

APPENDIX D - 2019 OHA SANITARY SURVEY



PUBLIC HEALTH DIVISION
Center for Health Protection, Drinking Water Services
Kate Brown, Governor



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<http://healthoregon.org/dwp>

January 13, 2020

Steve Starner
Water Quality Division Supervisor
City of Silverton
306 S. Water Street
Silverton, OR 97381

Re: Water System Survey, City of Silverton, PWS ID # 4100823

Dear Mr. Starner:

Thank you for your time and assistance, in addition to that of Travis Sperle and Mike Downey, in conducting a **Water System Survey at the City of Silverton on December 10, 2019**. The main purpose of the survey is to evaluate the entire water system in terms of supplying safe drinking water to the public. I have enclosed a copy of the report for your records. Please let me know if any corrections need to be made.

The first page of the report lists significant deficiencies and rule violations in the system that will have to be corrected as soon as possible. **You must submit a written corrective action plan describing how and when the deficiencies/violations will be corrected by March 2, 2020.** Once the deficiencies and rule violations are corrected, you will need to send written verification that they have been corrected and the dates of correction.

The significant deficiencies and rule violations noted are as follows:

Treatment:

1. **Monitoring for combined filter effluent (CFE) turbidity at the old plant is not sampled from the correct location, as required by Oregon Administrative Rule (OAR 333-061-0076(4)(a)(A)).** The CFE turbidity included in required 4-hour compliance turbidity monitoring is a mixture of each of the two individual filter effluent (IFE) turbidity samples, rather than a 'combined' sample. Given differences in sample flows with each filter, a mixture of the two individual samples may not accurately reflect combined effluent turbidity. See the schematic on page 4 of the survey report for a depiction of this, as each filter empties separately into the 26,000 gallon clearwell.

Report 4-hour CFE turbidity accordingly, when the old plant is used:

- When only the old plant is running, use the higher of each IFE for the old plant.
- When both plants are running, use the highest of either 1.) the CFE leaving the new plant filters, or 2.) higher of each of the old filters' IFE readings.

Disinfection:

2. **A tracer study has not been conducted on the two treatment plant reservoirs used for disinfection contact time, as required by OAR 333-061-0076(4)(d)(C).** Submit a procedure for conducting a tracer study to DWS for review. As indicated on page 9 of the survey report, DWS has not approved the current determination of contact time. Our calculations note an estimated effective volume baffling factor of greater than 30% with this methodology. In the interim, begin using a conservative estimated 10% effective volume baffling factor with the storage volume in the two unbaffled reservoirs for contact time calculation, as follows. You may need to increase the chlorine residual at the first customer, especially during peak demand flows, to ensure disinfection CTs are met every day.

$$\text{Contact time [min]} = (0.10 \times \text{Total storage volume in reservoirs [gal]}) / \text{Peak hourly demand flow [gal/min]}$$

Storage:

3. **The hatches at the 1.5 MG treatment plant reservoir are not secured or protected from potential contaminant sources, as required by OAR 333-061-0076(4)(e)(B).** See the photo on page 12 of the report noting that the outlets of both perimeter hatch drains are not protected with a screen. Screen the drain openings and continue maintenance to ensure that the hatch drains and outlets are protected from potential entry or nesting of pests.

Management & Operations:

4. **Major modifications (Three waterlines: Steelhammer Street, Steelhammer subdivision, and Castlebrook Estates) placed into use without final approval, OAR 333-061-0050.** The engineer, or person involved in the waterline projects at the time of completion, shall certify that the projects were completed according to submitted plans and all conditions in the individual conditional approval letters for the project, provided during the survey, are met.

We were not able inspect or verify the following items at your reservoirs. Provide photographic or other documentation to me by March 2, 2020, for the following:

1. **Verify that the screening is adequately protecting the reservoir rooftop vent, for the 1.5 million gallon (MG) treatment plant reservoir.**
2. **Verify that the hatch is watertight and locked for the 2 MG reservoir.**

In addition, I have the following comments and recommendations:

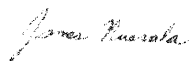
- 1) Drinking Water Services has established criteria for determining whether a system should be considered to have “outstanding performance.” Systems that are designated outstanding performers may have their water system survey frequency reduced from every 3 years to every 5 years. Although your water system did not meet the established criteria, please review the enclosed handout to see what steps you can take in the future towards receiving this designation.
- 2) I have completed an evaluation of the old water treatment plant and determined that the old plant has a *giardia* log removal value of 2.5-log. Together with the 2.5-log *giardia* removal value of the new plant from the comprehensive performance evaluation completed earlier, the filtration process *giardia* log removal value is increased from 2.0 to 2.5-log. As a result, the disinfection log removal requirement is decreased from 1.0 to 0.5-log *giardia* removal, to meet the combined 3.0-log *giardia* removal through the entire plant. Begin using a 0.5-log *giardia* removal value for estimating the amount of disinfection or CT required, in your daily disinfection calculations. See the attached evaluation.
- 3) Use the peak hourly demand flow of the day leaving the two treatment plant reservoirs in the calculation of daily disinfection contact time above. During the survey you indicated that currently there is no determination of the peak demand flow, which would be the sum of the high service pumps and the flow meter reading going to the low zone, during the busiest hour of the day. Report this figure in the peak hourly demand column on the monthly report sent to DWS.
- 4) With both filter plants now rated as 2.5-log *giardia* removal begin the following:
 - Measure and record settled water turbidity after both the new plant solids contact clarifier and the old plant’s settling basins, daily; and
 - Ensure both raw and filtered total organic carbon monitoring is both before both filter plants and after both filter plants, depending on which filter is used when quarterly sampling is conducted. You will need to collect filtered TOC from each individual filter effluent sample tap, and report the highest, for the old plant as there is no combined filter tap prior to the clearwell.
- 5) Calibrate the alum and caustic soda pumps used at the front of each filter plant, at multiple feed pump settings to ensure you are delivering the dose of chemical desired.
- 6) Be sure to measure and record the flow through each of the individual and combined filter effluent turbidimeters every quarter that the filter is operating, to verify if it is range, 200 to 750 milliliters per minute (3.1 to 11.9 gallons per hour). Dial down new filter #1 as it was reading 17 gallons per hour during the survey.
- 7) Include more than the 10 required routine coliform sampling sites in your rotation

schedule so you can sample at different locations at least every other month. Spread out your samples throughout the month for variability.

- 8) With the increase in population to over 10,000, you will be required to increase the number of lead and copper tap samples from 20 to 30 sites, every three years, beginning with summer 2020. You will also be required to increase disinfection byproducts sampling from two dual sets per year to two dual sets of TTHM and HAA5 per quarter, one at 879 W. Main, and one at 400 Schemmel Lane, a previous DBP site, beginning with the first quarter 2020 in January.
- 9) As you use either Silver or Abiqua Creeks individually and never together, continue to monitor chemicals twice during each monitoring period, once using Silver and once using Abiqua Creeks. Be sure to monitor for synthetic organic compounds (SOCs) in two consecutive quarters for each source.
- 10) Review the attached lead and copper tap site sampling form to ensure you are taking samples at high priority or tiered sites. Complete the form and return it to DWS for any new sample sites. Also be sure to return the attached lead consumer notification certification to DWS for the individual residents' notification.
- 11) A summary of your monitoring requirements can be found on page 14. Please maintain a copy of this page and refer to it for future monitoring scheduling.

If you have any questions or concerns, or would like this in an alternate format, please contact me at (971) 673-0459, or james.b.nusrala@state.or.us. Your cooperation is appreciated.

Sincerely,



James Nusrala, P.E., Regional Engineer
Drinking Water Services

Enclosures:

Water treatment plant evaluation, old filter plant

141A form for lead and copper site selection

Lead consumer notification certification

Outstanding performer criteria

cc:

Travis Sperle, Maintenance Division Supervisor, City of Silverton, 830 McClaine Street, Silverton, OR 97381

ec: Chantal Wikstrom, DWS

Deficiency Summary

Surveyor: James Nusrala

Date Corrective Action Plan is due: March 2, 2020

County: Marion

Yes	No	Significant Deficiencies and Rule Violations:	Date to be corrected	Date corrected
<input type="checkbox"/>	<input checked="" type="checkbox"/>	Source: <i>Well construction:</i> N/A		
		<i>Spring/other source:</i> No significant deficiencies or rule violations noted.	N/A	
<input checked="" type="checkbox"/>	<input type="checkbox"/>	Treatment: <i>Surface water treatment:</i> Incorrect location for compliance filtered turbidity (combined filter location for old plant not 'combined' but mixture of each individual filter effluent sample line)		
		<i>Disinfection:</i> No means to determine contact time under peak flow and minimum storage conditions.		
		<i>Other treatment:</i> No significant deficiencies or rule violations noted.	N/A	
<input checked="" type="checkbox"/>	<input type="checkbox"/>	Finished Water Storage: 1.5 MG reservoir at plant hatches perimeter drain outlets not protected with screen.		
<input type="checkbox"/>	<input checked="" type="checkbox"/>	Distribution: No significant deficiencies or rule violations noted.	N/A	
<input type="checkbox"/>	<input checked="" type="checkbox"/>	Monitoring: No significant deficiencies or rule violations noted.	N/A	
<input checked="" type="checkbox"/>	<input type="checkbox"/>	Management & Operations: Three waterline projects in use without final DWS approval.		
<input type="checkbox"/>	<input checked="" type="checkbox"/>	Operator Certification: No significant deficiencies or rule violations noted.	N/A	
<input type="checkbox"/>	<input checked="" type="checkbox"/>	Other Rule Violations: No significant deficiencies or rule violations noted.	N/A	

Comments:
See letter dated January 13, 2020 for details, and comments and recommendations.

