reconstructing the bunkhouse on
the Michigan Ditch, Summer '08

2008 Drinking Water Quality Policy Annual Report

Compiled by the Regulatory and Government Affairs Division

With contributions from:
Water Field Operations,
Water Production Division,
Environmental Services Division

Spring 08, blowing snow to clear the ditch and road for use

2008 Drinking Water Quality Policy Annual Report
June 2009

Background

In October 1993, Council adopted a drinking water quality policy for the City. The purpose of the policy is to ensure the continuous delivery of high quality drinking water to the City's customers. This document is the fifteenth annual water quality report providing an update on the goals and strategies included in the policy.

The policy establishes the following goals:

- The City will provide water services that meet or exceed customer expectations for quality, quantity and reliability.
- The City will protect and maintain high water quality in the development of all codes, policies, plans and specifications related to the acquisition, production and delivery of water services to its customers.
- The City's water supply, treatment, storage, delivery and laboratory facilities will be planned, designed, constructed, maintained, staffed and operated to assure safe, reliable and cost-effective service to the residents of Fort Collins and all those served by the City's water utility.

Strategies to attain these goals are further detailed in the policy (Attachment A). This report lists the strategies and summarizes the action taken in 2008.

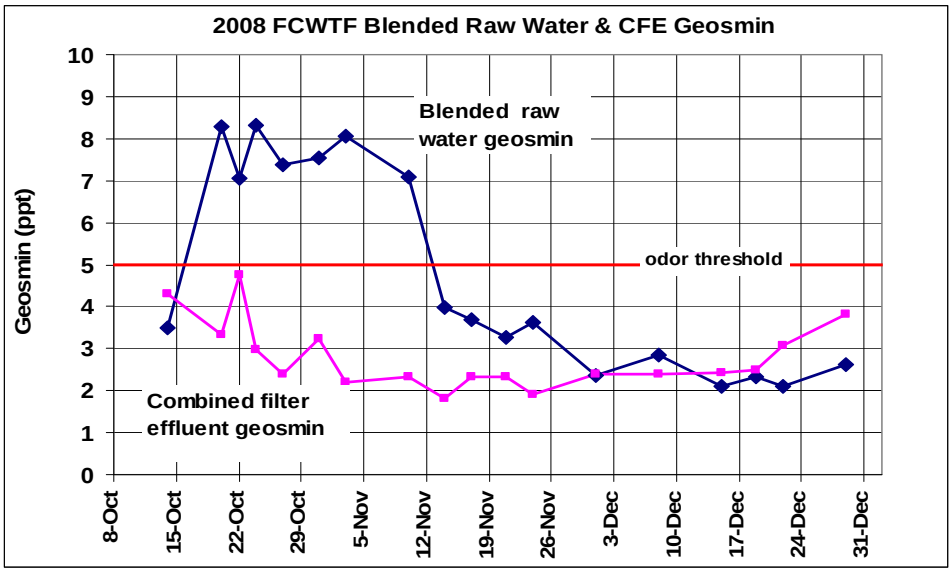
Strategy #1: Effective Management

Key Accounts

Anabaena, a type of geosmin producing algae.

In October and November of 2008, unprecedented levels of geosmin in the untreated source water from Horsetooth Reservoir affected both our regular and commercial/industrial customers. Geosmin, produced by algae and bacteria, can cause taste and odor problems. While geosmin does not pose a serious public health risk, it is of special concern to some of the City's key water accounts: breweries. These businesses are sensitive to any unusual taste or odor properties that customers may detect in their products.

Staff responded to this treatment challenge by taking several measures to control the levels of geosmin: the addition of powdered activated carbon, careful blending of less Horsetooth water with more Poudre water, tracking customer calls, and laboratory testing of the raw and finished waters for taste and odor compounds. Additionally, the breweries were contacted when the problem first appeared. Staff follow-up included the development of a technical memorandum with several recommendations for the future, including geosmin monitoring at additional sites and at a greater frequency.



