<http://www.cdphe.state.co.us/wq/drinkingwater/PublicWaterSystemReportingForms.html>

Residual Disinfectant Monitoring in the Distribution System

- The residual disinfectant must be measured at the same time and the same location as each total coliform bacteria sample
- These measurements must be conducted in the field by a certified operator (or under the direction of the certified operator)
- Residual disinfectant measurements must be written on each total coliform sample slip when it is submitted to the laboratory
- Systems must maintain a detectable residual in all locations in the distribution system. Detectable is considered at or above the detection limit of the field test kit method.

Disinfectant used in the distribution system:

- chlorine (residual must be measured as free chlorine)
 chloramines [residual must be measured as total chlorine (or combined chlorine with Department approval)]

Residual disinfectant quality assurance/quality control (QA/QC) – explain the exact procedures to be followed to ensure that the field test measurement will be accurate. This may be found in the manufacturer’s literature.

If the system measures residual disinfectant at other sites in addition to the required total coliform sampling sites, designate those sites in the table below.

Additional Residual Disinfectant Sampling Sites in Distribution System		
Site ID (if used on map)	Sample Site Name	Address

Expand table or add pages as needed for additional sample sites

Explain the frequency of the additional residual disinfectant monitoring.

Residual Disinfectant Treatment Technique Compliance Determination

The system is required to maintain a detectable residual disinfectant level in the distribution system. If the system fails to have a detectable residual in more than 5 percent of samples per month, for two consecutive months, the system is in violation of the treatment technique.

Inorganic and Organic Rules

In Colorado, the Chemical Contaminants [Inorganic Chemicals (IOCs), Volatile Organic Chemicals (VOCs) and Synthetic Organic Chemicals (SOCs)] Rules may be found in 5 CCR 1003-1, Article 6.

I, _____ have reviewed this Inorganic Chemicals and Organic Chemicals sampling plan, and that the provided information is true and correct to the best of my knowledge.

Signature _____ Date _____ Revision?

Laboratory Information

Inorganic chemicals lab:

Address: _____

Phone:

Organic chemicals lab:

Address: _____

Phone: _____

Initial, Routine and Reduced Monitoring Requirements

List of inorganic chemicals (IOC) Group:

Antimony
Arsenic
Asbestos
Barium
Beryllium
Cadmium

Chromium
Cyanide (as free cyanide)
Fluoride
Mercury
Nitrate
Nitrite

Selenium
Thallium

Entry Point ID (assigned by Department)	IOC Sampling Frequency	Fluoride Sampling Frequency	Nitrate Sampling Frequency	Nitrite Sampling Frequency	Monitoring Waivers
_____	<input type="checkbox"/> Quarterly <input type="checkbox"/> Yearly <input type="checkbox"/> Every 3 Years <input type="checkbox"/> Every 9 Years This frequency is: <input type="checkbox"/> Increased/Initial <input type="checkbox"/> Reduced <input type="checkbox"/> Routine	<input type="checkbox"/> Quarterly <input type="checkbox"/> Yearly <input type="checkbox"/> Every 3 Years <input type="checkbox"/> Every 9 Years This frequency is: <input type="checkbox"/> Increased/Initial <input type="checkbox"/> Reduced <input type="checkbox"/> Routine	<input type="checkbox"/> Quarterly <input type="checkbox"/> Monthly <input type="checkbox"/> Yearly This frequency is: <input type="checkbox"/> Increased/Initial <input type="checkbox"/> Reduced <input type="checkbox"/> Routine	<input type="checkbox"/> Quarterly <input type="checkbox"/> Yearly <input type="checkbox"/> Every 9 Years This frequency is: <input type="checkbox"/> Increased/Initial <input type="checkbox"/> Reduced <input type="checkbox"/> Routine	Asbestos Cyanide
_____	<input type="checkbox"/> Quarterly <input type="checkbox"/> Yearly <input type="checkbox"/> Every 3 Years <input type="checkbox"/> Every 9 Years This frequency is: <input type="checkbox"/> Increased/Initial <input type="checkbox"/> Reduced <input type="checkbox"/> Routine	<input type="checkbox"/> Quarterly <input type="checkbox"/> Yearly <input type="checkbox"/> Every 3 Years <input type="checkbox"/> Every 9 Years This frequency is: <input type="checkbox"/> Increased/Initial <input type="checkbox"/> Reduced <input type="checkbox"/> Routine	<input type="checkbox"/> Quarterly <input type="checkbox"/> Monthly <input type="checkbox"/> Yearly This frequency is: <input type="checkbox"/> Increased/Initial <input type="checkbox"/> Reduced <input type="checkbox"/> Routine	<input type="checkbox"/> Quarterly <input type="checkbox"/> Yearly <input type="checkbox"/> Every 9 Years This frequency is: <input type="checkbox"/> Increased/Initial <input type="checkbox"/> Reduced <input type="checkbox"/> Routine	Asbestos Cyanide
_____	<input type="checkbox"/> Quarterly <input type="checkbox"/> Yearly <input type="checkbox"/> Every 3 Years <input type="checkbox"/> Every 9 Years This frequency is: <input type="checkbox"/> Increased/Initial <input type="checkbox"/> Reduced <input type="checkbox"/> Routine	<input type="checkbox"/> Quarterly <input type="checkbox"/> Yearly <input type="checkbox"/> Every 3 Years <input type="checkbox"/> Every 9 Years This frequency is: <input type="checkbox"/> Increased/Initial <input type="checkbox"/> Reduced <input type="checkbox"/> Routine	<input type="checkbox"/> Quarterly <input type="checkbox"/> Monthly <input type="checkbox"/> Yearly This frequency is: <input type="checkbox"/> Increased/Initial <input type="checkbox"/> Reduced <input type="checkbox"/> Routine	<input type="checkbox"/> Quarterly <input type="checkbox"/> Yearly <input type="checkbox"/> Every 9 Years This frequency is: <input type="checkbox"/> Increased/Initial <input type="checkbox"/> Reduced <input type="checkbox"/> Routine	Asbestos Cyanide

Expand table or add pages as needed for additional entry points

The Department may reduce the total number of samples that must be analyzed by allowing the use of compositing. Composite samples from a maximum of five sampling points may be allowed. Compositing of all samples must be done in the laboratory. Prior to using compositing, systems should consult with the Department regarding sample dates, locations and the lab to be used.

List any samples that are composited: _____

List entry points to be included in the composite sample: _____

List of organic chemicals:

- Volatile Organic Chemicals (VOC) Group:

1,1- dichloroethylene	o-dichlorobenzene	Monochlorobenzene
1,1,1-trichloroethane	para-dichlorobenzene	Styrene
1,1,2-trichloroethane	trans-1,2 dichloroethylene	Tetrachloroethylene
1,2-dichloroethane	Benzene	Trichloroethylene
1,2-dichloropropane	Dichloromethane	Toluene
1,2,4-trichlorobenzene	Carbon tetrachloride	Xylenes (total)
Cis-1,2 dichloroethylene	Ethylbenzene	

- Synthetic Organic Chemicals (SOC) Group:

Alachlor	Heptachlor epoxide	Dinoseb
Aldicarb	Lindane	Diquat
Aldicarb sulfoxide	Methoxchlor	Endothall
Aldicarb sulfone	Polychlorinated byphenyls	Endrin
Atrazine	Pentachlorophenol	Glyphosate
Carbofuran	Toxaphene	Hexachlorobenzene
Chlordane	2,4,5-TO (Silvex)	Hexachlorocyclopentadiene
Dibromochloropropane	Benzo[a]pyrene	Oxamyl (Vyndate)
2,4-D	Dalapon	Picloram
Ethylene dibromide	di(2-ethylhexyl)adipate	Simazine
Heptachlor	di(2-ethylhexyl)phthalate	2,3,7,8-TCCD (Dioxin)

Entry Point ID (IDs assigned by Department)	VOC Sampling Frequency	SOC Sampling Frequency	Monitoring Waivers
_____	<input type="checkbox"/> Quarterly <input type="checkbox"/> Yearly <input type="checkbox"/> Every 3 Years This frequency is <input type="checkbox"/> Increased/Initial <input type="checkbox"/> Reduced <input type="checkbox"/> Routine	<input type="checkbox"/> Quarterly (List chemicals) _____ _____ <input type="checkbox"/> 1 Every 3 Years <input type="checkbox"/> 2 Quarterly per 3 Years (>3,300 population) This frequency is <input type="checkbox"/> Increased/Initial <input type="checkbox"/> Reduced <input type="checkbox"/> Routine	Dioxin Aldicarb (under Department administrative stay)
_____	<input type="checkbox"/> Quarterly <input type="checkbox"/> Yearly <input type="checkbox"/> Every 3 Years This frequency is <input type="checkbox"/> Increased/Initial <input type="checkbox"/> Reduced <input type="checkbox"/> Routine	<input type="checkbox"/> Quarterly (List chemicals) _____ _____ <input type="checkbox"/> 1 Every 3 Years <input type="checkbox"/> 2 Quarterly per 3 Years (>3,300 population) This frequency is <input type="checkbox"/> Increased/Initial <input type="checkbox"/> Reduced <input type="checkbox"/> Routine	Dioxin Aldicarb (under Department administrative stay)
_____	<input type="checkbox"/> Quarterly <input type="checkbox"/> Yearly <input type="checkbox"/> Every 3 Years This frequency is <input type="checkbox"/> Increased/Initial <input type="checkbox"/> Reduced <input type="checkbox"/> Routine	<input type="checkbox"/> Quarterly (List chemicals) _____ _____ <input type="checkbox"/> 1 Every 3 Years <input type="checkbox"/> 2 Quarterly per 3 Years (>3,300 population) This frequency is <input type="checkbox"/> Increased/Initial <input type="checkbox"/> Reduced <input type="checkbox"/> Routine	Dioxin Aldicarb (under Department administrative stay)

Expand table or add pages as needed for additional entry points

The Department may reduce the total number of samples that must be analyzed by allowing the use of compositing. Composite samples from a maximum of five sampling points may be allowed. Compositing of all samples must be done in the laboratory. Prior to using compositing, systems should consult with the Department regarding sample dates, locations and the lab to be used.