Source Deficiencies:

Well Construction Deficiencies:

- ⊕ Sanitary seal and casing not watertight
- ⊕ Does not meet setbacks from hazards
- ⊕ Wellhead not protected from flooding
- ⊕ No raw water sample tap
- ⊕ No treated sample tap (if applicable)
- ⊕ No screen on existing well vent

Spring Source Deficiencies:

- ⊕ Springbox not impervious durable material
- ⊕ No watertight access hatch/entry
- ⊕ No screened overflow
- ⊕ Does not meet setbacks from hazards
- ⊕ No raw water sample tap
- ⊕ No treated sample tap (if applicable)

Treatment Deficiencies/Violations:

Surface Water Treatment Deficiencies:

- + Turbidity standards not met - 0030(3)
- + Turbidimeters not calibrated per manufacturer or at least quarterly - 0036(5)(b)(A)(ii)
- ⊕ Incorrect location for turbidity monitoring
- ⊕ If serving > 3,300 people no alarm or auto plant shut off for low chlorine residual
- + For conventional or direct filtration: No alarm or plant shut off for high turbidity
- ⊕ For conventional filtration: Settled water not measured daily
- ⊕ For conventional or direct filtration: Turbidity profile not conducted on individual filters at least quarterly
- ⊕ For cartridge filtration: Filters not changed according to mfg. rec. pressure differential
- ⊕ For cartridge filtration: No pressure gauges before and after cartridge filter
- + For membrane filtration: Direct integrity testing does not meet requirements under -0036(5)(d)
- + For membrane filtration: Turbidimeter not present on each unit -0036(5)(d)(C) or -0050(4)(c)(G)
- + For membrane filtration: O&M manual doesn't include a diagnosis/repair plan -0065(4)(c)
- ⊕ For diatomaceous earth filtration: Body feed not added with influent flow

Disinfection Deficiencies/Violations:

- + DPD/EPA approved method not used - 0036(9)(e)
- + Free chlorine residual not maintained - 0032(3/5)
- + Chlorine not measured & recorded - 0036(9)
- + Minimum CT required not met all times - 0032(3/5)
- ⊕ No means to adequately determine flow rate on contact chamber effluent line

- + pH, Temperature, and chlorine residual not measured daily at first user - 0036(5)(a/b)
- ⊕ Failure to calculate CT values correctly
- ⊕ No means to adequately determine disinfection contact time under peak flow and minimum storage conditions

UV Disinfection Violations (OAR 333-0050(5)(k)):

- + Bypass around UV system
- + Lamp sleeve not cleaned
- + Lamp not replaced per manufacturer
- + No intensity sensor with alarm or shut-off

Other Treatment Violations:

- + Non-NSF approved chemicals - 0087(6)
- + Corrosion control parameters not met - 0034

Distribution System Violations:

- + System pressure < 20 psi - 0025(7)

Cross Connection (OAR 333-061-0070):

- + No ordinance or enabling authority (CWS)
- + Annual Summary Report not issued (CWS)
- + Testing records not current (CWS, NTNC, TNC)
- + No Cross Connection Control Specialist (CWS ≥ 300 connections)

Finished Water Storage Deficiencies:

- ⊕ Hatch not locked or adequately secured
- ⊕ Roof and access hatch not watertight
- ⊕ No flap valve, screen, or equivalent on drain
- ⊕ No screened vent

Monitoring Violations:

- + Monitoring not current - 0025(1)
- + Unaddressed MCL violations or LCR AL exceedances - 0030
- + No Coliform Sampling Plan - 0036(6)(a)(I)

Management & Operations Violations:

- + No operations and maintenance manual - 0065(4)
- + Emergency response plan not completed - 0064(1)
- + Major modifications not approved (plan review) - 0050
- + Master plan not current (≥ 300 con.) - 0060(5)
- + Annual CCR not distributed (CWS) - 0043(1)(a)
- + PNC or out of compliance with AO
- + Public notice not issued as required - 0042

Operator Certification Violations:

- + No certified operator at required level - 0065(2)
- + No protocol for under certified operator - 0225(2)

Other Rule Violations: _____

⊕ Significant deficiency per OAR 333-061-0076
+ Rule violation per OAR 333-061-XXX

