State of California—Health and Human Services Agency
California Department of Public Health

RON CHAPMAN, MD, MPH
Director & State Health Officer

EDMUND G. BROWN JR.
Governor

April 25, 2014

Clear Creek CSD
5880 Oak Street
Anderson, CA 96007

Attention: Kurt Born, General Manager

Subject: Public Water System No. 4510016 – Inspection Report

On December 18, 2013, Michael Burgess, Staff Engineer, met with Jim Paul, Roger Schreiber, and Matt Turner and conducted an annual inspection of the domestic water system serving the Clear Creek Community Services District (District). The Annual Inspection Report and System Deficiency Record are enclosed for your review and action. Overall, the system is well maintained and conscientiously operated. As discussed during the inspection, we have enclosed "Filter Surveillance Guidance" for the District's use while performing their required annual filter inspections.

According to Department records, the District is current on most raw water chemical monitoring, and the water produced by the District meets all primary drinking water standards. However, the District did not sample Well 01 for all required volatile organic chemicals (VOCs) during 2013. If the District has performed this monitoring please have the lab submit the results to the Department, otherwise, please perform the required monitoring (chemical monitoring schedules enclosed) by no later than May 31, 2014.

If you have any questions, please contact Michael Burgess at (530) 224-6506 or myself at (530) 224-4800.

Michael J. McNamara, P.E.
Lassen District Engineer
DRINKING WATER FIELD
OPERATIONS BRANCH

Enclosures

cc: Shasta County Environmental Health Department

4510016/AIR
2013 AIR Ltr/mtb

California Department of Public Health
Drinking Water Field Operations Branch
Inspection Report

Purveyor Clear Creek CSD **System Number** 4510016
Person(s) Contacted/Position Roger Schreiber – Treatment Plant Operator, Jim Paul – Superintendent, Matt Turner – Plant Operator
Date of Inspection December 18, 2013 **Reviewing Engineer** Michael Burgess
Last Annual Inspection December 10, 2012, Kim Hanagan **District Engineer** Michael J. McNamara P.E.

A. INTRODUCTION

1. Permit Status

Full Permit issued April 28, 1971
Amendment(s) None
Are the permit provisions complied with? Yes
Is the permit up to date? No. An amended permit is needed for the following: in-line filtration, all filters, Wells 1, 2, and 3, the 1.0-MG Whiskeytown Tank, the 4.0-MG distribution reservoir, the 32,000-gallon Zone 7 bolted steel tank, the 5,000-gallon Zone 8 hydropneumatic Tank, Booster Station 1 and Booster Station 2, and the bolted steel tank constructed in 2010 at Booster Station #1. The permit also needs to be amended to change the turbidity performance standard to 0.1 NTU (95% of measurements).

2. Changes in System

Since last inspection Installed additional isolation valves within distribution system.
Planned future changes: Design backwash pond and recycle system. Replace the 24" line around the treatment plant with a larger diameter pipeline. Additional isolation valves within the distribution system (ongoing).

3. Consumer & Production Data

Year	Reported Production, MG			Max Day, gpm	Centerville Max Day, gpm	Service Conn.	Max Day, gpmpc
	Annual	Max Mo	Max Day				
2003	2,517	498	21.2	14,722	2,460	2,374	5.2
2004	2,781	493	20.8	14,444	2,272	2,620	4.65
2005	2,336	506	22.7	15,764	2,331	2,645	5.1
2006	2,576	409	21.1	14,652	2,325	2,666	4.6
2007	2,568	481	15.5	10,760	2,394	2,671	3.1
2008	2,674	451	24.8	17,222	2,401	2,671	5.6
2009	1,875	344	14.4	10,000	No A.R.	2,698	3.7
2010	1,883	394	14.8	10,277	2,172	2,691	3.8
2011	1,754	347	15.0	10,417	1,923	2,332	4.5
2012	2,176	394	15	10,417	2,172	2,334	3.5
					10-Year Average		**4.4**

Discussion: The District reports the total water produced annually, during the maximum demand month, and on the maximum demand day; however, a portion of this water is delivered to Centerville CSD. In order to determine the maximum day demand within the District, the Centerville maximum day demand was subtracted from the maximum day demand reported by the District. The average maximum day demand within the District over the past 10 years was 4.4 gpm per connection (gpmpc) with a high of 5.2 gpmpc in 2003. The maximum day demand of 24.8 MG in 2008 was due to fire-fighting efforts in the area and was not used to determine the District's compliance with Waterworks Standards. Water usage is nearly five times the amount of a typical municipality and varies widely from

year to year; however, it is consistent with the usage at Bella Vista Water District, a similar system in the area that also has a few hundred agricultural users. Historically, the District delivers approximately 20% of the water treated to Centerville CSD.

B. SOURCE DATA

1. Groundwater Source Data

Sources	Status	Capacity	Comments
Well No. 1	Standby	1,400 gpm	Installed November 1991. Screened 216 to 444 ft bgs.
Well No. 2	Standby	1,400 gpm	Installed March 1999. Screened 205-440 ft bgs. has connection for portable generator power.
Well No. 3	Standby	1,400 gpm	Installed March 1999. TD=470', screened 206-430 ft bgs. has connection for portable generator power.
Total GW Capacity		**4,200 gpm**	

Discussion The District's three wells are located at the far south end of the distribution system along Gas Point Road. Each well is located in a secured vault below grade. Each vault is equipped with a sump that discharges to a storm drain through an air gap. Each well is equipped with a submersible pump. Continuous chlorination is not provided; however, each well is equipped with a chlorine injection point on the well outlet and an electrical outlet for emergency chlorination. The wells pump water to the 383,000 gallon storage tank at Booster Station #1, which then supplies the distribution system from the tank. As reported, during a shutdown of the conduit in 2010, the District manually operates the booster station 16 of 24 hours per day when the wells are used to supply the water system. The wells are operated manually based on the water level in the new Booster Station #1 Tank. Continuous chlorination is required when the wells are in service in order to maintain a chlorine residual within the distribution system in compliance with the Surface Water Treatment Rule (SWTR). The wells are permitted as standby sources and may only be used in an emergency for not more than five consecutive days nor more than 15 total days in a year. A raw water bacteriological sample taken at the manifold of the wells is required when the wells are in service. The wells do not need to be monitored for total coliform when they are not in use.

2. Surface Water Source Data

Sources	Status	Capacity	Comments
Whiskeytown Lake	Water Rights	15,300 acre-feet/year	Entitlement from the USBR.
Treatment Plant	Active	31.68-MGD (22,000 gpm)	Water production based on a maximum filter-loading rate of 7 gpm/ft^2.

Discussion The District's operations plan states that the maximum hydraulically limited production rate is 33 MGD, and the normal net production would be up to 25 MGD. The District's USBR water rights are equivalent to 4,986 MG per year, nearly twice the highest reported annual demand. Centerville CSD paid for the construction of the surface water treatment plant along with the District and pays a portion of the treatment plants operational expenses based on the total expenses and the amount of water supplied to Centerville. Centerville can receive up to 5 MGD of water based on the agreement between them and the District, effectively reducing the District's maximum treatment capacity to 18,500 gpm when planning for future growth. Based on the water usage reported by Centerville, the highest maximum day demand over the past 10 years was 2,460 gpm in 2003, reducing the District's current effective source capacity to 19,540 gpm.