21st Century Initiative

Based on valuable insights and feedback from customers in a 2007 survey, and on our observation and understanding of the many challenges facing municipal utilities in this new century, Fort Collins Utilities (FCU) began the 21 Century Utilities initiative. As Utilities provides water, wastewater, electric and stormwater services to the community, we recognize the economic, social and environmental impacts of our operations. The 21st Century Utilities initiative creates the foundation for our long-term direction, integrating sustainability principles in to our strategy, culture and operations. We are committed to enhancing our positive impacts and minimizing our negative impacts on the community and the environment. Water is a precious resource in Colorado, and Utilities is committed to providing clean, safe drinking water, minimizing our impacts to the Cache la Poudre and CBT watersheds and balancing our community's supply and demand.

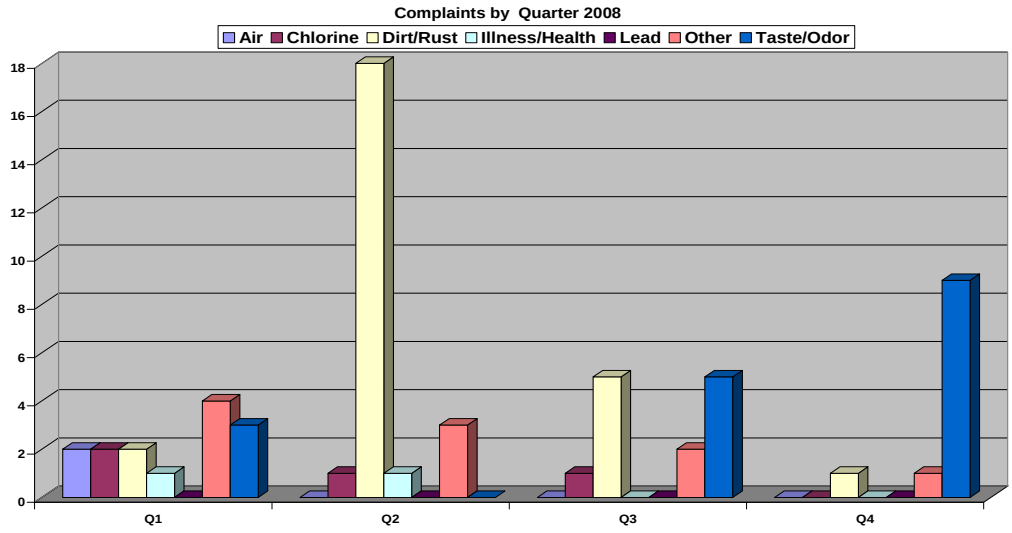
Strategy #2: Proactive Monitoring & Testing

Ultraviolet (UV) Analyzer

Staff installed a UV-254 analyzer at the Upper Poudre Intake. UV-254 is a measure of absorbance in the water, and it can be correlated to the amount of total organic carbon (TOC) in the Poudre River. This water quality tool is used by the plant operators to help determine how to modify treatment parameters in order to optimize performance. The analyzer is particularly useful during the runoff season when rising TOC in the river increases the challenge of water treatment.

Responding to Customer Concerns

The Water Quality Lab (WQL) is responsible for providing regulatory drinking water compliance monitoring and for responding to customer complaints about drinking water quality. The Utility received 61 drinking water quality complaints during 2008. WQL staff made site visits to 33 of these to address specific customer concerns.



The majority of the 2nd quarter complaints were the result of rusty water from valve work in the distribution system, on the older lines on West Mountain Ave. The taste/odor complaints in the 4th quarter were the result of high levels of geosmin in the source water.

Strategy #3: Protecting, Developing, and Preserving Water Resources

Watershed Protection Efforts Providing Better Water Quality

FCU has been involved in watershed management activities for the protection of its drinking water sources since the 1990's. In 2008, the FCU watershed program efforts focused on Horsetooth Reservoir, the Big Thompson Watershed, and the Upper Cache la Poudre (CLP) Watershed. FCU is working collaboratively with the City of Greeley and the Tri-Districts on the watershed monitoring programs for both the Upper CLP and Horsetooth Reservoir. The three entities have determined that it is in their best interest to collectively share existing water quality information on their common source waters, address future water quality monitoring needs, and assess the condition and trends in water quality over time. FCU has also continued to work collaboratively with the Big Thompson Watershed Forum to monitor and assess the Big Thompson River and components of the Colorado-Big Thompson (C-BT) Project that are upstream of Horsetooth Reservoir.