List any samples that are composited _____

List entry points to be included in the composite sample _____

Increased Monitoring Requirement

Inorganic chemicals

For new sources, the Department requires four (4) consecutive quarters of IOC sampling. Sampling must be done at the entry point associated with the new source.

If any chemical in the IOC group is above the MCL, a confirmation sample is required within two (2) weeks. If the average of the two samples is still above the MCL, the system will begin quarterly monitoring for that chemical beginning the next calendar quarter. Quarterly sampling is required at the entry point where the sample result was above the MCL.

If a nitrate or nitrite sample is above half the MCL the system will begin quarterly monitoring for that chemical beginning the next calendar quarter. Quarterly sampling is required at the entry point where the sample result was above half the MCL.

Special 24-hour confirmation sampling for nitrate and nitrite

If a sample is greater than the MCL a confirmation sample is required at that entry point within 24 hours of receiving notification of the result. Systems unable to collect the confirmation sample within 24 hours must issue a public notice within 24 hours and collect the confirmation sample within two (2) weeks. The system must immediately consult with the Department regarding the public notice.

Organic chemicals

For new sources, the Department requires four (4) consecutive quarters of organics sampling. Sampling must be done at the entry point associated with the new source.

If any chemical in the SOC group is above the regulatory detection limit, the system will begin quarterly monitoring for that chemical beginning the next calendar quarter. Quarterly sampling is required at the entry point where the sample result was above the detection limit.

If any chemical in the VOC group is above the regulatory detection limit, the system will begin quarterly monitoring for all VOCs beginning the next calendar quarter. Quarterly sampling is required at the entry point where the sample result was above the detection limit.

MCL Compliance Determination

Inorganic and organic chemicals

Compliance is determined at each entry point for each individual chemical/radionuclide based on a running annual average. Each entry point is evaluated independently for each chemical/radionuclide.

Nitrate and nitrite

Compliance is based on an average of the original sample and the confirmation sample unless a confirmation sample is not taken within the required timeframe, then it is based on the original sample. All nitrite and nitrite violations require immediate consultation with the Division.

**In Colorado, for Nitrate or Nitrite MCL Violations
Contact the Colorado Department of Public Health and Environment
Phone Number 303-692-3541
Or After-Hours Incident Reporting: 1-877-518-5608**

Disinfectants and Disinfection Byproducts Rule

In Colorado, the Disinfectants and Disinfection Byproducts Rule may be found in 5 CCR 1003-1, Article 7.

I, _____ have reviewed this Disinfectants and Disinfection Byproducts Rule sampling plan, and that the provided information is true and correct to the best of my knowledge.

Signature _____ Date _____

Revision?

Laboratory Information

Total trihalomethanes/haloacetic acids lab: _____

Address: _____

Phone: _____

Chlorite lab: _____

Address: _____

Phone: _____

Bromate lab: _____

Address: _____

Phone: _____

DISINFECTANTS

Routine and Reduced Monitoring Requirement

Chlorine and/or chloramines

Monitoring requirements are described in other sampling plans –

- The residual disinfectant must be measured at the same time and the same location as each total coliform bacteria sample. See the Total Coliform and Residual Disinfectant sampling plan.
- Systems that filter surface water (or groundwater under the direct influence of surface water) must also measure the residual disinfectant at the entry point. See the Surface Water Treatment Rules sampling plan.
- Systems conducting compliance monitoring under the Groundwater Rule may be required to measure residual disinfectant at the entry point. See the Groundwater Rule sampling plan.

Chlorine dioxide

If chlorine dioxide is used for any purpose, it must be monitored **daily** at each entry point

List entry point IDs (assigned by Department) to be sampled

Increased Monitoring Requirement

Chlorine and/or chloramines

Monitoring may be increased due to repeat/increased monitoring under the Total Coliform Rule and/or the Surface Water Treatment Rule.

Chlorine dioxide

If any daily sample exceeds the MRDL, the system must take a 3-sample set in the distribution system the next day in addition to the sample required at the entry point. The location and frequency of the samples depends on the type of disinfectant dosing in the distribution system as shown in the following table.

Only complete one of the following tables.

DISINFECTANTS			
	Sample Site Name/Address	Location Type	
<u>Routine and Reduced Monitoring Requirement</u>		Near the First Customer	
		Average Residence Time	
Chlorine and/or chloramines		Maximum Residence Time	
Chlorine Dioxide Sampling Sites in the Distribution System			
<small>For all other systems</small>			
Site ID (if used on map)	Sample Site Name/Address	Location Type	Frequency
		Near the First Customer	At least 6 hours between samples. (three samples total)

Chlorine dioxide quality assurance/quality control (QA/QC) – explain the exact procedures to be followed to ensure that the test result will be accurate. This may be found in the test kit manufacturer’s literature.

MRDL Compliance Determination

Chlorine and/or chloramines MRDL

Compliance is based on a running annual average of distribution system monitoring, computed quarterly. If the average is above the MRDL, the system is in violation of the MRDL. To protect public health, systems are allowed to temporarily increase residual disinfectant beyond the MRDL to address a specific microbiological contamination event.

Non-acute chlorine dioxide MRDL

Compliance is based on consecutive daily samples at the entry point. If any two daily samples are above the MRDL, but all distribution system samples are at or below the MRDL, this is considered a non-acute MRDL violation. Failure to monitor at the *entry point* the day after an entry point sample exceeds the MRDL is also considered a non-acute MRDL violation

Acute chlorine dioxide MRDL

Compliance is based on the daily sample at the entry point and the distribution system monitoring on the next day. If a daily sample at the entry point is above the MRDL and on the following day at least one sample in the distribution system is also above the MRDL, this is considered an acute MRDL violation. Failure to monitor in the *distribution system* the day after an entry point sample exceeds the MRDL is also considered an acute MRDL violation. Public notification will be required within 24-hours.

**In Colorado, for Acute Chlorine Dioxide MRDL Violations
Contact the Colorado Department of Public Health and Environment
Phone Number 303-692-3541
Or After-Hours Incident Reporting: 1-877-518-5608**

DISINFECTION BYPRODUCTS

Routine and Reduced Monitoring Requirement

STAGE 1 total trihalomethanes (TTHM) and haloacetic acids (HAA5)

TTHM and HAA5 must be monitored in the distribution system.

Number of samples required: _____

Monitoring frequency required: Quarterly, Yearly (in August) or Every Three Years (in August)

This frequency is Reduced or Routine

Has the Department approved the system to reduce sampling locations based on multiple wells in the same aquifer? Yes No

If the system collects more than the minimum required samples, explain how the extra sampling will be scheduled and located to represent system conditions. Explain how this data will be used for compliance.

Explain if sampling will be modified for seasonal treatment plants/sources.

If system uses surface water (or groundwater under the direct influence of surface water) and has been granted a reduced frequency, raw water total organic (TOC) must also be conducted **quarterly** from each SW/GU source.

List SW/GU sources on quarterly TOC monitoring

STAGE 1 TTHM and HAA5 Sampling Sites		
Site ID (if used on map)	Sample Site Name/Address	Does this site represent maximum residence time or average residence time?

Expand table or add pages as needed for additional sampling sites

STAGE 2 total trihalomethanes (TTHM) and haloacetic acids (HAA5)

The system will stop conducting Stage 1 monitoring and begin Stage 2 compliance monitoring in (month/year) _____

If the system was required to complete an Initial Distribution System Evaluation (IDSE) Report, monitoring must be conducted per the recommendations of the IDSE Report.

TTHM and HAA5 must be monitored in month of highest disinfection byproduct formation. Calendar month of highest disinfection byproduct formation: _____

Number of samples required: _____

Monitoring frequency required:

Quarterly (every 90 days). List months to sample _____

Yearly. List month to sample _____

Every Three Years. List month to sample _____

This frequency is Reduced or Routine

If system uses surface water (or groundwater under the direct influence of surface water) and has been granted a reduced frequency, raw water total organic (TOC) must also be conducted quarterly (**every 90-days**) from each SW/GU source.

List SW/GU sources on quarterly (every 90 days) TOC monitoring _____

List months to sample _____

STAGE 2 TTHM and HAA5 Sampling Sites		
Site ID (if used on map)	Sample Site Name/Address	Sample Site for TTHM, HAA5 or Both?

Expand table or add pages as needed for additional sampling sites

Chlorite (only applies to systems using chlorine dioxide)

Chlorite must be monitored **daily** at each entry point that uses chlorine dioxide.

List entry point IDs (assigned by Department) to be sampled _____

Amperometric titration may be used for daily monitoring at the entry point.

Chlorite quality assurance/quality control (QA/QC) – explain the exact procedures to be followed to ensure that the test result will be accurate.