3. **Purchased Water Source Data N/A**

4. **Emergency Connections – None**

5. **Discussion & appraisal (i.e., does source capacity comply with Waterworks Standards?)** The Waterworks Standards require sufficient source capacity to meet maximum day demands. The District's current effective source capacity (after meeting the maximum day demands in Centerville) is 19,540 gpm, which is greater than the District's highest reported maximum day demand over the past ten years of 13,433 gpm in 2005. Based on the average annual growth rate in Shasta County over the past ten years of 0.82%, a maximum day demand of 5.2 gpmpc, and a minimum source capacity of 16,500 gpm (75% of the current treatment plant capacity), the District should have sufficient source capacity for the next 37 years or an additional 840 service connections.

B. STORAGE DATA

Name	Type	Capacity (MG)	Zone	Comments
Whiskeytown Tank	Welded Steel	1.0	Conduit	Built 1976, last inspected 2006. Located between filter plant and NEED Camp. Floats on pressure in Conduit.
Regulating Reservoir	Welded Steel	0.25	Main	Built 1966. All District water flows through this tank. There was not a ladder for access.
Distribution Reservoir	Welded Steel	4.0	Main	Built 1997. All District water flows through this tank. Did not climb; pics were submitted showing all deficiencies noted in previous inspection have been addressed.
Booster Station #1 Tank	Bolted Steel	0.032	Zone 7	
New Booster Station #1 Tank	Bolted Steel	0.35	Zone 7	Built 2010. Locked hatch; very little sediment. Floats on system pressure along with smaller tank at this site.
Booster Station #2 Tank	Hydropneumatic	0.009	Zone 7	Serves County landfill and Veteran's Cemetery
	Total	**5.632 MG**		(not including the Hydropneumatic tank)

Does storage capacity comply with Waterworks Standards? Waterworks Standards require that a water system serving 1,000 or more service connections must have sufficient source and storage capacity to meet peak hour demands for at least four consecutive hours. Peak hour demands are estimated to be 150% of maximum day demands. Based on the highest reported maximum day demand over the past ten years of 15,764 gpm, the District's peak hour demands are 23,650 gpm, 5,150 gpm greater than the 18,500 gpm in source capacity available to the District alone. Therefore, the District must provide 1.24 MG of storage capacity in order to meet Waterworks Standards for source and storage capacity combined. The District's 5.632 MG of storage meets this requirement.

Are all data sheets completed & on file? Not sure.

Are ODW coating procedures adhered to? Yes, the District is aware and conforms to our requirements.

Discussion & appraisal: The Whiskeytown Tank looks like it may need re-coating. Above the water line, the tank was showing significant corrosion. The Whiskeytown Tank floats on the Mule Town

Conduit. In order to increase the turn over of water in the tank, the common inlet/outlet is split so that flow into the tank is through a 14-inch pipe containing a control valve, and flow out of the tank is through both the control valve and a second 14-inch pipe containing a check valve. The tank was scheduled to be inspected and cleaned in February 2014.

C. TREATMENT

1. Watershed and Source Water

Name of source Whiskeytown Lake which is supplied from Trinity Lake through the Carr Power House and Clear Creek.

Are there significant sewage hazards? The 2011 Watershed Sanitary Survey for the Whiskeytown Lake water source, the most recent prepared, did not note any permitted sewage discharges into Whiskeytown Lake, the water diverted from the Trinity River, or the creeks that supply the lake. There is risk of some sewage contamination due to the large amount of body contact recreation on Whiskeytown Lake and camping within the watershed; however, the Forest Service has provided portable toilets at popular locations around Whiskeytown Lake and floating toilets on Whiskeytown Lake in addition to the septic systems and pit toilets at Forest Service facilities. Additionally, house boats are not allowed on Whiskeytown Lake. These steps have reportedly reduced the unpermitted sewage discharges into Whiskeytown Lake, which is evidenced by the low levels of fecal coliform, Giardia, and Cryptosporidium found in routine monitoring of the water supplied from Whiskeytown Lake to the District's treatment plant and the City of Redding's Buckeye treatment plant.

Is there significant recreation? Yes, Whiskeytown Lake, located within the Whiskeytown-Shasta-Trinity National Recreation Area, provides opportunity for many types of water recreation including swimming, fishing, boating, and camping.

Have there been significant changes to or activities on the watershed since the last inspection and/or changes in raw water quality, such as, turbidity or coliform levels? No significant changes in activities on the watershed since last inspection. No significant change in turbidity or coliform levels from 2012 to 2013.

What is date of last watershed survey? PACE Engineering completed the most recent watershed survey update in February 2011 for the District and other public water systems using Whiskeytown Reservoir as a source.

2. Treatment Plant - General

Name of Plant Whiskeytown Dam Treatment Plant

Classification The District's treatment plant is an unapproved alternative filtration technology commonly referred to as "in-line" filtration. It is considered to be equivalent to direct filtration as long as it meets a 0.1 NTU standard in at least 95% of the combined filter effluent turbidity readings each month.

General description of process Raw surface water is delivered to the treatment plant from the base of the Whiskeytown Dam via the Mule Town Conduit. Polyaluminum chlorohydrate (PACh) and sodium hypochlorite solutions are injected into the 30-inch diameter transmission main off the Muletown Conduit at the chlorine building approximately 450 feet upstream of the filtration plant. Then a cationic polymer coagulant (currently Zetafloc 20) is injected at the filtration plant just upstream of the filters as a filter-aid. A sodium hypochlorite solution is injected at this location as well. The filtration plant consists of six filtration "trains" with a maximum filtration capacity of 32 MGD at 7 gpm/ft^2. Additional chlorine is added to the filtered water and is returned to the Mule Town Conduit and delivered to the distribution system.

Multiple filter units for redundant capacity? Yes.

Standby power for treatment plant? Yes, an 80 kW diesel generator can supply sufficient power to operate the complete treatment process. The generator is operated monthly for 20 minutes.

Is operations plan up-to-date? Yes, dated February 1998. The procedures are updated as necessary and a copy of the operations plan is kept at the treatment plant.

Describe removal credits granted by the Department: Based on past performance data, the District's in-line filtration is considered equivalent to direct filtration. Section 64653 grants 2-log

removal credit for *Giardia* cysts and a 1-log virus removal credit for direct filtration when in compliance with performance standards.

3. **Coagulation**

Description of process The District injects neat PACh into the raw water just downstream from the prechlorination injection point at the chlorine building. Reportedly, they have found that injection of PACh at the same location as the chlorine provides optimal filter performance. The PACh metering pumps are located in the filter building, and the PACh is delivered to the injection point through approximately 450 feet of ¾-inch pipe. A cationic polymer is added to the unfiltered water via a metering/carrier pump system at the filtration building. A metering pump injects neat polymer into filtered water supplied by a centrifugal carrier pump. The diluted polymer is supplied at a rate of 18 gpm to the unfiltered water at a static mixer just prior to the filters. Contact time for the primary coagulant from the chlorine building to the filters is limited at peak flow rates to approximately one minute. A backflow prevention device is installed on the carrier water piping to prevent unfiltered water from bypassing the filter.