The design of a Collaborative Water Quality Monitoring Program for the Upper CLP Watershed was completed in 2008. The goal of this collaborative program is to provide data and information that will help the Fort Collins Water Treatment Facility, City of Greeley Bellvue Water Treatment Plant and the Tri-Districts Soldier Canyon Filter Plant meet present and future drinking water treatment goals. In the spring 2008, the first water samples were collected as part of this program. Sample collection consisted of 11 sampling events between April and November at ten sites on the mainstem CLP and nine sites on the North Fork, including Seaman Reservoir. Water samples were analyzed for a total of 39 parameters.

During 2008, FCU conducted seven routine sampling missions on Horsetooth Reservoir. Staff from the City of Greeley and the Tri-Districts assisted FCU on the 2008 sampling missions. The highest geosmin concentrations on record were measured in Horsetooth Reservoir in early November 2008. Because of this, an eighth sampling mission was conducted in December to collect additional geosmin samples from across the reservoir. Geosmin is a taste and odor compound that imparts an earthy odor to water and can be detected by the most sensitive noses at extremely low concentrations.

Horsetooth Reservoir sampling mission.

A 15-month project was continued in 2008 with the University of California at Los Angeles (UCLA) to characterize total organic carbon (TOC) in our source waters and treatment plants. This project is being managed by City of Fort Collins and jointly funded by City of Fort Collins, City of Greeley, Tri-Districts, and Northern Water. Sample collection was completed in 2008,

and data analysis and report preparation will be completed in 2009. The study will provide information that will be used to help make decisions into the future regarding raw water blending, treatment, minimization of disinfectant byproduct formation, and watershed management.

In 2008, FCU staff served on the Big Thompson Watershed Forum Board of Directors. FCU staff also participated as members of water quality committees organized by Northern Water, including the C-BT Nutrient Project Technical Advisory Team and the Horsetooth Reservoir Steering Committee. FCU staff continued participating in the Front Range Watershed Wildfire Protection Working Group that is addressing issues related to the protection of drinking water supplies from high severity wildfires in our watersheds. Finally, FCU staff reviewed the Draft Environmental Impact Statements for the Northern Integrated Supply Project and the Windy Gap Firming Project, and provided written comments related to source water quality.

Strategy #4: Advancing Treatment Technology & Operations

Partnership For Safe Water

FCU is a member of the Partnership for Safe Water program. In this cooperative program, participants strive to reach the goal of maximizing water treatment effectiveness beyond what is required by regulations. The Water Treatment Facility completed the rigorous Partnership for Safe Water Phase III Self-Assessment Completion Report in 1999 and was awarded the "Directors Award" for completing Phase III. Every year since then, the Water Treatment Facility has completed an annual treatment assessment report and has maintained their Phase III Directors Award status. In 2008, the Water Treatment Facility was the only treatment plant in Colorado to earn this prestigious award for eight consecutive years.

Colorado Environmental Leadership Program

The Colorado Environmental Leadership Program (ELP) is a voluntary program designed to recognize organizations that demonstrate superior environmental performance; these organizations consistently operate at a level that goes beyond mere compliance with environmental regulations. In 2008, the FC WTF was the recipient of the Bronze Award, and was one of only three water treatment facilities in the state to achieve the ELP status.

Strategy #5: Operating and Maintaining the Water Distribution System

Leak Detection Program

Sonic leak-detection equipment identifies the sound of water escaping a pipe. The benefits of a leak detection program include improved operational efficiency, lowered water system operational costs, reduced potential property damage, and reduced water outage events. The Utilities leak detection staff surveys the entire distribution system every two years.

Fire Hydrant Maintenance

To keep fire hydrants in a ready condition, they are on a four-year, cyclical, maintenance schedule. The 4-year schedule includes a 10-point inspection checklist, as well as lubrication, cleaning, and painting if needed. Additionally, the hydrants are on a two-year, cyclical, flushing schedule.