Inventory and Narrative

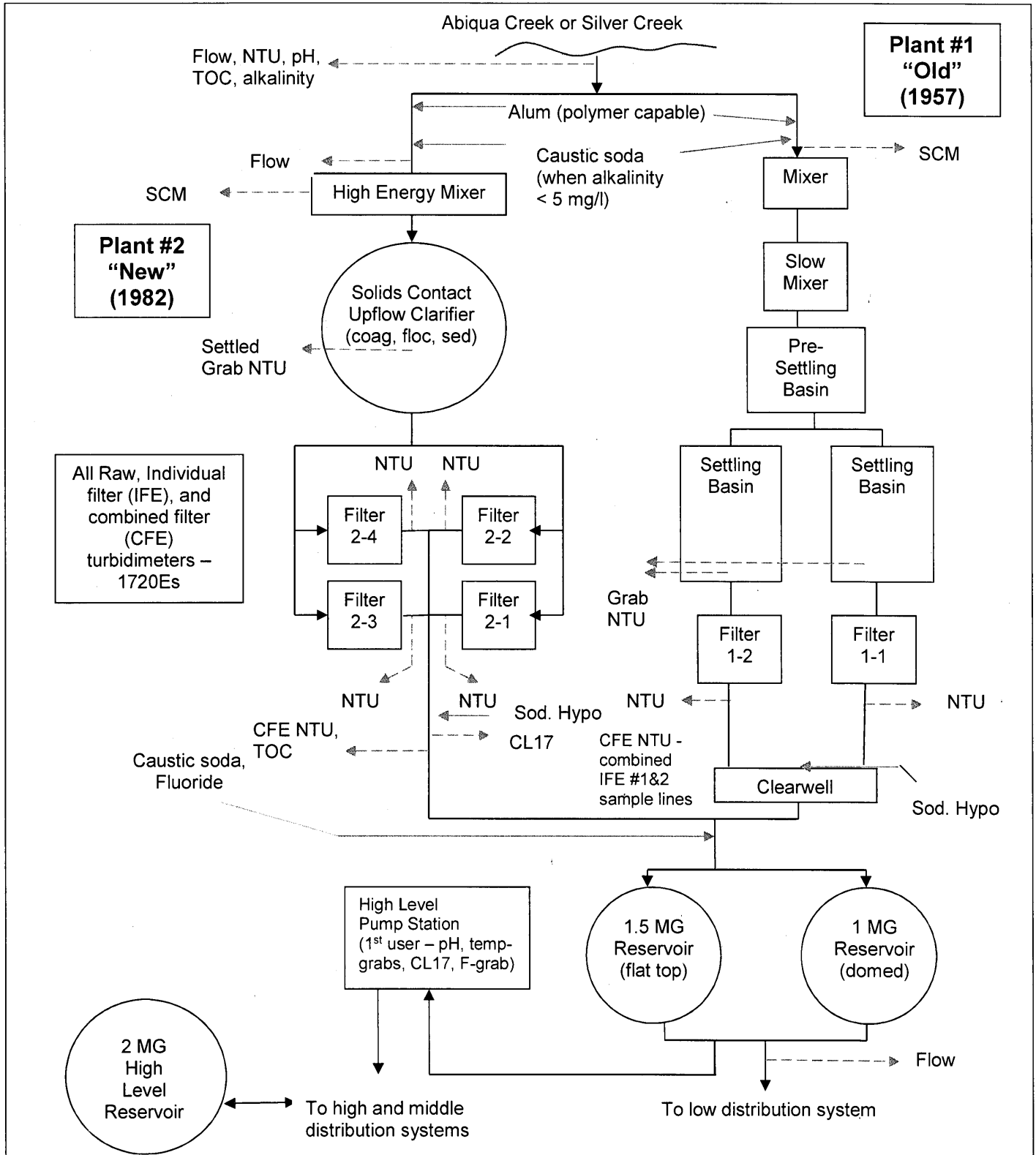
<input type="checkbox"/> Outstanding Performer					
Type:		Status	Size	Season:	<input checked="" type="checkbox"/> All year <input type="checkbox"/> Seasonal
<input checked="" type="checkbox"/> Community (C)		Population:	10,325	Begins: (mm/dd)	/
<input type="checkbox"/> Non-Transient Non-Community (NTNC)		Connections:	3,541	Ends: (mm/dd)	/
<input type="checkbox"/> Transient Non-Community (TNC)		License:			<input checked="" type="checkbox"/> Not Lic. <input type="checkbox"/> Health Dept. <input type="checkbox"/> Ag
<input type="checkbox"/> Non-EPA (NP)		Service Area Characteristics:			MU
Responsible Agency:		<input checked="" type="checkbox"/> State <input type="checkbox"/> County <input type="checkbox"/> Ag			Owner Type:
Minimum WS Certification Requirements:		WD: 2 WT: 3 <input type="checkbox"/> FE <input type="checkbox"/> Small WS <input type="checkbox"/> N/A			4