Chemical Addition

Chemical	Trade Name	Primary Use	Typical Dosage	Injection Point
Polyaluminum Chloride (NTU 926)	NTU Technologies (as of Jan 2011)	Coagulant	0.5 – 3.0 mg/L	Within static mixer outside chlorinator building
Cationic Polymer (ZetaFloc 20)	NTU Technologies	Coagulant	0.5 – 2.0 mg/L	Within static mixer outside filter building

Metering pumps

Chemical	Number	Make	Model	Capacity
Polyaluminum Chloride	2	Wallace & Tiernan	Premia 75 MEM4 Premia 75 MP15	1.00 gph 3.91 gph
Polymer	2	Wallace & Tiernan	Premia 75 MEM4 Premia 75 MP15	1.00 gph 3.91 gph

Standby metering pumps? Two pumps are provided for each coagulant, one for low plant flow rates and the other for high plant flow rates.

How often metering pumps calibrated? The District has graduated cylinders for calibrating the metering pumps each time the dosage is changed.

How is coagulant feed rate determined and optimized? The coagulant feed rate is determined and optimized by the operators based on turbidity, particle count, and streaming current monitoring.

Coagulation (and flocculation) used at all times and optimized? Coagulation is operated at all times and is optimized based on either turbidity or particle counts.

4. **Filtration**

Filters (number, type, media, filter area, flows, etc.) The treatment plant has eight dual media horizontal pressure filters as shown in the following table. The first two trains were constructed in 1975, Train 3 was constructed in 1985, and Trains 4 through 6 were constructed in 1996. The treatment plant capacity is based on a maximum hydraulic loading rate of 7.0 gpm/ft^2 on each filter less the amount of water needed for backwash/rinse/rest. In 1994 the District submitted a demonstration study showing that the filters were able to provide adequate filtration at filter-loading rates of up to 8.0 gpm/ft^2; however, the treatment plant is hydraulically limited to a total flow rate of 23,000 gpm, 7 gpm/ft^2. At this loading rate, filters are typically backwashed every 24 hours. Each filter train takes about one hour to complete a backwash cycle. Therefore, the daily production from each filter train would be as follows:

Trains #1 and #2: 7 gpm/ft^2 x 640 ft^2 x 60 min. x 23 hrs / 1,000,000 gal = 6.18 MGD (ea)
Trains #3 thru #6: 7 gpm/ft^2 x 500 ft^2 x 60 min. x 23 hrs / 1,000,000 gal = 4.83 MGD (ea)

Train #	Filter #	No. of Cells	Anthracite	Sand	Gravel	Dimensions	Surface Area	Max flow @ 7-gpm/ft^2
1	1	2	18"	12"	18"	8'Ø x 40'	320 ft^2	4,480 gpm total
	2	2	18"	12"	18"	8'Ø x 40'	320 ft^2	
2	3	2	18"	12"	18"	8'Ø x 40'	320 ft^2	4,480 gpm total
	4	2	18"	12"	18"	8'Ø x 40'	320 ft^2	
3	5	3	14"	14"	32"	10'Ø x 50'	500 ft^2	3,354 gpm
4	6	3	14"	14"	32"	10'Ø x 50'	500 ft^2	3,354 gpm
5	7	3	14"	14"	32"	10'Ø x 50'	500 ft^2	3,354 gpm
6	8	3	14"	14"	32"	10'Ø x 50'	500 ft^2	3,354 gpm

How is filter rate controlled? Operators set the target flow rate of each filter train in the SCADA system. A flow meter measures the flow to each filter train and a control valve on the effluent line from each train is operated by the SCADA system to meet the target flow rate.

Are filters operated to minimize shutdowns and startups or rapid changes in filter rates and are filter rates constant or varied to meet system demands? Filter rates are normally constant and as demand increases, more filter trains are brought on line. The District operates the plant to minimize filter shutdowns and restarts.

Describe operating criteria under Section 64660: In general, dual media pressure filters are allowed to operate at no more than 3.0 gpm/ft^2. On June 27, 1994, the District submitted a demonstration study to our office. This study was completed when the treatment plant consisted of Filters 1, 2, and 3. A pilot filter was also used to simulate future filters 5, 6, 7, and 8. This study, performed by Montgomery Watson in association with PACE Engineering, concluded that the existing filters were capable of a 2.0-log removal of 4 to 10 micron sized particles at typical raw water turbidities of 0.3 to 0.5 NTU and filter flow rates of 8 gpm/ft^2. The study also concluded that the pilot filter was capable of 2.5 to 4.5-log removal of 4 to 10 micron sized particles at filtration rates of up to 8 gpm/ft^2 with raw water turbidities of 7 to 10 NTU. Filtration rates are to be increased gradually after a backwash cycle. Following backwash or any interruption event, the individual filter turbidity should not exceed 2.0 NTU at any time during the first four hours of operation, and 1.0 NTU at any time during the first four hours following 90% of the interruptions, and 0.5 NTU after four hours of operation. Pressure filters must be inspected on an annual basis. Coagulation and flocculation unit processes shall be in use at all times and effective as demonstrated through jar testing or at least 80% turbidity reduction through the filters.

Are operations criteria met? Yes, the filter-loading rates are 5 to 6 gpm/ft^2 during the summer.

Have filter rates exceeded maximum approved rate? No.

Describe applicable filtration performance standards under Section 64653: Performance standards require that the turbidity level of the filtered water should be equal to or less than 0.3 NTU in 95 percent of the measurements taken each month, shall not exceed 1 NTU for more than one continuous hour, and shall not exceed 1.0 NTU for more than eight consecutive hours.

If using an unapproved alternative filtration technology (in-line) does it meet 0.1 NTU (CAP goal) 50% of the time, has a study been performed, or does a study need to be performed? On June 27, 1994, the District submitted a demonstration study to our office. This study was completed when the treatment plant consisted of Filters 1, 2, and 3. A pilot filter was also used to simulate future filters 5, 6, 7, and 8. This study, performed by Montgomery Watson in association with PACE Engineering, concluded that the existing filters were capable of a 2.0-log removal of 4 to 10 micron-sized particles at typical raw water turbidities of 0.3 to 0.5 NTU and filter flow rates of 8 gpm/ft^2. The study also concluded that the pilot filter was capable of 2.5 to 4.5-log removal at filtration rates of up to 8 gpm/ft^2 with raw water turbidities of 7 to 10 NTU. Additionally, based on the monthly treatment records submitted to the Department, the combined filter effluent has been below 0.1 NTU at least 99% of the time during each month since October 2005, through December 2012.

Are filtration performance standards met? Yes, performance standards are consistently met.

Are pressure filters physically inspected annually? The District inspects the condition of the media annually (half in November, other half in March/April). The inspection log is submitted to the Department. Anthracite was added in 2009; it is usually required every 3 to 4 years.

Describe backwash cycle (source of backwash water, flow rates, use of air/water, length of backwash, surface wash) Filter Train #1: This filter train consists of 2 filters, each with two filter cells. During a backwash cycle, each cell is backwashed sequentially. Filter Cell 1A is backwashed by filtering raw water through Cells 1B, 2A, and 2B. The filtered water from these three cells is directed to Cell 1A for backwashing. A backwash control valve regulates the flow based on the operator set point and measurements taken from the raw water flow meter for the filter train. Typical backwash flow rate is 13.5 gpm/ft^2. The backwash cycle lasts for 10 to 12 minutes per filter cell, the optimal length as determined during filter evaluations performed in September 2003, and surface wash is used throughout the backwash. The entire backwash cycle is approximately 65 minutes per filter train. All other trains backwash similarly.