Valve Maintenance

To help ensure water valves are in working condition and in the open position, 10% of them are exercised each year.

Water valve being exercised

Strategy #6: Assuring the Quality of Water Service

Risk Management Program

Chlorine, a disinfectant, is added to the drinking water prior to the entrance of the distribution system. To help ensure protection of the public, chlorine is regulated by the EPA through the Clean Air Act. The requirements are structured to prevent and minimize the impacts of accidental chlorine releases. Water Production, Regulatory & Government Affairs, and Risk Management staff collaborate on EPA's requirements which include:

- Hazard Assessment--Assess the potential impacts of worst-case and alternate release scenarios;
- Prevention Program--Implement a comprehensive management program that affects a wide variety of operation, maintenance, construction and safety program activities;
- Emergency Response--Meet OSHA requirements for emergency action plans and training;
- Risk Management Plan--Describe the WTF's Risk Management Program.

Security

More security was added at all doors at the Water Treatment Facility and supporting facilities. There is now a record of entrances and exits of authorized personnel. Additionally the cameras that monitor on-site and off-site facilities were upgraded.

Poudre Pipeline Valve Replacement

Valve improvements continued in 2008 on the Poudre pipelines. These pipelines were built in the 1920's and the 1950's. Continued rehabilitation is necessary to maintain reliable operation.

Strategy #7: Coordinating Drinking Water Production and Water Reclamation Management

The Utility's Pollution Control and the Water Quality Labs closely coordinate their regulatory and certified testing services in the following ways:

- Staff from both labs are cross-trained on mercury analysis.
- The labs share a ½-time position that is dedicated to performance benchmarking and data quality assurance.
- Both labs provide monitoring, testing and reporting services for the Cache la Poudre River from near Cameron Pass to the confluence with the Platte River east of Greeley.

Water Quality Lab chemist prepares a drinking water sample for total coliform analysis

- After-hours response to drinking water customer complaints and other water quality emergencies is shared by Water Quality, Pollution Control, and Regulatory & Government Affairs staff.
- Both labs provide regulatory and certified drinking water, river and wastewater testing and reporting services to regional water providers and wastewater treatment agencies.

Strategy #8: Cooperating With Other Water Providers and Users

Wholesale/Consecutive System Agreements

Throughout 2008, City staff collaborated with Colorado State University and West Fort Collins Water District to develop Wholesale/Consecutive System agreements for each. The City supplies drinking water to these consecutive systems, which then distribute the water to their customers. The wholesale/consecutive system agreement assigns responsibilities for applicable monitoring and reporting requirements to the consecutive systems and defines a process to communicate water quality issues, violations, and public notices that may affect the other entity's distribution system.

Colorado Water/Wastewater Agency Response Network

In May 2008, the Utilities joined the Colorado Water/Wastewater Agency Response Network (CoWARN). CoWARN is a formalized system of "utilities helping utilities," designed to facilitate mutual aid during emergency situations. CoWARN members are other Colorado public and private utilities providing water and wastewater service. The benefits of belonging to CoWARN include increased planning and coordination, organized response according to established requirements, and an agreement that contains an indemnification provision to protect participating utilities and provides for reimbursement of costs as needed.