Primary Administrative Contact (Mailing Address):					
Contact Name:	Steve Starner	Phone:	(503) 873-5437		
Title:	Water Quality Division Supervisor	Cell:	(503) 991-6359		
Street Address:	306 S Water St	Emergency #:	(503) 991-3462		
City/State/Zip:	Silverton, OR 97381	Email:	sstarner@silverton.or.us		
Legal/Owner Address:					
Contact Name:	Petra Schuetz	Phone:	(503) 874-2210		
Title:	Public Works Director / City Hall	Cell:	()		
Street Address:	306 S Water St	Emergency #:	()		
City/State/Zip:	Silverton, OR 97381	Email:	pschuetz@silverton.or.us		
System Physical Address:					
Contact Name:	Water Treatment Plant	Phone:	()		
Title:		Cell:	()		
Street Address:	121 S Ames St	Emergency #:	()		
City/State/Zip:	Silverton, OR 97381	Email:			
Emergency Systems Available:					
Name:	N/A	PWS ID#:	41		

Narrative:

The city of Silverton obtains water from two surface sources: Abiqua and Silver Creeks. Treatment comes from two conventional treatment plants (Plant #1 "old" and Plant #2 "new") that sit side-by-side. Plant 2 runs year-round, while Plant 1 runs June through September to help meet summer demands. Plant 1 is a typical conventional plant with flocculation, sedimentation, and two filters. Plant 2 consists of a solids contact upflow clarifier that combines coagulant mixing, flocculation, and sedimentation in a single unit, followed by four filters. Alum is added at the head of both plants for coagulation (capability exists to add polymer if needed). Caustic soda is added prior to filtration when raw water alkalinity is low (below 5.0 mg/l). Filtered water from both plants combines before flowing into the two reservoirs located onsite. Reservoirs are in parallel and both are used for contact time. Onsite generated sodium hypochlorite is added to both prior to Plant 1's 26K gal clearwell and Plant 2's filtered water effluent. Caustic soda for preventative corrosion control and fluoride are added prior to the two onsite treatment plant reservoirs. Finished water then gravity-flows to the distribution system and/or is pumped uphill to the high and middle distribution zones and high level reservoir.

Water System Schematic



Source Information

ID	Entry Points (Location where water enters distribution and is sampled)	Source Type (Ground, Surface, GWUDI)	Availability (Permanent, Seasonal*, Emergency) <i>*If seasonal, indicate begin/end dates</i>			
			Begin (M/D)		End (M/D)	
A	EP for Abiqua and Silver Creeks	Surface	Permanent			

ID	Sources (Contributing to Entry Point)	Land Use*	Capacity (GPM)	Source Type (Ground, Surface, GWUDI, Purchased ground, Purchased surface)	Availability (Permanent, Seasonal, Emergency, Abandoned, Disconnected)
AA	Abiqua Creek	K, M	4488	Surface	Permanent
BA	Silver Creek	G,L	2244	Surface	Permanent

*Land Use Codes: (A) Pristine Forest (B) Irrigated Crops (C) Non-Irrigated Crops (D) Pasture (E) Light Industry (F) Heavy Industry (G) Urban-Sewered Area (H) Rural On-Site Sewage Disposal (I) Urban On-Site Sewage Disposal (J) Rangeland (K) Managed Forest (L) Commercial (M) Recreational Use

Yes No

- Has the water system implemented strategies to protect their drinking water sources? (e.g., posting source area signs, notifying residents of hazardous waste collection events, provide residents information about maintaining their septic systems, abandoning unused wells, etc.)
- Is the water system interested in protecting their drinking water sources from contamination? If yes, contact regional geologist at 541-726-2587.

Comments:

The majority of water treated comes from Abiqua Creek. The water right was established in 1916 and is for 10 cfs (line capacity is 7.4 cfs). Silver Creek is used secondarily because of pumping costs. The water right was established in 1911 and is for 5 cfs. Silver Creek water is primarily used during storm events (NTU is generally better than Abiqua Creek).

System has done a watershed survey but not yet formally adopted a Drinking Water Protection Program. System is part of TMDP implementation plan for Molalla-Pudding Watershed working with Marion County Soil and Water Conservation District. Locked access roads to both intakes.

System has a 2018 updated source water assessment. Abiqua and Silver Creeks are used independently, either one or the other, but never both at the same time.