Frequency of backwashing and/or what initiates backwash The filter backwash automatically at a pressure drop across the filter of 7 to 8 feet of head or a predetermined run time, whichever occurs first. Summer time filter runs are 24 to 36 hours, winter runs are typically 48 to 60 hours due to lower flow rates. The District adjusts the filter run time that will trigger a backwash to match when they estimate the pressure drop will reach 7 to 8 feet of head.

Are filter rates gradually increased after backwashing or other shut down? The electric motor driven filter control valves take approximately 3 minutes to cycle from fully closed to fully open.

Is backwash water recycled? No, however, filter-to-waste water is recycled. The District has hired Pace Engineering to design the components required to add backwash recycle.

If coagulant added to backwash water, dosage and name of coagulant? N/A

If reclaimed backwash water returned to headworks, describe treatment, settling time provided, percent solids removal, and return rate to plant Backwash water is not recycled; however, the District allows the filter-to-waste water to settle for four hours prior to recycling it.

Is filter to waste provided? Yes.

If filter to waste provided, length of time Filters are operated in waste mode following backwash or other interruptions until the filtered water turbidities drop to approximately 0.05 NTU, typically 15 minutes to 30 minutes depending on time of year.

Are filters equipped with surface or subsurface wash? Yes, rotating surface washers supplied with filtered water.

Is appropriate backflow prevention device installed on surface wash? Yes, a double check valve is installed on the surface wash supply pipe.

Method used to minimize turbidity spikes after backwashing or other interruption events Filter-to-waste minimizes turbidity spikes.

Discussion & appraisal Filters appear to be operating well within the limits of the Surface Water Treatment Rule. Monthly monitoring reports show that the combined filter effluent is typically less than 0.1 NTU, and consistently met all turbidity standards. Additionally, the District monitors the particle concentrations in the 2-5 micron range and the 5-15 micron range in both the raw water and the combined filter effluent. The daily maximum, minimum, and average particle reductions in these size ranges is reported to the Department as part of the District's monthly treatment records. In order to meet the requirements of the Long term 1 Enhanced Surface Water Treatment Rule (LT1), the District needed to demonstrate that the filters are able to achieve at least a 2.0-log reduction in cryptosporidium sized particles (2-5 micron) through filtration.

Based on particle count data submitted to the Department since October 2005, where the finished water turbidity was consistently less than 0.1 NTU, the average daily reduction in particles in the 2 -5 micron range has been greater than 2.0 log each month. Additionally, the District has met the 0.1 NTU CAP goal in at least 99% of the combined filter effluent turbidity measurements reported each month. The District now conducts combined filter effluent turbidity monitoring, and records submitted to this Office show the combined filter effluent turbidities never exceeds 0.3 NTU and are consistently less than 0.1 NTU. The permit should be amended to change the monthly turbidity performance standard to 0.1 NTU in at least 95% of the measurements collected during the month. The filtration plant can be granted a 2-log *Cryptosporidium* removal credit while meeting the 0.1 NTU standard.

5. **Disinfection**

Process Description The District utilizes gas chlorination for the disinfection of the raw and filtered water. Filtered water is supplied by a 7½ hp booster pump to either the 24-inch diameter raw water main at the chlorination building (pre-chlorination) or to the 24-inch diameter filtered water main at the filtration building (post-chlorination). Chlorine is introduced into the carrier water supplied by the booster pump via two eductors, one for pre-chlorination and one post-chlorination. Chlorine gas is supplied to the eductors through two sets of gas rotameters for each educator, one 100 pound per day (ppd) and one 200 ppd. The flow rate through the rotameters is controlled by the carrier water flow rate, which in turn is controlled by an automatic valve that adjusts the chlorine flow rate to meet the District's target chlorine residuals of 0.7 mg/L pre-filtration and a 0.8 mg/L post-filtration.

Capacity Currently, the District uses a 100 ppd rotameter for pre-chlorination, though as noted above, a 200 ppd rotameter is also available. The District uses a 100 ppd rotameter for post-chlorination during the winter and a 200-ppd rotameter for post-chlorination during the summer. At the maximum production rate of 33 MGD, the District is able to provide a maximum chlorine dosage of 1.5 parts per million (ppm) through pre- and post-chlorination combined using the 200 ppd rotameters for both locations or 1.1 ppm if only using the 100 ppd rotameter for pre-chlorination. The chlorination building has room for four, 1-ton cylinders. The District orders chlorine when they have two empty cylinders. Two cylinders are maintained in service at a time with an automatic switchover valve for when a cylinder runs empty. Both cylinders in service are also equipped with an automatic shutoff valve on the cylinder that closes if chlorine gas is detected in the chlorination building.

Injection Points Prechlorination: chlorine solution is injected into the 24-inch raw water main which tees from the 42-inch Mule Town conduit, just outside the chlorinator building (down near the lake). Postchlorination: chlorine solution is added to the 24-inch filtered water effluent main, just outside the chlorinator building, prior to the connection to the 42-inch Mule Town Conduit.

Provisions for Power Failure In the event of a power failure, an 80 kW diesel generator is utilized to provide all power requirements for the treatment facility. A 6 second delay between power loss from PG&E and generator start-up prevents nuisance start-ups of the generator during momentary interruptions. The operation of the generator is tested monthly as part of a general maintenance plan for the generator.

Describe applicable disinfection performance standards under Section 64654: Disinfection must be sufficient to provide a 1-log inactivation of *Giardia* cysts and 3-log inactivation of viruses. Water delivered to the distribution system must contain a minimum of 0.2 mg/L free chlorine residual. A detectable level of free chlorine residual must be maintained in at least 95% of the samples taken from the distribution system each month.

Facilities providing contact time:

Process	Calculation	Available Volume (gallons)	T_{10}/T	Effective Contact Volume
30 "Raw Water Main	$L\pi r^2 = 450*\pi*(15/12)^2*7.48$	16,500	1.0	16,500
8x40 foot filters (4)	$4L\pi r^2*.5 = 4*40*\pi*(4)^2*7.48*.5$	30,080	0.7	21,056
10x50 foot filters (4)	$4L\pi r^2*.5 = 4*50*\pi*(5)^2*7.48*.5$	58,748	0.7	41,124
30 "Filtered Effluent Water Main	$L\pi r^2 = 450*\pi*(15/12)^2*7.48$	16,500	1.0	16,500
45" Mule Town Conduit to NEED Camp turnout	$L\pi r^2 = 5{,}019*\pi*(45/24)^2*7.48$	414,640	1.0	414,640
4" main from Conduit to NEED Camp first connection	$L\pi r^2 = 1{,}000*\pi*(2/12)^2*7.48$	653	1.0	653

Assumptions made in determination of contact volume: The 1 MG clearwell at the treatment plant is not given any credit for CT calculations.

1. The first connection is at NEED camp; CT at the Centerville turnout is always met if it is met at NEED camp.
2. The length of 30-inch diameter piping from the pre-chlorine injection point to the filters is estimated to be 450 feet.
3. The length of 30-inch diameter piping from the filters to the post-chlorination injection point is estimated to be 450 feet.
4. The volume of water in the filters is estimated to be half the empty volume of the filter vessel.
5. The length of 45-inch diameter pipe from the filters to NEED camp turnout is 0.95 miles.
6. The length of the 4" main which services the NEED Camp has been estimated to be 1000 feet.