Chlorite must also be monitored in the distribution system. The distribution system samples must be analyzed at a certified laboratory by ion chromatography. The system must collect a **3-sample set** Monthly (routine frequency) or Quarterly (reduced frequency)

Chlorite Sampling Sites in the Distribution System		
Site ID (if used on map)	Sample Site Name/Address	Location Type
		Near the First Customer
		Average Residence Time
		Maximum Residence Time

Bromate (only applies to systems using ozone)

Bromate must be monitored at each entry point that uses ozone treatment:

Monthly (routine frequency) or Quarterly (reduced frequency)

List entry point IDs (assigned by Department) to be sampled _____

Increased Monitoring Requirement**STAGE 1 total trihalomethanes (TTHM) and haloacetic acids (HAA5)**

Any system monitoring less than quarterly must begin quarterly monitoring if either TTHM or HAA5 results (or average of results if multiple samples are required) are above the MCL. The system will begin quarterly monitoring for both TTHM and HAA5 beginning the next calendar quarter.

For systems on a reduced monitoring frequency - if any monitoring period exceeds 0.060 mg/L for TTHM or 0.045 mg/L for HAA5, the system must return to the routine monitoring frequency. Also, if the system is required to perform raw water TOC monitoring to qualify for reduced TTHM/HAA5 monitoring, and the annual average TOC level is greater than 4.0 mg/L, the system must return to routine monitoring frequency.

STAGE 2 total trihalomethanes (TTHM) and haloacetic acids (HAA5)

Any system monitoring less than quarterly must begin quarterly monitoring if any TTHM or HAA5 results are above the MCL at any sampling location. The system will begin quarterly monitoring for both TTHM and HAA5 beginning the next calendar quarter at all sample locations.

For systems on a reduced monitoring frequency - if on quarterly monitoring and the LRAA at any location in any monitoring period exceeds either 0.040 mg/L for TTHM or 0.030 mg/L for HAA5, or if the annual or triennial sample at any location exceeds 0.060 mg/L for TTHM or 0.045 mg/L for HAA5, the system must return to the routine monitoring frequency at all sample locations. Also, if the system is required to perform raw water TOC monitoring to qualify for reduced TTHM/HAA5 monitoring, and the annual average TOC level is greater than 4.0 mg/L, the system must return to routine monitoring frequency at all sample locations.

Chlorite (only applies to systems using chlorine dioxide)

If any daily sample exceeds the MCL, the system must take a 3-sample set in the distribution system the next day in addition to the sample required at the entry point. The locations must be the same as the routine distribution system monitoring. The system may use these samples to meet the routine distribution system requirement.

For systems on a reduced distribution system monitoring frequency - if any sample at the entry point or in the distribution system exceeds 1.0 mg/L, the system must return to monthly distribution system monitoring.

Bromate (only applies to systems using ozone)

For systems on a reduced monitoring frequency - if the running annual average, computed quarterly, exceeds 0.0025 mg/L using methods 317.0 r 2.0, 326.0 or 321.8, the system must return to monthly monitoring.

MCL Compliance Determination

STAGE 1 total trihalomethanes (TTHM) and haloacetic acids (HAA5)

For both TTHM and HAA5, compliance is based on a running annual average of quarterly sampling. The running annual average is computed system-wide, not at each sampling location. If the average is above the MCL, this is considered a MCL violation.

STAGE 2 total trihalomethanes (TTHM) and haloacetic acids (HAA5)

For both TTHM and HAA5, compliance is based on a running annual average of quarterly sampling. The running annual average is computed for each sampling location independently (locational running annual average). If the average is above the MCL at any location, this is considered a MCL violation.

Chlorite (only applies to systems using chlorine dioxide)

Compliance is based on the average of the 3-sample set collected from the distribution system. If the average is above the MCL, this is considered a MCL violation.

Bromate (only applies to systems using ozone)

Compliance is based on a running annual average of quarterly sampling. The running annual average is computed for each sampling location independently. If the average is above the MCL at any location, this is considered a MCL violation.

Lead and Copper Rule

For Colorado, the Lead and Copper Rule may be found in 5 CCR 1003-1, Article 8.

I, _____ have reviewed this Lead and Copper Rule sampling plan, and that the provided information is true and correct to the best of my knowledge.

Signature _____ Date _____

Revision?

Laboratory Information

Preferred lab: _____

Address: _____

Phone: _____

Routine and Reduced Monitoring Requirement

Lead and Copper Tap Monitoring

Lead and copper tap samples must be collected in the distribution system from cold water that has stood motionless for at least six hours.

Number of sampling sites required: _____

Monitoring Frequency Required:

Every Six Months, Yearly (June – Sept) or Every Three Years (June – Sept)

This frequency is: Reduced or Routine

Lead and copper tap sampling quality assurance/quality control (QA/QC) – lead copper tap samples are typically collected by non-water system personnel (instead of at a certified operator). If this is the case, explain the exact procedures to be followed to ensure that the sample was properly collected before submitting it to the lab.

Increased Monitoring Requirement

Lead and copper tap monitoring

For new water systems, the Department requires two initial consecutive six-month periods of lead and copper monitoring at standard number of tap sites.

For systems on a reduced lead and copper sampling frequency... if the system exceeds the action level for either lead or copper, the system must return to routine monitoring at standard number of tap sites beginning Jan or next calendar year.

Action Level Exceedance Determination

If more than 10% of the tap monitoring samples is greater than the action level (i.e. if the 90th percentile level is greater than the action level), the system has exceeded the action level. This is not a violation, but requires further action.

The system must consult with the Department if the action level is exceeded. The Department will require the system to conduct investigatory sampling (water quality parameter monitoring and source water monitoring and routine lead and copper tap monitoring) and take corrective actions. The system will also be required to conduct public education for a lead exceedance.

Groundwater Rule

In Colorado, the Groundwater Rule may be found in 5 CCR 1003-1 Article 13.

I, _____ have reviewed this Groundwater Rule sampling plan, and that the provided information is true and correct to the best of my knowledge.

Signature _____ Date _____ Revision?

Laboratory Information

Preferred lab: _____

Address: _____

Phone: _____

Alternate lab: _____

Address: _____

Phone: _____

Routine Monitoring Requirement

Triggered source water monitoring

This section *does not apply* if system provides Department approved 4-log treatment of viruses and conducts compliance monitoring as approved by the Department.

Within 24-hours of notification that a distribution system sample is positive for total coliform bacteria, the system must collect a raw fecal coliform or *E. coli* sample from each groundwater source that was in use at that time.

Has the system received Department approval to use a sampling site that represents more than one groundwater source? Yes No

If yes, name of sampling site _____

Sources represented by this sampling site _____

Systems serving 1,000 people or fewer may use a triggered source water monitoring sample to satisfy the fourth repeat sample required for the Total Coliform Rule repeat sampling requirements.

Compliance monitoring for 4-log treatment

This section only applies if system provides Department approved 4-log treatment of viruses and conducts compliance monitoring as approved by the Department.

The system must maintain the Department assigned minimum operations/levels (describe below) every day the system serves groundwater to consumers. Residual disinfectant must be monitored before or at the first consumption tap. If monitored before the first consumption tap, it must be after contact time.

Treatment Plant Name and ID (IDs assigned by Department)	Minimum Residual Disinfectant (assigned by Department)	Membrane Filtration Operation Requirements (if assigned by Department)	Alternative Filtration Operation Requirements (if assigned by Department)
	_____ mg/L at entry point monitored <input type="checkbox"/> continuously or <input type="checkbox"/> daily at peak flow		
	_____ mg/L at entry point monitored <input type="checkbox"/> continuously or <input type="checkbox"/> daily at peak flow		
	_____ mg/L at entry point monitored <input type="checkbox"/> continuously or <input type="checkbox"/> daily at peak flow		

Expand table or add pages as needed for additional treatment plants

Quality assurance/quality control (QA/QC) (applies to all parameters above) – explain the exact procedures to be followed to ensure that the test result will be accurate. _____

Increased Monitoring Requirement

Additional source water monitoring (for systems required to collect source water samples)

If any raw sample collected from a groundwater source is fecal indicator-positive (fecal coliform or *E. coli*), the system must collect a set of five additional raw fecal coliform or *E. coli* samples from the same groundwater source. This sampling must be conducted within 24-hours of notification of the sample result.

Alternatively, the Department may waive the requirement to collect five additional samples if the Department requires immediate corrective action instead.

Compliance monitoring for 4-log treatment

If a system monitors residual disinfectant daily (rather than continuously) and the residual drops below the Department assigned minimum level (shown in table above), the system must take follow-up measurements every 4-hours until the residual is restored to the assigned level.

Assessment source water monitoring

If directed by the Department, the system must conduct periodic fecal coliform or *E. coli* monitoring at each groundwater source. This monitoring must meet the Department assigned requirements.

Is the system required to conduct assessment monitoring? Yes No

Beginning date _____ and ending date _____

List groundwater sources to be sampled: _____

Number of samples required at each source _____

Monitoring frequency required: Weekly Monthly

Treatment Technique (TT) Compliance Determination

A system can be in violation of the treatment technique if any of the following occurs:

- A triggered source water monitoring sample is positive for fecal or *E. coli* and the Department requires immediate corrective action;
- A triggered source water monitoring sample **and** at least one of the five additional source water monitoring samples are positive for fecal or *E. coli*; or
- An assessment source water monitoring sample is positive for fecal or *E. coli*.
- If conducting 4 log compliance monitoring and the residual disinfectant level falls below the required minimum for 4 or more hours.

If a system is in violation of the treatment technique, the system must consult with the Department regarding corrective actions.