Salmonella Outbreak in Alamosa

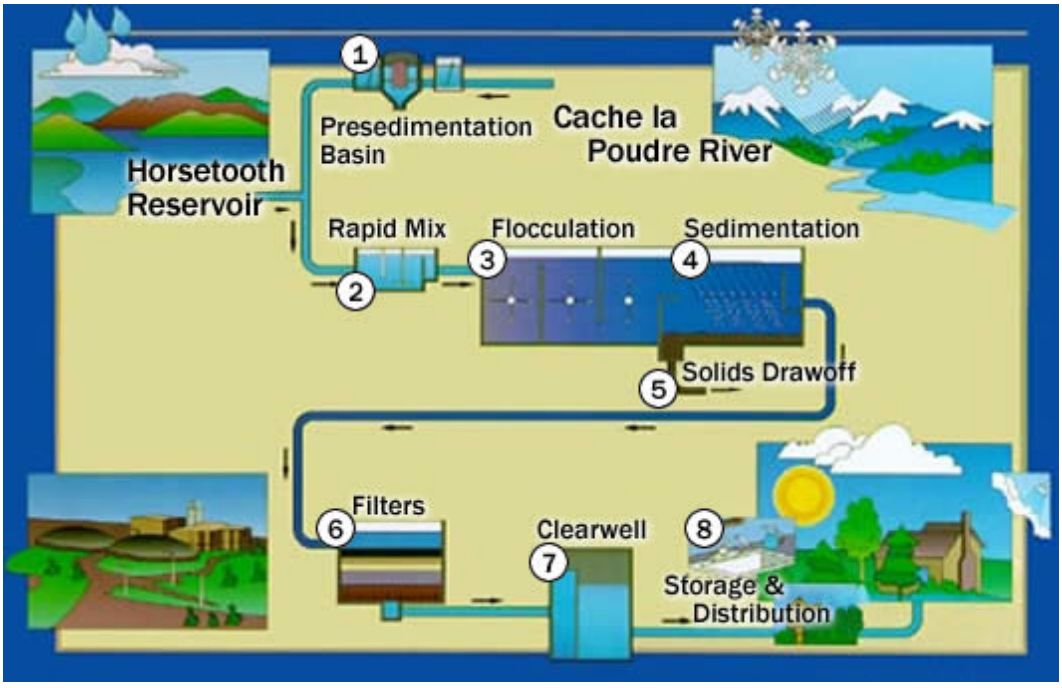
In March '08, there was a salmonella outbreak in Alamosa, Colorado. Contaminated drinking water was confirmed to be the source of salmonella. FCU sent equipment to aid the utility in the recovery of their system.

Salmonella (the red, rod-shaped objects) in human cells

Other Cooperative Efforts

- Co-hosted TEEX Workshop with Poudre Fire Authority and provided a tour for the attendees;
- Trained 10 employees over a three week period from the City of Albuquerque Water Utilities in preparation for the startup of their new plant;
- Worked cooperatively with State Parks, Forest Service, State Division of Water Resources and irrigation companies;
- Continued work with the Tri-districts (Fort Collins-Loveland Water District, North Weld County Water District and East Larimer County Water District);
- Provided plant tours for the Cities of Fort Lupton, Hudson, Aurora, and Westminster;
- Assisted New Belgium Brewery with manganese analyzer training;
- Provided City Works 101 Tour for 21 people;
- Shared raw water data and information with Anheuser-Busch and Avago;
- Hosted various Web casts for training purposes; and
- Contributed to and participated with other City departments in the Pandemic Flu Tabletop exercise.