Are log inactivation requirements met before the first service connection? Yes, based on records submitted by the District starting in May 2005, The District consistently provides at least 1-log inactivation of *Giardia* cysts at the NEED Camp and Centerville turnouts. During high flow conditions particular attention is paid to the residual leaving the plant; target is about 1.0 mg/L to ensure adequate CT at NEED camp. The amount of CT required to provide 3-log virus inactivation is much less.

Are residuals entering distribution system ≥ 0.2 ppm? Yes.

Are distribution system residuals at least a trace 95%? Yes.

Discussion & appraisal The District adjusts their chlorine dosage in order to always maintain a minimum 1-log inactivation of *Giardia* cysts at the NEED Camp turnout. The District uses a spreadsheet, developed with help from our office, to calculate the *Giardia* cyst inactivation daily. This spreadsheet is submitted to our office each month.

6. **Monitoring and Alarms**

Describe filtration monitoring requirements under Section 64655: Turbidity measurements must be of the combined effluent, before the clearwell, at least once every four hours. Turbidity measurements of the individual filter effluent must be conducted continuously and recorded at least once every 15 minutes. The supplier must validate the accuracy of continuous monitoring turbidimeters on a weekly basis.

Are filtration monitoring requirements met? Yes, the District uses Hach 1720E turbidimeters to monitor the raw water and combined filter effluent turbidity and 1720D turbidimeters to monitor the individual filter effluent.

How often are turbidimeters calibrated? The District validates the 1720D and 1720E turbidimeters weekly by comparison to a Hach 2100A turbidimeter. All except the raw water turbidimeter, are cleaned and calibrated quarterly. The raw water turbidimeter is cleaned and calibrated monthly. The 2100A is checked against gel standards to validate the calibration. The turbidimeters are also calibrated if there is a 10% or greater difference in the verification readings. The turbidimeters are calibrated at least quarterly using formazine solution.

How are they calibrated and what standards are used? The turbidimeters are calibrated per the manufacturer's specifications using Formazine standard solutions.

Are samples collected at proper locations that give accurate and representative results (i.e. turbidity sample must be before clearwell) Yes.

Describe disinfection monitoring requirements under Section 64656: Temperature, pH, disinfectant contact time, and residual disinfectant concentration must be recorded.

Are disinfection monitoring requirements met? Yes.

Type and model of chlorine residual monitors or test kits Pre-filtration free chlorine residuals are measured by a Wallace & Tiernan Dupolox 3 amperiometric continuous chlorine analyzer. Post-filtration free chlorine residuals are measured by an ATI A15 amperiometric continuous chlorine analyzer.

Are alarms tested, and if so, how often? Reportedly, the alarms are tested annually.

MONITORING & ALARMS

Parameter	Location	Sample Frequency	Recorded	Alarmed (yes/no)	Alarm Setpoint and Action[2]
Filter Flowrate	raw water, each train	continuous	Yes	No	
Turbidity	raw	continuous	Yes	Yes	2.5 NTU – operator notified
Turbidity	individual filter train	continuous	Yes	Yes	0.5 NTU – filter shutdown
Turbidity	combined effluent	continuous	Yes	Yes	0.3 NTU – plant shutdown 0.2 NTU – operator notified
Free Chlorine Residual	Pre-filtration	continuous	Yes	No	
Low Free Chlorine Residual	Post-filtration	continuous	Yes	Yes	0.4 to 0.8 mg/L – operator notified[1] 0.3 to 0.6 mg/L – plant shutdown[1]
High Free Chlorine Residual	Post-filtration	continuous	Yes	Yes	3.0 mg/L – plant shutdown
Water temp	Pre-filtration	continuous	No	No	
Water pH	Pre-filtration	grab	Yes	No	
Current meter	Pre-filtration	continuous	No	Yes	50 – operator notified
Particle Count	pre & post filtration	continuous	Yes	Yes	1.0-log removal – operator notified
Filter high diff. Pressure				Yes	11-ft – shutdown filter train
Utility power failure				Yes	operator notified
Generator "on"				Yes	operator notified
Coagulant Feed Failure				Yes	operator notified
Surface wash low pres				Yes	operator notified
Cl_2 low discharge pres				Yes	operator notified
Cl2 leak				Yes	operator notified
Filter Building power				Yes	operator notified
Cl_2 building power				Yes	operator notified
Air supply pressure				Yes	operator notified

1 Varies with the time of year and flow rates.

2 Turbidity alarms are equipped with delays of 2 to 3 minutes, so that momentary spikes don't set off the alarms.

Discussion An autodialer makes several calls until someone responds: calls are made first to an operator, then a pager, then an answering service.

Describe records maintained of treatment (Section 64662): See treatment records in file.

Describe monthly report sent to the Department (Section 64664): The monthly treatment records submitted by the District meet the requirements of Section 64664.

Discuss other monitoring or sampling (particle counters, etc.) The District has two MetOne particle counters that operate continuously, measuring the raw water and combined filter effluent particle counts in the 2-5 micron range and 5-15 micron range. The District's SCADA system is used to calculate the log removal and a report is sent to our office each month which gives daily average, minimum, and maximum log removal. Based on particle count data submitted to the

Department since October 2005, where the finished water turbidity was consistently less than 0.1 NTU, the average daily reduction in particles in the 2 -5 micron range has been greater than 2.0 log each month.

Discussion & appraisal The monitoring and alarms appear to be adequate to enable system operators to operate the treatment plant according to surface water treatment regulations and respond to system upsets. The plant has two separate alarm systems, both of which are SCADA. One is located at the WTP and the other at the District office. It notifies operators of conditions that include: high effluent turbidity, low chlorine residual, high/low 1.0 MG tank level, power failure, and a chlorine gas leak.

7. **Compliance with the Federal Long Term 2 Enhanced Surface Water Treatment Rule (LT2)**

Was disinfection profiling performed? No, based on the results of monitoring for total trihalomethanes (TTHMs) and the five regulated haloacetic acids (HAA5s) performed during 2002, the District was not required to perform disinfection profiling.

Has the water system submitted an LT2 monitoring plan or "grandfathered data? On March 18, 2008, the District submitted 24 months of fecal coliform results from 2006 and 2007 to the Department along with their intent to grandfather prior raw water fecal coliform monitoring data. The District continued to report the results from two raw water bacteriological samples per month through November 2009 and one per month since then.

Has the water system begun cryptosporidium/E. coli monitoring under the LT2? Yes, the District collects one raw water sample each month for E. coli monitoring. Based on past data submitted by the District on March 18, 2008, the average level of E. coli bacteria in the District's lake source was below a most probable number (MPN) of 10 E. coli per 100 ml. The federal LT2 allows systems to receive a waiver from cryptosporidium monitoring requirements if the average level of E. coli in the source water is less than 100 per 100 ml. The District met this requirement, and the source was classified in Bin 1 for purposes of the LT2.