Section 5: Maps

This section includes:

- Sketch of Water Source
- Process Schematic of Water Treatment Plant
- Map of Distribution System
- Map of Sampling Locations

Insert Sketch of Water Source Here

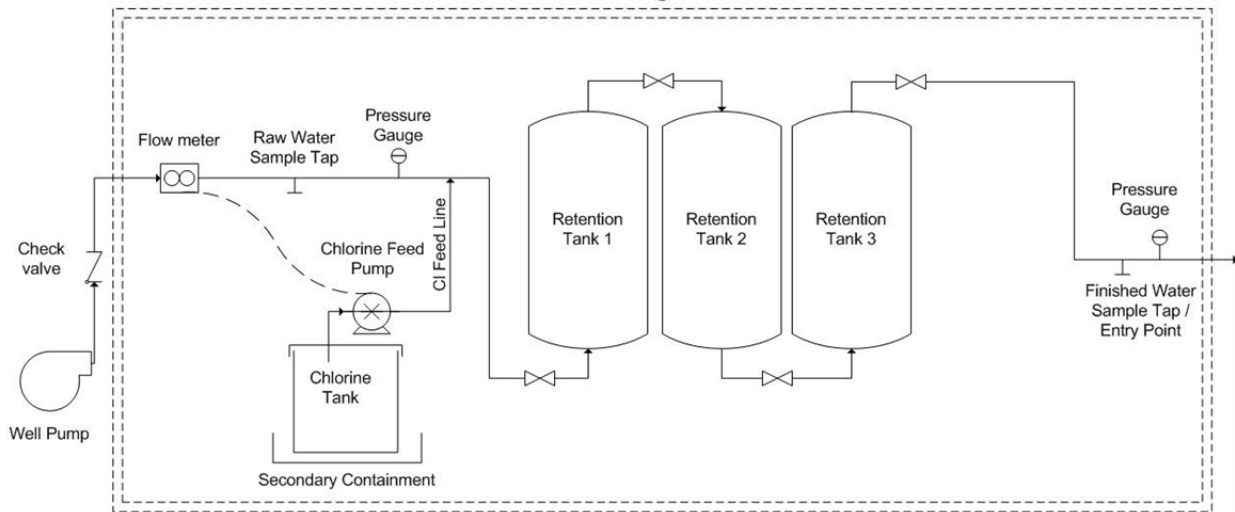
Insert Process Schematic of Water Treatment Plant Here

Insert Map of Distribution System Here

Insert Map of Sampling Locations Here

Example System Map 1

Process Flow Diagram – Treatment Schematic
3 Tank Configuration



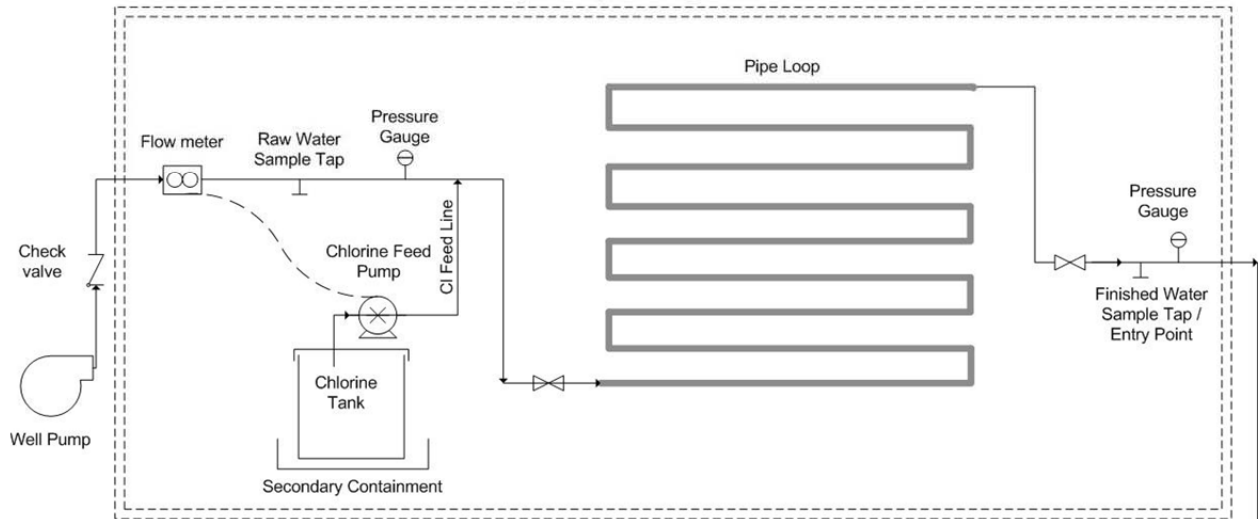
System Specific Design Configurations	Recommended Design Features
<p>must be documented by system:</p> <ul style="list-style-type: none"> - Well Pump - Well Pump Control - Distribution system pressure pump - Any additional treatment (e.g., roughing filter) - Distribution system storage (if required) 	<p>Recommended by not required elements which will contribute to the operational ease of the treatment process:</p> <ul style="list-style-type: none"> - Air release valve - Bypass piping around flowmeter - Static mixer - Drain(s) - Redundancy (second pump, replacement parts) - Blow off line - Unions - Redundancy (second pump, replacement parts)

Distribution System Tank (no treatment)
Outside the scope of the Division's pre-accepted design.

Depending on system configuration, distribution system pumps or additional storage may be necessary. Storage tanks must be Division approved prior to installation.

Example System Map 2

Process Flow Diagram – Treatment Schematic
Pipe Loop Configuration



<u>System Specific Design Configurations</u>	<u>Recommended Design Features</u>
must be documented by system: - Well Pump - Well Pump Control - Distribution system pressure pump - Any additional treatment (e.g., roughing filter) - Distribution system storage (if required)	Recommended by not required elements which will contribute to the operational ease of the treatment process: - Air release valve - Bypass piping around flowmeter - Static mixer - Drain - Redundancy (second pump, replacement parts) - Blow off line - Unions - Redundancy (second pump, replacement parts)

Distribution System Tank (no treatment)
Outside the scope of the Division's pre-accepted design.

Depending on system configuration, distribution system pumps or additional storage may be necessary. Storage tanks must be Division approved prior to installation.

Section 6: Sampling Plans

This section includes:

- Weekly Chlorine Monitoring Sampling Plan
- Total Coliform Bacteria Sampling Plan
- Nitrate and Nitrite Sampling Plan
- Other Sampling Plans

Weekly Chlorine Sampling Plan

Note:

- Weekly chlorine as required for triggered monitoring and additional chlorine monitoring as necessary

1.0 Introduction

Contaminated drinking water is one of the oldest known public health concerns. Preventing waterborne disease is one of the primary objectives of any drinking water system. Although waterborne disease outbreaks are relatively uncommon in the United States, they do occur. In most cases, the results are diarrhea, cramps, nausea, and other symptoms. But in some cases—particularly among the young, the elderly, and persons with weakened immune systems—waterborne diseases can lead to severe illness. The risk of waterborne disease is greatly reduced when the water system is designed and operated to provide multiple barriers of protection. The key barriers are:

- Source water protection
- Treatment
- Distribution system integrity
- Monitoring and public awareness

2.0 Groundwater Rule-Triggered Monitoring

Part of a general monitoring plan contains the Groundwater Rule. This rule requires the system to choose continuous online monitoring for disinfectant to comply with 4-log inactivation requirements or weekly chlorine monitoring to comply with triggered monitoring requirements. The sample site should be the entry point into the system.

2.1 Sample Collection Techniques and Procedures

Collect your sample within the first part of the week, in case there is a problem with the analysis.

2.1.6 Sampling Procedures for Residual Chlorine

As of July 1, 2011, collection of a residual chlorine sample on a weekly basis is required. The procedures presented below should be followed to collect a representative sample.

- A. Collect a “representative” sample by allowing the water to run at least four to five minutes before testing.
- B. Test chlorine residuals at least once a week to assure that your residual provides adequate disinfection to your system (should be ≥ 0.20 milligrams per liter).
- C. Your sample vial or tube should be clean. Dirt or even finger prints on the vial can impact the sample results.
- D. Have the correct milliliter reagent packet for your sample vial (i.e.: 10 milliliter packet for ten milliliter sample), check the expiration date on your reagent, and use the required testing packet or reagent (Free or Total) for your system.
- E. Make sure that your chlorine equipment is functioning properly. If you have a battery operated tester, make sure your batteries are fresh and the contacts are clean. Have a repair kit and tubing on hand for any metering pumps

2.0 Sample Sites

The location of each sample site should be entered in the table found in the laboratory results section of this notebook. A sample location number or other designation should be used to identify the location on the system map.

3.0 References

- Ground Water Rule Triggered and Representative Monitoring: A Quick Reference Guide. EPA 815-F-08-004, July 2008
- Bacon, Mike, Colorado Department of Public Health and Environment, Aqua Talk Newsletter, Spring 2011, Vol. 5, Issue 2, “Coaches Corner”

Total Coliform Bacteria Sampling Plan

Notes:

- Check your monitoring schedule for collection dates
- In Colorado, see the total Coliform Rule Quick Guide at <http://www.cdphe.state.co.us/wq/drinkingwater/pdf/TCRQuickGuide.pdf>

1.0 Introduction

The Total Coliform Rule (TCR) is the Federal regulation under the Safe Drinking Water Act (SDWA) that sets maximum contaminant levels (MCLs) and monitoring requirements for certain biological contaminants. It requires every Public Water System (PWS) to periodically collect samples and analyze them for bacteria called coliforms. Samples collected for analysis of coliform must follow the procedures documented in this Sampling and Analysis Plan.