Conventional & Direct Treatment Plant Inspection

- WTP inspection done with Water System Survey
- WTP inspection only

WTP ID: 41 00823 WTP Name: TP for WTP
 Date of inspection: December 10, 2019 Inspected by: James Nusrala
 Total points given: 20 Plant operator: Steve Starner

Points	Visit Frequency	Check One
Low range (0-15)	Every 3 years	<input type="checkbox"/>
Mid-range (16-25)	Annually	<input checked="" type="checkbox"/>
High range (26 or more)	Every 6 months	<input type="checkbox"/>

Comments:

Comprehensive Performance Evaluations (CPEs) done of "new" plant in 1995 and 2000 rated it at 2.0 for giardia due to lack of filter-to-waste after backwash, lack of individual filter effluent turbidimeters, and lack of filtered water turbidity consistently being below 0.1 NTU. Improvements made in 2001 corrected these deficiencies in the both plants (Note: "old" plant always had filter-to-waste). The "old" plant has never had a CPE. See cover letter for more information. New plant granted 2.5-log *giardia* credit in 2001, but old plant given 2.0-log credit as no evaluation ever done.

Source:

Describe Intake: Diversion dams on both sources. No changes in past 3 years. Will increase pump capacity on Silver Ck with a more fish improvements.
 Describe pumping facilities: Abiqua Creek (main source) gravity flows 7 miles to treatment plant. Silver Creek water must be pumped up hill to the plant.
 Watershed control information: (protection plan, security measures, etc.) System has done a watershed survey but not yet formally adopted a Drinking Water Protection Program.
 Factors affecting water quality: (algal blooms, logging, etc.) Storm events Abiqua is mainly a forested watershed. Silver watershed is a mix of forestry and agricultural usages.

Treatment:

Coagulation Chemical added: Alum, caustic soda if raw alka < 5 mg/L, and polymer (if needed)
 Sedimentation basin Tube settlers Adsorption clarifier Solids contact clarifier
 pH Adjustment Flocculation Filter Media (single dual/mixed deep bed >60" anthracite)
 Corrosion control Other treatment Describe: Caustic soda (voluntary corrosion control); sodium fluorosilicate
 Peak instantaneous op. flow last year& w 1 bwash (gpm):

New plant	Old plant	Comments: <u>Peak flow new is measured; peak flow old = (flow total - flow new)</u>
1736 / 1302	1042/ 521	
548 / 411	528 / 264	

 Filter Area (total & with one filter backwashing (ft²):

New plant	Old plant
3.17 / 3.17	1.97 / 1.97

 Filter Loading Rate (total & with one backwash) (gpm/ft²):

New plant	Old plant
3.17 / 3.17	1.97 / 1.97

 Log removal credit given Giardia:

New plant	Old plant	2.5
	<u>Crypto:</u>	2.5

What was the peak instantaneous operating flowrate at time of treatment plant evaluation (gpm): New plant only: 1,736 gpm (2.5 MGD)/ old - 1.5

Based on: CPE Plan review WTP evaluation/rating form Date: New plant only: 1/10/00-CPE/ Old plant WTP - Jan '20

Comments:

The max design flow, based on filter tx capacity, is 1.5 MGD (1,042 gpm) for the old plant and 3.8 MGD (2,639 gpm) for the new plant (clarifier limits to 2.5 MGD (1,736 gpm) so never exceed that). The high summer flow with the 2000 evaluation for new plant was 2.5 MGD. Old plant treatment plant evaluation conducted, showing plant can meet 1.5 MG design flow without any unit process limitations at 1.5 MGD, therefore old plant is now rated at 2.5-log giardia reduction. With 2.5-log rating for new plant with CPE, filtration now granted 2.5-log giardia removal, so only 0.5-log giardia needed with disinfection.

Conventional/Direct Treatment Plant Continued:

WTP- A

If no, check points

Yes No

- Is raw water turbidity data collected at least daily? On-line Bench-top 3 pts
Uses 1720E to monitor raw water NTU. Sees less than 1 NTU in the summer and up to 200 (Abiqua) and 75 (Silver) in winter.
-
- For 2.5-log plants only: Is settled water turbidity measured at least daily? N/A 5 pts
 When average annual raw water turbidity is ≤ 10 NTU, is settled water turbidity ≤ 1.0 NTU? 2 pts
 When average annual raw water turbidity is > 10 NTU, is settled water turbidity ≤ 2.0 NTU? 2 pts
 Takes grab settled water turbidity from center of solids contact clarifier as it flows to filters for new plant. Can see settled turbidities up to 4 NTU with raw over 10 NTU (with storms).
 Takes settled water samples after floc basin for old plant.
-
- Are turbidity compliance standards met? (< 0.3 NTU 95% of time; all < 1 NTU) 10 pts
 Are filter Optimization goals met? (≤ 0.10 NTU 95% of time; always ≤ 0.30 NTU) CFE IFE 4 pts
 ● Is CFE monitoring location acceptable (prior to any storage)? 5 pts
 Sept '16 – Aug -19 highest CFE NTU of day: max 0.28, 95th %tile 0.10 NTU – meets optimization goals. The 4-hour CFE is high of each plant's 4 hour CFE NTU. However, CFE of old plant is combination of each IFE sample tube, rather than a true CFE sample, as each filter dumps separately into 26,000 gal. clearwell. See notes below.
-
- Is each IFE turbidity always below triggers? If no, check box below:-see below for alarm setpoints.
 Turbidity > 1.0 NTU in 2 consecutive 15-min readings
 $> 10,000$ population only: Turbidity > 0.5 NTU in 2 consecutive readings 1st 4 hrs. after startup
 Turbidity > 1.0 NTU in 2 consecutive 15-min readings for 3 months in a row
 Turbidity > 2.0 NTU in 2 consecutive 15-min readings for 2 months in a row
 Can chart recorder document turbidity > 1.5 NTU? N/A
 Has IFE and CFE alarms for all filters at below 0.3 NTU. New filter CFE scaled 0-5 NTU at controller.
-
- Are chemical dosages adjusted with water quality changes (jar test or equivalent)? Process identified: 3 pts
 For both plants, rely on optimal 'zero' streaming current meter setpoints and good floc formation (old plant) to adjust alum and caustic soda dose. With use of alum, alkalinity is consumed, so will see pH drop to below 7. Re-sets 'zero' on SCM 3-4 times per year.
-
- If using alum, is raw water alkalinity collected at least weekly? N/A 3 pts
 Weekly.
-
- Does the operator know all chemical dosages applied in mg/L? 3 pts
 For alum and caustic at both plants, uses formula which incorporates feed pump drawdown in mL/min and plant flow in MGD, to calculate mg/L dosages. All chemicals are mixed with finished water as carrier water. Records dosages daily.
-
- Are feed pumps calibrated at least annually? 3 pts
 Adjusts both speed and stroke of chemicals at both plants, but does not calibrate pumps at multiple settings.
-
- How is backwash initiated? -Both WTPs – every other day, more often in summer.
 Turbidity level: Headloss: Time:
-
- Is total plant flow adjusted when filters are taken off-line for backwashing?
 Is evidence of air binding absent during backwash? – New filter backwash looked uniform – see below.
 Does the plant have filter to waste piping? 3 pts
 If yes, is the duration of filter-to-waste cycle based on turbidity profile results? N/A 3 pts
 What is the criteria for putting filters back on-line?
 For both plants, < 0.1 NTU to return filters to service. New filters: 10 min b/wash followed by 20 min. filter to waste, which is adjustable. Did observe small clumps in adjacent filters at new plant during bwash. Changed media at new plant in 2010, on a 15-year cycle. Old plant backwash and filter-to-waste times adjustable also.

Conventional/Direct Treatment Plant Continued:		WTP- A	If no, check points
Yes	No		
<input checked="" type="checkbox"/>	<input type="checkbox"/>	● Are filter profiles conducted after backwash at least quarterly? – both plants' filters.	<input type="checkbox"/> 5 pts
<input checked="" type="checkbox"/>	<input type="checkbox"/>	Are optimization goals immediately after backwash met? If no, check goal NOT met: For all conventional/direct plants: <input type="checkbox"/> Max spike \leq 0.30 NTU <input type="checkbox"/> \leq 0.10 NTU within 15 minutes For plants with filter-to-waste capability: <input type="checkbox"/> Return to service \leq 0.10 NTU Produces graphs of NTU filter profiles for all 6 filters in notebook.	<input type="checkbox"/> 4 pts
<input type="checkbox"/>	<input type="checkbox"/>	● If recycling filter backwash water, is return location prior to chemical addition? <input checked="" type="checkbox"/> N/A Filter backwash and filter-to-waste sent to Webb Lake, then to Abiqua Creek with a discharge permit. Discharges 7 miles down from Abiqua intake.	<input type="checkbox"/> 5 pts
<input checked="" type="checkbox"/>	<input type="checkbox"/>	● Are turbidimeters calibrated according to factory specifications or at least quarterly?	<input type="checkbox"/> 5 pts
<input checked="" type="checkbox"/>	<input type="checkbox"/>	Are calibration standards valid (not expired)?	
<input type="checkbox"/>	<input checked="" type="checkbox"/>	Is flow through turbidimeter within manufacturer's range? <input type="checkbox"/> N/A (bench top or portable meter) New filter #1 at 17 gal/hour (1,072 mL/min), and old filters', 1720E's flows not measured/recorded. Verify all filters' 1720E's measured between 250 – 750 mL/min (Hach 1720E range). Use meter drain, if necc.	
<input checked="" type="checkbox"/>	<input type="checkbox"/>	● Are CT's calculated correctly?	<input checked="" type="checkbox"/> 10 pts
<input type="checkbox"/>	<input checked="" type="checkbox"/>	● Is contact time based on tracer study or adequate alternative?	
<input checked="" type="checkbox"/>	<input type="checkbox"/>	● pH, temperature, and chlorine residual measured at or before 1 st user?	
<input checked="" type="checkbox"/>	<input type="checkbox"/>	● Is there a flow meter on effluent side of clearwell or adequate alternative (describe)? See disinfection page for more details.	
<input checked="" type="checkbox"/>	<input type="checkbox"/>	Is corrosion control practiced? – see below.	
<input type="checkbox"/>	<input type="checkbox"/>	● Is it operated within parameters set by DWS? <input checked="" type="checkbox"/> N/A – no parameters set. Describe method of corrosion control used: Caustic soda added voluntarily. System never exceeded lead or copper action levels.	<input type="checkbox"/> 5 pts
<input checked="" type="checkbox"/>	<input type="checkbox"/>	● Do all under-certified operators follow a written decision-making protocol as established by DRC? <input type="checkbox"/> N/A (all operators are certified at the level required for the plant)	<input type="checkbox"/> 5 pts
<input checked="" type="checkbox"/>	<input type="checkbox"/>	● Are standard plant operating procedures written and followed?	<input type="checkbox"/> 5 pts
<input type="checkbox"/>	<input checked="" type="checkbox"/>	Are operators on site during all hours of plant operation?	
<input checked="" type="checkbox"/>	<input type="checkbox"/>	● If no, is there an alarm for low chlorine and high turbidity? (> 3300 pop. for chlorine) <input checked="" type="checkbox"/> Low chlorine <input checked="" type="checkbox"/> High turbidity <input type="checkbox"/> Plant shutdown <input checked="" type="checkbox"/> Auto-dial Operator call-outs set at >0.25 NTU (new plant IFE's), >0.25 & 0.3 NTU (new plant CFE), and >0.22 NTU (old plant IFE's) – 10 minute duration required to alarm. Low chlorine alarm at 1 st user high service pump station set at 0.4 mg/L also with a 10 minute duration required to alarm.	<input type="checkbox"/> 5 pts
			Total Points =
			20
<input checked="" type="checkbox"/>	<input type="checkbox"/>	AWOP fact sheet provided to operator?	