Discussion & appraisal Under the LT2, the District was required to collect 24 raw water samples for cryptosporidium monitoring in order to determine what level of surface water treatment they are required to provide. On March 18, 2008, the Department received a request from the District to "grandfather" past fecal coliform data, along with the results from coliform bacteria monitoring of the District's raw surface water for 2006 and 2007 in support of the District's request to grandfather. Based on the submitted data, the MPN for fecal coliform bacteria in the District's raw water source was less than 10 per 100 ml. Therefore, the District was not required to perform the initial raw water monitoring for cryptosporidium, and the District's source was classified as a Bin 1 source. The District has continued to collect one raw water bacteriological samples per month, and the average level of fecal coliform bacteria in the 11 raw water samples collected during 2012 (no sample result was reported for March 2012) was 11.1 per 100 ml, as only six of the 11 samples had any detectable fecal coliform bacteria with a high of 50 per 100 ml in samples collected during February and December 2012.

8. **Groundwater Sources**

Is continuous disinfection provided? Chlorination equipment is not stored at the standby well sites; however, the District is required to provide continuous chlorination when wells are used.

Describe facilities Each well is equipped with an electrical outlet synchronized with the on and off switching of the pump. The disinfectant can be injected into the discharge piping of the well pump for individual well chlorination, or at the well manifold of all three wells.

If disinfection is not provided, are provisions & connections for emergency chlorination provided per DDW guidelines? Yes, the District maintains chemical metering pumps for the chlorination of the water provided by the wells when necessary.

Discussion & appraisal: Although tests indicate that there is no contamination of the wells, since the District also provides treated surface water, chlorination is required in order to meet the SWTR requirement for a measurable disinfection residual throughout the distribution system.

D. TRANSMISSION FACILITIES

Describe transmission facilities The Mule Town Conduit is the major transmission main in the distribution system. It operates by gravity and delivers raw water from the Whiskeytown Dam to the treatment plant and treated water from the treatment plant to the 4.0 MG Tank. The main is approximately 8 miles long; 4.8 miles of 45" diameter pipe and 3.2 miles of 42" diameter pipe. The pipe is cement lined steel.

Discussion & appraisal: The District reports that most of the Mule Town Conduit is in good condition with the exception of a small section that was apparently bed with natural backfill containing a large amount of rocks. The District inspects the air relief valves and blow-offs on the conduit annually.

E. DISTRIBUTION SYSTEM

1. **Booster or Reducing Stations**

Station	Location	Capacity	From Zone	To Zone	Comments
PRV-1	China Gulch	2-inch 6-inch	2	3	Underground vault
PRV-2	Happy Valley & Hawthorne	8-inch 3-inch 2-inch	2	3	Above ground (each are for high flow, low flow, and for a bypass)
PRV-3	Majestic View & Happy Valley	6-inch 6-inch	3	4	Underground vault
PRV-4	End of Majestic View	6-inch 4-inch 2-inch	3	4	4-inch is a relief valve Underground vault
PRV-5	Red Leaf & Olinda	8-inch 6-inch 3-inch	2	5	Underground vault
Booster Station 1	Happy Valley Rd. & Old Happy Valley Rd.	4,500-gpm	6	2	3, 150-hp pumps (1500 gpm ea.), pumps are operated to balance output from wells.
Booster Station 2	Cloverdale & Clear Creek		1	7	Two 50-hp VFD pumps and one 5-hp centrifugal pump.

Discussion & Appraisal: The Booster Station 1 pumps are used to boost water from the wells into the main distribution system and storage when water is not available from the surface water treatment plant. At this time, the booster pumps are operated manually to balance the production of the well(s). Booster Station 2 delivers water to the Veterans Cemetery, the county dump, and Igo School. There is a portable generator stored at the office.

2. **Pressure Zones**

Pressure Zone	Pressure Range	Water Sources	No. Conn.
Zone 1 – Muletown Conduit	0-60 psi	WTP	
Zone 2 – Main	40-159 psi	Zone 1 via 4.0 MG Tank and 0.025 MG Tank	1919
Zone 3 – Amber Ridge	69-96 psi	Zone 2 via 2 PRVs	145
Zone 4 – Majestic View	54-140 psi	Zone 3 via 2 PRVs	157
Zone 5 – Chestnut Improvement Area	72-105 psi	Zone 2 via PRV	78
Zone 6 – Wells	3-110 psi	Wells or Zone 2 via PRV at 0.032 MG and 0.35 MG Tanks (105 psi at lone service connection)	1
Zone 7 – Cloverdale	60 psi-72 psi	Booster from Zone 1	5

Discussion: Under normal operating conditions, the District's distribution system is primarily served from the 4.0 MG Tank by gravity either directly or via pressure reducing valves (PRVs). Zone 7 receives water from Zone 1 through Booster Station #2. Zone 6 typically receives water from the Main Zone through a PRV, but can also receive water from the District's wells when they are in operation.

3. **Mains**

A description of distribution mains is in the following table:

Material	Amount	Size	Condition
Cement Lined Steel	18 miles	36-42"	good
Asbestos Cement	19 miles	4-24"	fair
PVC	65 miles	4-12"	good

4. **Discuss leak history during past 12 months (mains & connections)** The District reported 41 service connection breaks/leaks and 1 main break during 2012. This is relatively low for a system of this size.

5. **Are Distribution facilities constructed per Waterworks Standards?** The District is aware of the Waterworks Standards (WW Stds). Reportedly, the District has found sections of pipe that were not constructed according to the WW Stds. All new water mains meet WW Stds.

6. **Describe water main & sewer line separation practices** The District is aware of our separation criteria. The area is not sewered.

7. **Extent of lead pipes, joints, &/or lead solder used in distribution system & present policy** Reportedly, there are no known lead pipes or joints in the distribution system.

F. WATER QUALITY & MONITORING

1. **Bacteriological Monitoring**
Description of program The District collects three samples per week from among 12 routine sample sites identified in the District's Bacteriological Sample Siting Plan (BSSP). The 12 sites appear to be representative of the distribution system. The District collects raw water samples from each of the standby well sources each calendar quarter, and the surface water source is sampled

monthly prior to treatment. The samples are delivered to Basic Labs, a state-certified lab, for testing.

Sampling plan approved & current (do we have a copy?) The District submitted an updated BSSP on October 28, 2009, which includes source water monitoring in compliance with the Groundwater Monitoring Rule.

Number of samples required? Three per week based on population.

MCL violations in past year? None.

Discussion & appraisal: The District consistently collects the required routine bacteriological samples from the distribution system and the required raw water sample from the surface water source. The District has met all bacteriological standards for at least the past four years.

2. **Chemical Monitoring**

Description of program Samples are collected by District personnel based on chemical monitoring schedules provided by the Department. The wells are designated standby sources; therefore, the monitoring frequency for all required chemicals has been reduced to one sample every nine years for the well sources.

Discussion and appraisal: According to Department records, the water provided by each of the District's sources both active and standby meets all drinking water standards. The District is current on all chemical monitoring for the active surface water source and standby Wells 02 and 03. The District is required to monitor Well 01 for all required volatile organic chemicals during 2013. According to Department records, the District has not submitted the required monitoring results for Well 01.

3. **Distribution Haloacetic Acid (HAA5) and Trihalomethane (TTHM) Monitoring**

Description of program Based on past monitoring, the Department allowed the District to reduce monitoring for TTHMs and HAA5s to one paired sample per year at a location representing maximum residence time during the month of warmest water temperature. The District submitted their most recent Disinfection Byproducts monitoring plan to the Department on September 9, 2005. On February 13, 2008 the District submitted a 40/30 Certification Letter, requesting a waiver of the Initial Disinfection System Evaluation requirement of the Stage 2 Disinfection Byproducts Rule (DBPR). The District was required to submit an updated DBPR monitoring plan in compliance with Stage 2 DBPR by October 1, 2013, and begin monitoring in compliance with the Stage 2 DBPR monitoring requirements October 1, 2013.