Regulated PWSs are required, under the Safety Drinking Water Act (SDWA), to provide water that meets federal standards to their customers 24 hours a day, 365 days a year. If the water supply becomes contaminated, consumers can become seriously ill. Operators, one of the most important assets of any public water system, should take many steps to ensure that the public is provided with safe drinking water. One of the most important steps is to regularly test for coliform bacteria.

Contaminated drinking water is one of the oldest known public health concerns. Preventing waterborne disease is one of the primary objectives of any drinking water system. Although waterborne disease outbreaks are relatively uncommon in the United States, they do occur. In most cases, the results are diarrhea, cramps, nausea, and other symptoms. But in some cases—particularly among the young, the elderly, and persons with weakened immune systems— waterborne diseases can lead to severe illness. The risk of waterborne disease is greatly reduced when the water system is designed and operated to provide multiple barriers of protection. The key barriers are:

- Source water protection
- Treatment
- Distribution system integrity
- Monitoring and public awareness

2.0 Total Coliform Plan

Part of a general monitoring plan contains the Total Coliform Plan. In this plan, routine sites, upstream, and downstream sites are documented, along with a map of the system showing the location of these sites. These sites need to be “representative” of your distribution system. Routine sites should not include the well house or the last tap of your system. Routine sites should be “rotated” in the sample period noted on your sampling schedule. How many routines should you collect is based on how many it takes to achieve “representation” of your system. For large distribution systems, it is suggested to break your system into quadrants /areas and take a routine sample in each one of these quadrants.

2.1 Sample Collection Techniques and Procedures

If the laboratory that supplied the sampling containers provided instructions with the sampling kit for the type of monitoring you are doing, refer to those instructions.

Collect your sample within the first part of the week, month, or quarter of your schedule, in case there is a problem with the analysis.

2.1.1 Before you begin sampling.

Before you begin sampling, it is important to have all of your supplies on hand. Here is a list of the suggested supplies you may need:

- Cooler for shipping and storage of your sample while in transit between collection point and lab
- Ice for your shipping cooler
- PVC or unsupported Neoprene gloves to keep sample from possible contamination
- 100mL sample bottle with sodium thiosulfate for chlorinated water systems
- Lab slips, labels, and markers for sample container identification

Additional Recommended Items are:

- Paper towel for drying off the outside of your sample container after sampling
- Plastic storage baggies for ice and sample container

2.1.2 Sampling Containers

Although different sizes and types of sampling containers may be used for collecting coliform samples, most laboratories supply 100mL sterilized, plastic bottles. A few laboratories may furnish single service, sterilized glass bottles.

2.1.3 Collecting a Clean Sample

As a general rule, proper washing of hands is highly recommended for the sample collector. Also, food, drink, and even 2nd hand cigarette smoke should never come into contact with the sample or its containers. These foreign objects have been suspected of causing false results in samples, so be sure to practice good clean sample collection procedures.

2.1.4 Damaged Sample Containers

It is recommended that you not sample with any containers that appear to have been tampered with since this may cause an undesirable sample result.

2.1.5 Sampling Procedures for Coliform

Follow the procedures recommended by the laboratory (if any) for sampling and addition of preservatives. The following steps describe the general sampling procedures to be followed for collecting TCR coliform and *E. coli* monitoring samples.

- A. Sampling site selection: Achieve a representative chlorine residual. Faucets and specially-installed sampling taps are the two most common types of sampling sites. If faucets are to be used, each faucet should be examined carefully to ensure its suitability. Do not collect samples from goose neck or swivel faucets and do not collect samples from outside spigots/hydrants. Poor faucet design or placement may contribute to invalid sample results or fail to identify problems within your water system. Collect samples from businesses or residents on the system.
- B. Remove any aerator, strainer, or hose that is present, as any of these may harbor bacteria and cause a false coliform positive sample result.
- C. Turn on the cold water and run the water to flush the tap. This typically takes 4 to 5 minutes. Then reduce the flow so that the stream is no greater than ¼ inch in diameter, or the width of a pencil. Check for steady flow. While the water is running, fill out the labels, tags, and laboratory forms. Apply the labels to the containers. Do not change the water flow once the sampling has started as that could dislodge microbial growth. Be sure to test for chlorine in the water and place the results on your chain of custody and on the bottle.
- D. Remove the bottle cap. Be careful not to contaminate the sample by touching the inside of the cap or the inside of the sample container with your fingers.
- E. Position the bottle under the water flow. Hold the bottle in one hand and the cap in the other. Do not lay the cap down or put it in your pocket! Water dripping from your hands may also cause contamination of the sample so extra care should be taken when collecting this sample. Fill the bottle to the shoulder or to about ¼ inch from the top. Some bottles have a fill line.
- F. The sample container should be tightly capped. Blot the sample container with paper towel to dry it off. Since ice is sometimes recommended for use in shipping, it is recommended that it be bagged separately to eliminate any contamination of the sample.
- G. Turn the tap off. Replace the aerator, strainer, or hose.
- H. Check that the information on the label is correct (or check the laboratory form and attach it to the bottle with a rubber band). Complete any additional laboratory forms that came with the sample bottle, including chain-of-custody form (if necessary).
- I. **IMPORTANT:** The samples must reach the laboratory and the analysis must begin within 24 hours of collection. It is recommended that all samples be refrigerated or cooled to 4 degrees to 10 degrees Celsius (39 degrees to 50 degrees Fahrenheit). If the laboratory is nearby, refrigerate with ice packs, and deliver the samples there directly. If not, send the samples overnight by US mail or by an overnight courier. Taping of the chest prior to shipping is also recommended since the container could be mistakenly opened during shipment. Also, be sure to tape any additional forms or sample documentation either inside or on the outside of the lid.

2.1.6 Sampling Procedures for Residual Chlorine

As of July 1, 2011, collection of a residual chlorine sample on a weekly basis is required. The procedures presented below should be followed to collect a representative sample.

- A. Collect a “representative” sample by allowing the water to run at least four to five minutes before testing.
- B. Test chlorine residuals at least once or twice a week to assure that your residual provides adequate disinfection to your system (suggest 0.20-0.50 milligrams per liter).
- C. Your sample vial or tube should be clean (acid washed). Dirt or even finger prints on the vial can impact the sample results.
- D. Have the correct milliliter reagent packet for your sample vial (i.e.: 10 milliliter packet for ten milliliter sample), check the expiration date on your reagent, and use the required testing packet or reagent (Free or Total) for your system.
- E. Make sure that your chlorine equipment is functioning properly. If you have a battery operated tester, make sure your batteries are fresh and the contacts are clean. Have a repair kit and tubing on hand for any metering pumps

2.0 Sample Sites

The location of each sample site should be entered in the attached table. A sample location number or other designation should be used to identify the location on the system map.

The sample location for the collection of residual chlorine samples should also be given a distinct location identification. The location of these sites should be entered in the attached table.

3.0 References

- Total Coliform Rule: A Handbook for Small Non-Community Water Systems serving less than 3,300 Persons. EPA 816-B-06-001, July 2006
- Bacon, Mike, Colorado Department of Public Health and Environment, Aqua Talk Newsletter, Spring 2011, Vol. 5, Issue 2, “Coaches Corner”

Nitrate and Nitrite Sampling Plan

Note:

- Check your monitoring schedule for collection dates

1.0 Introduction

Nitrates and nitrites are nitrogen-oxygen chemical units which combine with various organic and inorganic compounds. Once taken into the body, nitrates are converted into nitrites. The greatest use of nitrates is as a fertilizer.

In 1974, Congress passed the Safe Drinking Water Act. This law requires EPA to determine safe levels of chemicals in drinking water which do or may cause health problems. These non-enforceable levels, based solely on possible health risks and exposure, are called Maximum Contaminant Level Goals.

The MCLG for nitrates has been set at 10 parts per million (ppm), and for nitrites at 1 ppm, because EPA believes this level of protection would not cause any of the potential health problems described below.

Based on this MCLG, EPA has set an enforceable standard called a Maximum Contaminant Level (MCL). MCLs are set as close to the MCLGs as possible, considering the ability of public water systems to detect and remove contaminants using suitable treatment technologies.

The MCL for nitrates has been set at 10 ppm, and for nitrites at 1 ppm, because EPA believes, given present technology and resources, this is the lowest level to which water systems can reasonably be required to remove this contaminant should it occur in drinking water.

These drinking water standards and the regulations for ensuring these standards are met, are called National Primary Drinking Water Regulations. All public water supplies must abide by these regulations.

1.1 Health effects

Short-term: Excessive levels of nitrate in drinking water have caused serious illness and sometimes death. The serious illness in infants is due to the conversion of nitrate to nitrite by the body, which can interfere with the oxygen-carrying capacity of the child's blood. This can be an acute condition in which health deteriorates rapidly over a period of days. Symptoms include shortness of breath and blueness of the skin.

Long-term: Nitrates and nitrites have the potential to cause the following effects from a lifetime exposure at levels above the MCL: diuresis, increased starchy deposits and hemorrhaging of the spleen.

2.0 Nitrate/Nitrite Sample Collection Technique

Steps and procedures for collecting nitrate samples can vary depending on the laboratory used, so follow the instructions provided by the individual laboratory. The general sampling procedure for nitrate monitoring is as follows:

A. Step One

Freeze the chemical cold pack before collecting samples.

B. Step Two

Locate a sampling tap downstream of treatment (if applicable) but prior to entry to the distribution system.

C. Step Three

Remove any attachment from the tap such as hoses, filters, screens, or aerators.