Water Treatment Schematic



Test Type	MCL	Poudre River	Horsetooth	SS#2 (HSPS)	WFCWD Office	Service Center	Poudre Valley Hospital	Drake Terrace	PRPA Bldg
Bacteriology									
Free Chlorine Residual, mg/L	4			0.62	0.41	0.39	0.45	0.60	0.44
Temperature, ºC	-	8	7	8	15	15	14	11	14
Quanti-tray, Total Coliform per 100mL	<1	356	875	0	0	0	0	0	0
Quanti-Tray, *E. coli* per 100mL	<1	6	1	0	0	0	0	0	0
Fecal Strep per 100mL		47	1	0					
Heterotrophic Plate Count / 1.0 ml	-	137	81	0	7	2	1	1	1
Chemistry									
Alkalinity, mg/L as CaCO3	-	22.2	27.9	36.5	37.2	37.0	36.9	36.5	37.0
Ammonia-N, mg/L	-	<0.02	<0.02	<0.02					
Calcium mg/L as CaCO3	-	17.1	23.8	42.1	43.8	42.8	41.9	43.6	37.4
Color, APHA Units	-	15.0	12.2	<2.5	<2.5	<2.5	<2.5	<2.5	<2.5
Hardness, mg/L as CaCO3	-	22.6	28.9	49.5	50.1	50.1	49.4	49.1	45.2
Langlier Larson Saturation Index	-	-2.2	-1.9	-1.3	-1.1	-1.2	-1.3	-1.3	-1.2
ortho-Phosphate, mg/L	-	<0.005	0.005	<0.005					
pH	6.5 - 8.5	7.61	7.59	7.87	7.94	7.98	7.92	7.88	8.03
Silica, mg/L	-	8.5	3.1	7.0					
Specific Conductance, µmhos/cm	-	58.2	71.5	115.0	116.3	116.4	115.7	114.8	111.8
Total Dissolved Solids, mg/L	(500)	44	48	74	72	74	71	76	70
Turbidity, NTU	1	1.91	3.71	0.13	0.12	0.15	0.17	0.14	0.15
Anions									
Chlorate, mg/L	-			0.02	0.03	0.03	0.02	0.02	0.03
Chloride, mg/L	250.00	1.6	1.1	2.4					
Chlorite, mg/L	1.00			0.08	0.08	0.08	0.08	0.08	0.14
Fluoride, mg/L	4.00	0.13	0.13	0.89	0.89	0.89	0.88	0.88	0.82
Nitrate-N, mg/L	10.00	0.05	0.08	0.06					
Nitrite-N, mg/L	1.00	<0.04	<0.04	<0.04					
Sulfate, mg/L	250.00	3.1	3.8	12.1					
Metals (µg/L)									
Aluminum	(50-200)	157.0	410.4	64.4	48.9	56.7	54.8	59.6	68.1
Antimony	6	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0
Arsenic	10	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0
Barium	2000	34.7	32.4	17.2	17.8	17.0	15.5	17.5	22.3
Beryllium	4	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2
Cadmium	5	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1
Chromium	100	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
Copper	[1300]	<3.0	5.3	<3.0	35.6	12.4	50.0	8.4	18.8
Iron	(300)	206.4	146.7	37.4	49.1	21.7	39.0	24.4	27.0
Lead	[15]	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0
Manganese	(50)	13.6	12.8	1.7	1.7	2.7	3.1	2.2	1.8
Mercury	2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2
Molybdenum	-	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0
Nickel	-	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0
Selenium	50	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0
Silver	(100)	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
Thallium	2	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0
Metals (mg/L)									
Calcium	-	6.0	8.3	15.8					
Magnesium	-	1.6	1.6	1.6					
Potassium	-	0.8	0.8	0.8					
Sodium	(20)	2.7	2.6	2.7	2.7	2.7	2.8	2.9	3.6
Zinc	(5)	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05
Nutrients									
Total Kjeldahl Nitrogen as N, mg/L	-	0.14	0.21						
Total Phosphorus, mg/L	-	0.01	0.02	<0.01					
Total Organic Carbon									
Total Organic Carbon, mg/L	-	3.26	3.06	1.43	1.47	1.46	1.46	1.46	1.53
Chlorophyll									
Chlorophyll-a, mg/L	-	0.77	3.00						
VOLATILE ORGANIC COMPOUNDS(µg/L)									
Total Trihalomethane, µg/L	80	<0.4	<0.4	15.9	28.0	24.0	24.7	19.9	22.8

Legend:

mg/L = milligrams per liter or part per million
µg/L = micrograms per liter or parts per billion
Poudre River = Cache la Poudre River Raw Water at WTF
Horsetooth Res = Horsetooth Reservoir Raw Water at WTF
MCL = Maximum Contaminant Level
( ) = Secondary Level (asthetic)
[ ] = 90th %tile Action Level

WFCWD Office = West Fort Collins Water District Office 2711 Overland Trail
SS#2 = Sample Station 2, Official Entry Point to Distribution System
Service Center = Utilities Service Center, 700 Wood Street
Poudre Valley Hospital, 1024 Lemay Avenue
Drake Terrace = Drake Terrace Business Park, 343 West Drake Road
PRPA Bldg = Platte River Power Authority Building at Horsetooth and Timberline
< = Less Than