Disinfection Byproducts Monitoring

Sample Date	TTHMs, ppb		HAA5s, ppb	
	Result	RAA	Result	RAA
1/13/2004	52	--	36	--
4/15/2004	33	--	38	--
7/19/2004	23	--	21	--
10/27/2004	35	36	26	30
8/12/2005	30	30	25	25
8/16/2006	23	23	19	19
8/13/2007	23.9	23.9	25	25
8/20/2008	25.7	25.7	22	22
9/1/2009	31.2	31.2	30.1	30.1
8/16/2010	24.1	24.1	28.3	28.3
8/30/2011	31.2	31.2	29.3	29.3
8/2/2012	21.7	21.7	20.3	20.3
8/14/2013	29.2	29.2	25.9	25.9

Discussion & appraisal: A public water system that serves 3,300 to 9,999 people with treated surface water is required to sample quarterly at two sites in the distribution system. Since the District only has historic data for one site they were required to select a second site that represents

the highest anticipated level of HAA5s. Since HAA5s can disassociate over time, the highest levels are typically in the middle of the system. On September 10, 2013, the Department received a Stage 2 DBPR monitoring plan from the District which only identified one monitoring site. However, the District did submit results for TTHM and HAA5 monitoring for two sites for the 1st quarter of 2014. In addition to the Stage 1 site at Lorina and Towhee, a sample was collected from 7330 Whitehouse Drive. This site appears to be closer to the treatment plant than the Lorina and Towhee site and appears to meet the requirements of the Stage 2 DBPR. Based upon past monitoring, the District is required to continue monitoring for TTHMs and HAA5s at both sites during the first month of each quarter. Once the District has completed four consecutive quarters of monitoring, they may apply for a reduction in monitoring frequency to annual sampling for TTHMs and HAA5s at both sites. The District monitors for total organic carbon in the raw water quarterly, as required.

2. **Lead and Copper Monitoring**
Description of program (Physical quality of distribution system, corrosion, lead monitoring, etc.) According to Department records, the District has completed a total of nine rounds of monitoring for lead and copper in the distribution system with no exceedances of the 90th percentile action levels (ALs) for lead and copper of 0.015 milligrams per liter (mg/L) and 1.3 mg/L, respectively (see table below). The District is now required to collect at least one set of twenty tap water samples from the distribution system every three years during the summer months. The most recent set of twenty tap water samples was collected during August 2013; therefore, the next set of twenty tap water samples is due during June, July, August, or September 2016.

Lead and Copper Monitoring

Round	Date	# Samples		90th Percentile Pb, mg/L		90th Percentile Cu, mg/L	
		Collected	Required	Results	AL	Results	AL
1	11/13/92	40	40	0.011	0.015	1.100	1.3
2	3/3/93	40	40	0.0055		0.608	
3	6/25/97	20	20	nd		0.797	
4	12/22/98	20	20	0.010		0.668	
5	8/23/01	20	20	0.014		0.963	
6	6/24/04	20	20	0.0063		0.725	
7	08/06/07	20	20	0.008		1.237	
8	09/22/10	20	20	0.005		1.104	
9	8/22/13	20	20	0.0085		0.853	
10	Set of 20 samples due during June, July, August, or September 2016						

5. **Additional Monitoring**
Description of program (Physical quality of distribution system, corrosion, etc.) Records show the Aggressive Index (AI) of the water is 10.6 which is considered aggressive. Since the distribution system contains asbestos cement water mains, the District needs to collect samples for asbestos monitoring from the distribution system.
Discussion & appraisal Distribution system asbestos sampling was last performed July 9, 2009; therefore, the next sample for asbestos is due in 2018.

6. **Is an approved water quality-monitoring plan on file?** Not required for systems with less than 10,000 service connections.

7. **Status of Drinking Water Source Assessment Program (DWSAP)**

Sources	DWSAP Status	Completion Date	Comments
Whiskeytown Lake	Complete	April 2003	Completed by the Redding District Office
Wells 1-3	Incomplete		No information in our files

Discussion and appraisal The DWSAP was completed by the Lassen District Office, and was distributed to the District on July 31, 2003.

8. **Emergency Response Plan (ERP)** On 5-24-04, the District submitted a plan under the title of "Emergency/Disaster Response Plan," which describes in detail what will be done if there is an emergency. The District should update the Plan to incorporate changes in personnel and addition of the storage tank at Booster Station #1 (near the wells). Also see our May 20, 2005 review comments to ensure the comments have been addressed (letter attached).

9. **Was Consumer Confidence report (CCR) completed?** Yes.
Date sent? June 30, 2013 **Is a copy of report on file with DDW?** Yes
Are there needed additions or changes? The CCR met requirements.

G. OPERATION & MAINTENANCE

1. **Planning & Personnel**
Are system improvements made in accordance with the Waterworks Standards? Yes, this office reviews plans for major improvements
Does utility have distribution system maps? The District maintains maps of the distribution system at the office for field personnel. The maps show all valves and mains and are updated as changes to the system are made. Each District truck is also provided with a valve book containing the locations of each main valve.
Is up-to-date copy of system schematic on file? Yes.
What is the minimum grade operator required? The District's treatment plant is classified as a Grade T5 treatment plant, which requires a state-certified Grade T5 treatment operator as its chief operator and state-certified Grade T3 or higher treatment operators as shift operators. The District is classified as a Grade D2 distribution system, which requires a state-certified Grade D2 distribution system operator as its chief operator and state-certified distribution operators as its shift operators. The District's operators meet these requirements. The District's operators are summarized in the table below.

Certified Operators

Name	Title	Distribution Grade	Treatment Grade
Ron Carlin	Chief Operator	D2	T5
Roger Schreiber	Plant Operator	D4	T5
Matt Turner	Plant Operator	D2	T3
Jim Paul	Superintendent	D2	T2
Rick Cascarina	Assistant Manager	D2	T1
Jack McCall	Field Supervisor	D2	
Audie Martin	Maintenance II	D2	
Robert Chacon	Maintenance I	D2	
Ron Dwinell	Maintenance II	D1	

2. **Cross-Connection Control Program**
Operating Rules or Ordinances: The District's Rules and Regulations for Water Service, effective April 15, 1992, Article VIII – Cross-Connection Control Ordinance is on file with the Department.

Backflow Devices

Year	Total Number in System	Number Installed	Number Tested	Number Failed	Number Repaired/ Replaced	Comments
2006	83	0	83	18	3 (repair in progress)	100% tested
2007	74	0	74	12		100% tested
2008	76	0	74	10	1	100% tested
2009	75	0	75	12	9	100% tested
2010	76	2	60	5	4/0	
2011	76	0	76	7	2/5 pending repairs; confirmed repairs were made	100% tested
2012	71	3	68	2	2	3 devices removed

Surveys: In June 2005, the District verified that all abandoned private wells had remained out of service. A complete and thorough cross-connection survey was not performed.

Trained person to carry out the program: Jack McCall certification # 08510 (AWWA/USC) and Roger Schreiber (certified also)

Records of device locations, test, and repairs: All records of device locations, testing status, etc., are maintained by the District in designated notebooks and spreadsheets.