D. Step Four

Flush the water for about 10 minutes or until the water reaches a constant temperature.

E. Step Five

While water is running and before collecting the sample, COMPLETELY fill out the laboratory form and sample label. Laboratory forms vary, but the following information is very important to include:

- Water System ID number
- Water System name
- Sample type and purpose (usually “RC” for routine compliance sample)
- Collection date and time
- Sample location (specific location, or example “pump house tap”)
- System type
- Sample type (i.e., pre-treatment/raw or post-treatment/finished)

F. Step Six

Fill sample container bottle to the shoulder of the bottle.

G. Step Seven

Keep all samples refrigerated until ready to ship. Just prior to shipping, package the samples, frozen chemical cold pack, and completed sample information form into a container and arrange for delivery to the laboratory within 24 hours. In Colorado, if you have questions about sampling collection procedures, contact the Water Quality Control Division.

3.0 References

- US EPA, EPA/814-B-92-001, Pocket Sampling Guide for Operators of Small Water Systems, April 1992.
- Colorado Department of Public Health and Environment, Safe Drinking Water A Guide for Transient Non Community Public Water Systems that use Ground Water

Other Sampling Plans

This Section Includes:

- Inorganic Chemicals
- Disinfectant and Disinfection Byproducts
- Lead and Copper
- Organic Chemicals
- Radionuclides

Section 7: Groundwater Rule Compliance

This section includes:

- Frequently Asked Questions

Groundwater Rule FAQ's

How do I calculate contact time and log inactivation?

Go to the following links for additional information:

http://www.cdph.state.co.us/wq/engineering/pdf/LogInactivationBrochure_2009.pdf

<http://water.epa.gov/lawsregs/guidance/sdwa/qref/index.cfm>

How often do I have to sample my source(s)?

Source water samples are required when a routine TCR distribution system sample is total coliform positive and the GWS is not providing 4-log inactivation/removal of viruses and is not conducting compliance monitoring. Source water samples may also be required if the system is conducting source Water Assessment Monitoring.

Where do I collect my source water sample?

Source water samples must be collected at a point **prior to disinfection**, preferably from a raw water sample tap located at the source. Systems with an approved triggered source water monitoring plan will be allowed to collect a sample that represents multiple sources.

What if my chlorine residual falls below the required 4-log level?

If your system has certified 4-log inactivation/removal of viruses and is conducting compliance monitoring (either by choice or due to corrective action being required), you will have four hours to bring your chlorine residual back to appropriate levels or you must contact the Division and public notification will be required (Tier 2). Grab samples must be collected every four hours until the residual level is back to the appropriate level. If your residual level is below the required level at the time of a TC+, a triggered source water sample will be required.

What if my source water sample comes back TC+ and EC+?

Source water samples are required to be analyzed for fecal indicators (E.coli, coliphage, or enterococci). Source water samples that are TC+, but fecal indicator negative will not require additional sampling or corrective action. However, if the source water sample is TC+ and fecal indicator positive, an additional 5 source water samples should be collected at each source that tested positive for the fecal indicator. If any of the additional samples is fecal indicator positive, corrective action is required. The Division has the authority to require corrective action after the first fecal indicator positive sample.

How long do I have to complete corrective action?

Corrective actions for significant deficiencies or for focally contaminated source water must be corrected within 120 days or the system must be on a corrective action plan that outlines the timeframe for correcting the deficiencies.

What are the public notification requirements?

There are several public notification requirements under the GWR:

1. Tier 1 PN is required for fecal indicator positive source water samples
2. Tier 2 PN is required for failure to maintain 4-log inactivation/removal of viruses for more than four hours.
3. Tier 3 PN is required for failure to collect the required source water monitoring sample.
4. Tier 3 PN is required for failure to correct significant deficiencies within 120 days. For each year the deficiency goes uncorrected, Tier 3 PN will be required.

What happens if I get a significant deficiency?

You will be notified of the significant deficiency within 30 days of the identification of the deficiency. You must respond to the Division within 30 days of notification and indicate how you will address the deficiency. You must respond to the Division in writing within 45 days of notification and indicate how you will address the deficiency. Within 120 days, the deficiency must be corrected or you must be on a corrective action plan that outlines the timeframe for correcting the deficiencies.

What if I want to be certified for 4-log Inactivation instead of triggered monitoring?

Go to the following link for additional information:

<http://www.cdphe.state.co.us/WQ/drinkingwater/pdf/4LogCertification.pdf>

Section 8: Emergency Response

This section includes:

- Emergency Telephone List
- Planning for an Emergency
- Emergency Response Plan
- Water/Wastewater Agency Response Network
- Public Notification Contact List for Colorado

Colorado Emergency Telephone List

**CDPHE 24-hour Emergency Incident Reporting Line
1-877-518-5608**

CDPHE Non-Community Cathy Heald	303-692-3613
CDPHE Drinking Water Engineer Douglas & Arapahoe County Paul Kim	303-692-3279
CDPHE Drinking Water Engineer Adams County Amy Zimmerman	303-692-3545
CDPHE Cross Connection Jorge Delgado	303-692-3511
TCHD Water Specialist Hope Dalton	720-200-1583
TCHD After-Hours Emergency Response Team Pager	303-890-0230
TCHD After-Hours Emergency Line (leave a message)	303-220-9200
CDPHE Operator Certification Lori Billeisen	303-692-3510

Operator and Responsible Charge _____

Owner of the Facility _____

Other Emergency Contacts _____

Questions to consider.....

- **Who will be called and when?**
Include system owner, system operator, local emergency numbers, CDPHE, & TCHD
- **In Colorado, who will contact CDPHE Incident Reporting Hotline at 877-518-5608? When?**
- **How will you provide water till your system is returned to functioning?**
- **How will the water be returned to service?**
- **Who will conduct the public notification? How?**
- **What is the method of notification (phone, direct communication, signage)?**
- **In an event of an emergency where are additional parts, chemicals, etc. for my system?**
- **How will we fulfill reporting requirements?**
Do we have the appropriate forms available?

Emergency Response Plan

System Information

System Name: _____

Public Water System (PWS) Number: _____

Lead Operator Name/#: _____

Back-up Operator Name/#: _____

Owner Name/#: _____

Population Served: _____ Number of Service Connections: _____

Attach treatment schematic and distribution system map from Monitoring Plan.

Emergency Contact Information

Life threatening emergency always dial: 911

In Colorado, CDPHE 24-Hour Emergency Hotline: 1-877-518-5608

COWARN (to receive aid from other utilities) Website: www.cowarn.org

In Colorado, CDPHE District Engineer Name/#: _____

County Sheriff #: _____

Critical Customer Contact #s: _____

Alternate Sources of Water Supply Name/#: _____

Emergency Power #: _____ Electrician #: _____

Plumber #: _____ Locates/Excavator #: _____

List of Critical Equipment/Chemicals with Supplier Name/#: _____

Name/# of Neighboring Utilities: _____

Emergency Response Procedures

Shut-down procedures and location of shut-off valve: _____

Start-up procedures: _____

Public notification procedures: _____

Location of fire extinguisher/safety equipment: _____

Location of spare or repair parts: _____

Additional Resources

The following EPA tool contains more information on emergency response plans and security:

<http://water.epa.gov/infrastructure/watersecurity/communities/index.cfm>

CDPHE emergency reference material and contact information can be found at:

<http://www.cdphe.state.co.us/wq/drinkingwater/CapacityBuilding.html>

Water/Wastewater Agency Response Network

1. For additional information regarding the Water/Wastewater Agency Response Network (WARN) see the following links:
<http://awwa.org/files/WARN/WARN%20FAQ%2020100505.pdf>
<http://awwa.org/files/WARN/WARN%20Overview%202011JAN.pdf>
2. In Colorado please visit <http://www.cowarn.org>

Colorado Contact Information for Drinking Water Questions

Total Coliform Positive Report Line 303-692-3308

1-800-886-7689 (ext. = last four digits of individuals direct line)

Groundwater (GW)- COMMUNITY (COMM) and NON-TRANSIENT, NONCOMMUNITY (NTNC):

Bryan Pilson - Compliance Specialist	(303) 692-3318
Michael Sherry - Compliance Specialist	(303) 692-3325
Bob Pohl - Compliance Technician	(303) 692-3254

Groundwater (GW) - TRANSIENT, NON-COMMUNITY (TNC):

Bryan Pickle - Compliance Specialist	(303) 692-3527
Desiree Jones - Compliance Technician	(303) 692-3538

Surface Water (SW) and Groundwater Under the Direct Influence of Surface Water (GWUDI) - COMM, TNC and NTNC:

Serenity Valdez - Compliance Specialist	(303) 692-3519
Melissa McClain - Compliance Specialist	(303) 692-3445
Aly Moores - Compliance Technician	(303) 692-3163

Early Implementation - Stage 2 Disinfectants/Disinfection Byproducts Rule and Long Term 2 Enhanced Surface Water Treatment Rule:

Julie Conroy - Early Implementation	(970) 248-7158
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New Systems and Database Updates (changes in source, treatment, etc.):

Erica Kannelly	(303) 692-3543
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Enforcement:

Amy Schultz - Enforcement Specialist	(303) 691-4927
Lauren Worley - Enforcement Specialist	(303) 692-3547

General Assistance (including forms, schedules, & other printed materials and changes to contact information):

Laurie Findlay	(303) 692-3556 or (303) 692-3541	cdphe.drinkingwater@state.co.us
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Section 9: Cross Connection Control Plan

Colorado Cross-Connection Control Plan

Introduction

This guidance addresses Article 12 of the Colorado Primary Drinking Water Regulations that states a public water system shall have no uncontrolled cross-connections to a pipe, fixture, or supply, any of which contain water are not meeting provisions of the drinking water regulations.

A cross-connection is any point in a water treatment or water distribution system where chemical, biological, or radiological contaminants may come into contact with potable water. During a backflow event, these contaminants can be drawn or pushed back into the potable water system. A backflow prevention device installed at every point of potential cross-connection prevents contaminated water from entering the potable water distribution system.

Any hazardous cross-connection discovered to be uncontrolled must be corrected within 10 days. The Colorado Department of Public Health and Environment Water Quality Control Division (WQCD) must be informed of the hazardous connection and the corrective action being taken.

Identification of Potential Cross-Connections

In accordance with Article 12.1 (b)(1), the Water System Operator will perform a survey of the public water system and identify a list of potentially hazardous cross-connections, prioritized by degree of hazard. This list will be included in Table 1 below. Any new water service installation will be inspected for compliance with these requirements for backflow prevention.

Public Education

The Water System Operator and/or the System Administrative Contact will educate system users about the potential health risk that cross-connections pose, with an emphasis on cross-connections within the system.

Installation of Devices

The Water System Administrator will require system users to install and maintain backflow prevention devices on potentially uncontrolled hazardous service connections, as stated in Article 12. All service connections within the water system must comply with Article 12 and the *Colorado Cross-Connection Control Manual*.

(In accordance with Article 12.1 (b)(2), the Water System Operator and/or Water System Administrative Contact shall, in this section of the plan, describe the means by which the system will require to install and maintain containment devices on any uncontrolled hazardous cross connections.) I do not think we need this. Input?

Each cross-connection may require a different type of backflow prevention device, commensurate with the degree of hazard posed by the cross-connection. The devices need to be approved by the Water System Operator and/or Water System Administrative Contact.

Annual Testing

Article 12 requires that backflow prevention devices be tested annually by a certified cross-connection control technician (aka: backflow tester or backflow technician). The following is a list of certified technicians in our area, their certification numbers, and contact information:

[Visit this web page for a listing of Certified Testers: <http://www.bpecc.us/public%20page.html>]

Record Keeping

Testing and maintenance records will be kept for three years, per the requirements of Article 12.

List of Backflow Prevention Devices

The following approved devices can be used for backflow prevention:

- Vacuum breaker
- Double-check valve assembly
- Reduced pressure principal backflow assembly
- Air gap

The WQCD accepts the use of backflow preventers that have received approval by either University of Southern California Foundation of Cross-Connection Control and Hydraulic Research or the American Society of Sanitary Engineers (ASSE).

The following is a list of common cross-connections and devices that may be used to prevent backflow:

Type of Cross-Connection	Potential Degree of Hazard	Backflow Prevention Device
Hose bib	High	Vacuum breaker
Fire sprinkler system; Solar house using potable water as heat source	Low	Double check valve assembly on water only line. Approved reduced pressure principal backflow assembly on branch lines carrying chemicals.
Photographic processors and developers	High	Reduced pressure principal backflow assembly
Hot water boilers	High	Reduced pressure principal backflow assembly
Outside spigot with attached hose	High	Air gap – disconnect hose Backflow vacuum breaker

Additional resources:

Colorado Cross-Connection Control Manual; Corporate Discount Books, 303-420-0246 or 1-877-986-0995

Backflow Prevention Education Council of Colorado: <http://bpecc.org/>

Web page listing Certified Testers: <http://www.bpecc.us/public%20page.html>

(Please utilize the following sample as a basis for your system evaluation and cross-connection control measure tracking.)

**Potential Cross-Connections
Sample List**

The water system operator and/or the system administrator must conduct a systematic survey of all facilities connected to the water distribution system. The survey can then be used to determine the degree of hazard posed by each facility connected to the water distribution system and the appropriate backflow prevention device to be installed at the service connection.

“Information in this manual, combined with interviews with facility managers, will help the water supplier to determine the degrees of hazard. Facilities presenting health hazards to the water distribution system will require containment assemblies. Those cross-connections viewed as the most severe hazards will have the highest action priority for correction.”

Source: *Colorado Cross-Connection Control Manual, March 2000, pages 11-12*

System Survey Conducted By: _____ Title _____ Date: _____

TABLE 1

Potential Cross-Connection ¹	Potential Cross-Connection Location	Degree of Hazard ²	Device Used	Backflow Prevention Assembly (Type & Model No.) ³	Annual Test Date

1– Potential Cross-Connections must be evaluated annually
 2– Degree of Hazard: High = H (Contamination or Health Hazard); Low = L (Pollution Hazard)
 3 –See Backflow Assembly reference Chart

Backflow Prevention Assembly Reference Chart

Backflow Prevention Assembly	Low Hazard	High Hazard	Back Pressure	Back Siphonage	Continuous Pressure	Containment	Isolation	Comments & ASSE Standards
Air Gap	X	X	N/A	X	N/A	N/A	X	2 times line diameter: A112.1.2
Dual Check Valve	X		X	X	X	X	X	Non-testable: 1011, 1012, 1024, 1052
Atmospheric Vacuum Breaker	X	X		X			X	Min. 6" above flood rim or highest downstream piping: 1001
Pressure Vacuum Breaker	X	X		X	X		X	Min. 12" above flood rim or highest downstream piping: 1020
Double Check Valve Assembly	X		X	X	X	X	X	Testable device: 1015
Reduced Pressure Zone Assembly	X	X	X	X	X	X	X	Testable device: 1013

**Section 10: Operations and
Maintenance Reference Guide**

Operations and Maintenance Reference Guide

	<u>Equipment</u>	<u>Location</u>	<u>Scheduled Routine Maintenance</u>
Example:	Example: Back Flow Prevention Assembly		Testing by certified company. For CO see http://www.bpecc.us/public%20page.html
1	_____	_____	_____
2	_____	_____	_____
3	_____	_____	_____
4	_____	_____	_____
5	_____	_____	_____
6	_____	_____	_____
7	_____	_____	_____
8	_____	_____	_____
9	_____	_____	_____
10	_____	_____	_____
11	_____	_____	_____
12	_____	_____	_____
13	_____	_____	_____
14	_____	_____	_____
15	_____	_____	_____

Section 11: Source Water Protection

Planning for Source Water Protection

-Does water flow away from the well? Is there a positive slope around the well?

-Is there a concrete pad around the well? If yes, what are the dimensions?

-Is anything stored near the well? If yes, describe what is being stored near the well?

-Is there a well house? If yes, describe.

-Is the well in a pasture or near animals? If yes, is there fencing or other deterrents to prevent animals from coming in contact with the well? If yes, describe.

-Is a cistern used? If yes, provide the location and how it is protected.

-Is the well near a parking lot or roadway? If yes, are concrete bollards used? Are any other barriers used to protect the well?

-List other sources of possible contamination, ie. Fuel tanks, agriculture, nearby rail road, nearby stream, etc.

Insert Source Water Assessment Report Here

Notes:

- For Colorado, reports can be found at <http://www.cdphe.state.co.us/wq/sw/swapreports/swapreports.html>
- Grants may be available for planning. For Colorado, visit <http://www.cdphe.state.co.us/wq/sw/planninggrantannounce.html>

Section 12: Operator Certification

This section includes:

- General Information
- Copy of Operator License(s)
- Copy of Operator in Responsible Charge Report
- Training

General Information

General Requirement

The following systems are required to be under the supervision of a certified operator in responsible charge (“ORC requirement”):

Public water systems – Community, Non-transient Non-community, Transient Non-community, and Purchased Water systems must be supervised in these areas:

Treatment (including well-and-chlorinator systems)

Distribution (exceptions: 1) ground water Transient Non-community systems serving fewer than 100 people per day and whose treatment consists of only non-gaseous chlorination; 2) water haulers may meet the requirement with SWS, water treatment D, OR water distribution 1.

Domestic wastewater systems – including non-discharging lagoon systems and collection systems not requiring a discharge permit must be supervised in these areas:

Treatment

Collection (there are a few exceptions to this requirement – In Colorado check with the Facility-Operator Program office at 303-692-3503)

Note: Individual Sewage Disposal Systems not requiring a discharge permit are exempted by the statute

Industrial wastewater systems – general rule: if the facility operates with a general or individual permit under the CDPS system and does not discharge to a POTW, a certified operator is required. In Colorado, check with the Facility-Operator Program at 303-692-3503 to determine whether a specific facility is covered by the requirement.

Reporting Requirement

In Colorado all systems subject to the ORC requirement must file an Operator in Responsible Charge reporting form with the Water Quality Control Division. This information must be kept current. Forms for Colorado are available at www.cdphe.state.co.us/op/ocb/index.html under “Reporting Requirements” or by contacting the Facility-Operator Program at 303-692-3503.

Types of Certification

Drinking Water

Treatment – levels A, B, C, D, and T (T – for ground water Transient Non-Community water systems serving fewer than 100 people per day and whose treatment consists of only non-gaseous chlorination)

Distribution – levels 4, 3, 2, and 1

Combined treatment and distribution – SWS (small water system - equivalent to level D treatment *and* level 1 distribution)

Domestic Wastewater

Treatment – levels A, B, C, and D

Collection – levels 4, 3, 2, and 1

Combined treatment and collection – SWWS (small wastewater system – equivalent to level D treatment *and* level 1 collection)

Industrial Wastewater

Treatment – levels A, B, C, and D

Certification Examinations for Colorado

In Colorado, Certification Examinations are offered four times each year.