System for the testing of backflow preventers: District personnel are responsible for testing the devices. Repairs are arranged for and paid by the customer. The District evaluates all new service connections for potential backflow hazards.

Discussion & appraisal: The District's cross-connection program appears to meet requirements in general. The District requires all commercial and industrial connections to have a backflow prevention device, typically a reduced pressure principle backflow prevention device (RP). The District evaluates new service connections and whenever there is a change in the customer served at an existing connection for potential backflow hazards. Backflow prevention devices are required as needed. The District reported that 68 of 71 devices were tested in 2012. The three remaining devices were removed as it was determined that they were not necessary.

A potential cross-connection exists at the District's surface water treatment plant. Originally there were three pipelines in the meter vault at the chlorination building that could allow water to bypass the filters; a 10-inch pipeline, a 14-inch pipeline, and a 36-inch pipeline. The District removed a spool piece from the 10-inch pipeline, and utilizes a double-block-and-bleed system for the 14-inch and 36-inch pipelines, which is appropriate protection.

3. **Complaints**

Describe complaint program: Complaints are called into the office where personnel fill out a work order which is usually given to an operator for follow up. Records of the original complaint, complainant, time and date of complaint, and actions taken by the District to resolve the complaint are kept on file.

Complaints

Type	Number	Comments
Taste and odor	3	Flushed lines
Color	1	Recommended School flush internal pipes
Turbidity		
Low/High Pressure	22	All were low pressure due to faulty customer PRVs
Other		
Total	26	

Discussion & appraisal: It appears the District has an adequate program to address complaints.

4. **Emergency Response**
   Is an up-to-date emergency notification plan on file? Yes, an updated Water Quality Emergency Notification Plan (ENP) was received on October 28, 2013.
   Emergency response plan Notify public via radio and television and by phone.
   Notification of CDPH of significant system problems District is aware that we should be notified and has done so in the past.
   Discussion & appraisal: The ENP appears to meet requirements.

5. **Main Disinfection Program**
   Describe main disinfection program (i.e., method, contact time, chlorine residual, bacteriological tests, records) for new & repaired mains All replacement mains and valves are swabbed with a 6% sodium hypochlorite solution prior to installation. The repaired section is flushed and a bacteriological sample is collected. The District follows AWWA procedures for using solid calcium hypochlorite tablets to disinfect new main installations. Results from all bacteriological monitoring are reported to the Department each month.
   Does the main disinfection program comply with AWWA standards? Yes.
   Discussion & appraisal: The District's main disinfection procedures appear to be adequate and in compliance with AWWA Standards for disinfecting water mains. We have a copy of the Emergency Disinfection Plan, received via fax in December 2008.

6. **Valve Maintenance/Exercising Program**
   Describe Program The District does not have a formal valve maintenance program. Though not required by drinking water regulations, it is strongly recommended public water systems operate main valves on a regular basis to help ensure valves operate properly when needed, especially during an emergency such as a main break and repair. We understand that at times, a larger area of the distribution system is depressurized than would normally be required due to faulty valves. The Department strongly recommend the District implement a valve maintenance and exercising program.
   Are number & location of valves satisfactory? The original system was constructed as an irrigation system, and reportedly has few isolation valves.
   Discussion & appraisal (i.e., are valves recorded on maps available to field crews? Are all valves located with valve covers raised to grade?) Reportedly, all valves are covered and raised to grade. Field maps showing the location of all known valves are available to District personnel. The District may want to begin a valve maintenance program which includes recording the number of turns to full close and full open for all main valves. The District has begun adding a small number of isolation valves each year to reduce the number of people affected by water main breaks and maintenance.

7. **Flushing**
   Describe flushing program (i.e. deadends, records, etc.) The District has initiated a formal flushing program. The program includes systematically flushing of dead ends each year.
   Approximate number of dead ends 34 **Percent with flushing valves** 100%
   Discussion & appraisal: Based on the low number of complaints reported, it appears that the District's flushing program is adequate.

I. OVERALL SYSTEM APPRAISAL AND SUMMARY

The inspection determined the Clear Creek Community Services District (District) domestic water system is operated in a conscientious and professional manner, and is well maintained. The domestic water supply system is in good condition, required monthly and yearly records are submitted in a timely manner, and the District is current on all chemical monitoring. According to Department records, the water provided by the District meets all drinking water standards.

The District provides the Department with records of their annual filter evaluations. The District evaluates the condition of the filter interior and notes any mud balls and mounding or depressions in the media service. In addition to the visible inspection of the filter media, it is recommended that the District monitor the backwash water turbidity and prepare a backwash water turbidity profile as indicated in the attached Filter Surveillance Guidelines at least annually or whenever they make any changes to the backwash rate.

The District submitted a Stage 2 DBPR monitoring plan to the Department on September 10, 2013. The District's Stage 2 DBPR monitoring plan states that the District will monitor for TTHMs and HAA5s at the Stage 1 monitoring site at Lorina and Towhee during January and August. However beginning in January 2014, the District submitted results for a second site at 7330 Whitehouse Drive, closer to the treatment plant than the Lorina and Towhee sample site that represents the highest anticipated levels of HAA5s. This second site meets the requirements of the Stage 2 DBPR. The District needs to continue monitoring for TTHMs and HAA5s at both sites during the first month of each quarter. Once the District has completed four consecutive quarters of monitoring for TTHMs and HAA5s at both sites, they may apply for a waiver to reduce monitoring to annually based on the results.

J. Attachments

System Deficiency Record
Filter Surveillance Guidelines
Chemical Monitoring Schedules

Report prepared by:

_____

Signature Date

SYSTEM DEFICIENCY RECORD

Name of System **Clear Creek CSD** System Number **4510016**

Date Noted	Description of Needed Correction	Order No.	Reported Corrected	Confirmed Corrected
2/27/09	Repair or replace the Air Vac unit on the BPS 2 pressure tank to keep from using rented oil piston air compressors.	3		02/17/10
2/27/09	To minimize large areas of water main depressurization during main repairs, this office strongly recommends a valve exercising program be initiated.	R		
2/27/09	Need to continue quarterly raw water bacteriological samples from wells when in service.	R		12/18/13
2/17/10	The District needs to provide an operations plan for the Muletown Conduit.	3		
1/16/13	The District should update the ERP to incorporate changes in personnel and addition of the storage tank at Booster Station #1 (near the wells). Also see our May 20, 2005 review comments to ensure the comments have been addressed (letter attached).	R		12/18/13
1/16/13	Need to submit Stage 2 Disinfection Byproduct Rule Compliance Monitoring plan for approval; compliance monitoring begins 4Q 2013.	3		12/18/13
1/16/13	The Department needs a copy of the changes made recently regarding requirement of RP device at every new connection.	3		12/18/13
1/16/13	Please submit updated ENP (form is attached). Notification plan should include a discussion of using SHASCOM in an emergency to notify either the entire District or isolated streets/areas if necessary.	3		12/18/13
12/18/13	Perform required monitoring for VOCs at Well 01 and submit results to the Department.	3		

Order Number:

1. Serious health hazard; corrective action must be taken immediately.
2. Critical system or operational defect &/or potential health hazard; must be corrected as soon as possible.
3. System or operational defect &/or potential contamination hazards of lesser public health significance. Must be corrected as workload permits.
4. System or operational defect &/or potential health hazard - costly to correct - to be included in any long-range water improvement project.

R Reminder