Treatment: Winter/Spring

Application Deadline – December 1st of the preceding year (for example, the application deadline for Spring 2009 examinations was December 1, 2008).

Examinations are offered on several dates (January – April) at several locations.

Examinations offered:

Treatment – drinking water, domestic wastewater, industrial wastewater
Plus – SWS and SWWS

Distribution/Collection: Spring/Summer

Application Deadline – February 15th

Examinations are offered in May and August in several locations.

Examinations offered:

Water Distribution
Wastewater Collection
Plus – SWS and SWWS

Treatment: Summer/Fall

Application Deadline – June 1st

Examinations are offered on several dates (August - October) at several locations.

Examinations offered:

Treatment – drinking water, domestic wastewater, industrial wastewater
Plus – SWS and SWWS

Distribution/Collection: Fall/Winter

Application Deadline – August 15th

Examinations are offered in November and February in several locations.

Examinations offered:

Water Distribution
Wastewater Collection
Plus – SWS and SWWS

Application Materials

Application forms are available at www.cdphe.state.co.us/op/ocb or at <http://www.ocpoweb.com>
Exam schedules and applications are generally available 6 to 8 weeks prior to each application deadline date.

Fees

The application fee (\$15) and examination fee \$45 (effective for January '08 exams) are payable at the time of application. Certification will be granted to those who pass the certification examination upon payment of the administration fee (\$55 effective for January '08 exams). Certification must be renewed every three years. Fees for certain drinking water certifications are reimbursable under an Expense Reimbursement Grant – see <http://www.cdphe.state.co.us/op/ocb/Misc/opexpensegrant.html>.

Pre-examination Training

Pre-examination training, by private providers, is scheduled prior to most examinations. Registration for an examination does not include registration for training; registration for training

does not include registration for examinations. Pre-exam training, while recommended, is not required.

Experience and Continuing Education Requirements

	Experience (Hands-On Operational Experience)	Continuing Education for Renewal (every 3 years)
Treatment:		
Class A	4 years	3.0 TUs*
Class B	3 years	2.4 TUs
Class C	2 years	1.8 TUs
Class D	1 month**	1.2 TUs
Class T	none	1.2 TUs
Distribution/Collection:		
Class 4	4 years	3.0 TUs
Class 3	3 years	2.4 TUs
Class 2	2 years	1.8 TUs
Class 1	1 month**	1.2 TUs
Small Water/Wastewater:	1 month**	1.8 TUs

*1 Training Unit (TU) is given for each 10 hours of class

** A specifically approved course may substitute for the 1-month experience requirement

For Further Information for Colorado Operator Certification

Water Quality Control Division – Facility-Operator Program
 4300 Cherry Creek Drive South – B2
 Denver, Colorado 80246-1530
 Lori Billeisen-Moore
 303-692-3510 (phone)
 303-782-0390 (fax) – be sure to attn. Lori Billeisen-Moore
lori.billeisen@state.co.us (e-mail)

Operator Certification Program Office (OCPO)
 2170 South Parker Road #290
 Denver, Colorado 80231-5711
 Teresa Tezak
 303-394-8994 (phone) 303-394-3450 (fax)

Useful Websites

<http://www.cdphe.state.co.us/op/ocb> (official Water and Wastewater Facility Operators Certification Board website)

<http://www.ocpoweb.com> (Certification Office website for training unit listing, application forms, etc.)

<http://www.crwa.net> (Colorado Rural Water Association)

<http://www.waterwastewater.org> (website for information on the trainings offered through the University of Colorado Office of Conference Services)

<http://water.montana.edu/training/ob2005> (free training course on CD-Rom: “Operator Basics 2005” covering small groundwater systems, small surface water systems, and small wastewater lagoon systems. This CD is also available by calling Betsy or Lori at WQCD – see above)

<http://www.rmsawwa.net> (website for the Rocky Mountain Section of the American Waterworks Association)

<http://www.rmwea.org> (website for the Rocky Mountain Water Environment Association)

Insert Copy of Operator License(s) Here

Insert Operator in Responsible Charge Report Here

Notes:

- File this form when the operator changes.
- For Colorado: Instructions can be found at <http://www.cdphe.state.co.us/op/ocb/opassist/orc/orcreportmemo.pdf>
- Form can be found at <http://www.cdphe.state.co.us/op/ocb/opassist/orc/orcreportform.pdf>

Insert Copies of Training Course Certificates Here

Notes:

- Information regarding the EPA Drinking Water Academy can be found at: <http://water.epa.gov/learn/training/dwatrainng/index.cfm>
- Information regarding free online training through Montana University Water Center can be found at: <http://watercenter.montana.edu/training/OB2005/default.htm>
- Your state may have training and/or grant programs. Information regarding Colorado grants is available at: <http://www.cdphe.state.co.us/op/ocb/opassist/opexpensegrant/opexpensegrant.html>

Section 13: Monitoring Schedule

Insert Monitoring Schedule Here

Notes:

- For Colorado, access monitoring schedules at this website with the following login info
<ftp://wqcdcompliance.hosting4less.com/>

Login: wqcdcompliance-ms

Password: 2010crr

Be sure to have water system ID number available to locate the correct schedule.

Section 14: Laboratory Results and Reporting Forms

This section includes:

- Weekly Chlorine Monitoring Results
- Total Coliform Bacteria Results
- Nitrate, Nitrite and Other Inorganic Chemicals Results
- Total Trihalomethanes, Haloacetic Acid and Bromate and/or Chlorite Results
- Corrosivity Results
- Organic Chemicals Results
- Radionuclides Results
- Other Laboratory Results

Weekly Chlorine Monitoring Results

This section includes:

- Weekly chlorine results to comply with triggered monitoring requirements

Total Coliform Bacteria Results

(Retain Records for 5 years)

This section includes:

- Total Coliform Results to Comply with the Total Coliform Rule
- For systems using chlorine (i.e. Clorox), free chlorine results
- For systems using chloramines, results for total chlorine

Colorado reporting forms can be found at the following locations:

- Form 2 – Used for unsafe routine sample data and repeats:
www.cdphe.state.co.us/wq/drinkingwater/pdf/reportforms/TCR/Unsafe_Summary_030303.pdf
- Reporting form for Bacteriological Analysis:
www.cdphe.state.co.us/wq/drinkingwater/pdf/reportforms/TCR/TCR_Report_Form_030303.pdf

Nitrate, Nitrite, and other Inorganic Chemicals Results

(Retain Records for 10 years)

This section includes:

- Nitrate to comply with the Inorganic Chemicals Rule (usually annually, check monitoring schedule)
- Nitrite to comply with the Inorganic Chemicals Rule (usually every 9 years, check monitoring schedule)
- Other Inorganic Contaminates to comply with the Inorganic Chemicals Rule
Antimony, Arsenic, Barium, Be, Cd, Chromium, Cyanide, F, HG, Ni, Se, Na, Thallium

Colorado reporting forms can be found at the following location:

- Nitrate/Nitrite
www.cdphe.state.co.us/wq/drinkingwater/pdf/reportforms/ChemRadsForms/NitrateNitriteLabReportForm.pdf
- Other Inorganic contaminants
www.cdphe.state.co.us/wq/drinkingwater/pdf/ReportForms/ChemRadsForms/InorganicLabReportForm.pdf

Total Trihalomethanes, Haloacetic Acid and Bromate and/or Chlorite Results

(Retain Records for 10 years)

This section includes:

- Total Trihalomethanes (TTHM) to comply with the Disinfectant and Disinfection Biproducts Rule.
- Haloacetic Acid (HAA5) to comply with the Disinfectant and Disinfections Biproducts Rule.
- Bromate and/or Chlorite (if necessary) to comply with the Disinfectant and Disinfection Biproducts Rule.

Colorado reporting forms can be found at the following locations:

Form #1 Total Trihalomethanes:

http://www.cdphe.state.co.us/wq/drinkingwater/pdf/ReportForms/DDBP/DBPForm1_Version2_7-9-2002.pdf

Form #2 Haloacetic Acid

www.cdphe.state.co.us/wq/drinkingwater/pdf/ReportForms/DDBP/DBPForm2_Version2_7-9-2002.pdf

Form #3 Bromate and/or Chlorite

www.cdphe.state.co.us/wq/drinkingwater/pdf/ReportForms/DDBP/DBPForm5_Version2_7-9-2002.pdf

Corrosivity Results

This section includes:

- Corrosivity to comply with the Lead and Copper Rule.

Colorado reporting forms can be found at the following location:

www.cdphe.state.co.us/wq/drinkingwater/pdf/ReportForms/LCR/Corrosivity_Report_Form_030303.pdf

Organic Chemicals Results

Colorado reporting forms can be found at the following location:

<http://www.cdphe.state.co.us/wq/drinkingwater/pdf/ReportForms/ChemRadsForms/OrganicLabReportForm051505.pdf>

Radionuclides Results

Colorado reporting forms can be found at the following location:

<http://www.cdphe.state.co.us/wq/drinkingwater/pdf/ReportForms/ChemRadsForms/RadLabReportForm.pdf>

Other Laboratory Results

This section includes:

- Process Monitoring
- Non-Reportable Monitoring/Lab Results

Section 15: Past Sanitary Surveys

Insert Past Sanitary Surveys Here

(Retain Records for 10 years)

This section includes:

- Letters from Regulator/Inspector and responses from the system

Section 16: Correspondence

Insert Correspondence Here

(Retain Records for 10 years)

This section potentially includes:

- Plan review for system upgrades
- Documentation related to regulatory compliance
- Other