Comments:

As CFE NTU sample tap for old plant is a combination of each IFE NTU sample collection tubes, not a true CFE of both filters. Since both filters empty separately into 26,000 gallon clearwell, CFE compliance reads will be highest of each IFE for old plant, when only old plant running, and highest of each IFE for old plant and CFE for new plant, when both plants running.
Old plant not running during survey, as it only is used in summer. It does not work well in cold water conditions.
City came off raw cyanotoxin monitoring after 2018 season, with the permanent DWS toxin rules. The City did not observe any algal blooms in either intake in 2019.

Disinfection

No #	Disinfection Method (Chlorine Gas, Sodium Hypochlorite, On-site Generated Sodium Hypochlorite, Calcium Hypochlorite, Chloramines, Ozone, UV, Mixed Oxidants, Other)	Location	Disinfection Source Water	Residual Maintenance	Other Purpose	Proportional to Flow	Dosage Recorded
1	On site generated sodium hypochlorite	Plant 1 CFE	<input checked="" type="checkbox"/>	<input type="checkbox"/>		<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>
2	On site generated sodium	Plant 2 CFE	<input checked="" type="checkbox"/>	<input type="checkbox"/>		<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>

Yes No Chlorine residuals N/A

- Is a DPD or other EPA approved method used? – all CL-17 and colorimeter reagents current.
- NSF 60/61 certified (or equivalent)?
- Are entry point residuals recorded at least once per day (SWTR, GWR 4-log)? N/A
- Is entry point residual monitoring continuous if population > 3,300 (SWTR, GWR 4-log)? N/A
- Are distribution residuals recorded at least twice weekly? – 10/ month w bactis
- Are on-line chlorine analyzers verified weekly with DPD type or EPA approved test kit? N/A-see below

Yes No Chlorine gas N/A

- | | | | |
|---------------------------------------------------|-------------------------------------------|---------------------------------------------------|-------------------------------------|
| <input type="checkbox"/> <input type="checkbox"/> | Separate room for gas storage and feeder? | <input type="checkbox"/> <input type="checkbox"/> | Gas cylinders properly secured? |
| <input type="checkbox"/> <input type="checkbox"/> | Fan with on/off switch outside? | <input type="checkbox"/> <input type="checkbox"/> | Door that opens out? |
| <input type="checkbox"/> <input type="checkbox"/> | Vent located next to the floor? | <input type="checkbox"/> <input type="checkbox"/> | Self-contained breathing apparatus? |
| <input type="checkbox"/> <input type="checkbox"/> | Door with a window? | <input type="checkbox"/> <input type="checkbox"/> | Air scrubber system? |

Yes No UV N/A

- Does all water contact UV (no bypass)?
- Is lamp sleeve cleaned?
- Is lamp replaced per manufacturer?
- Intensity sensor with alarm or shut-off?

CT evaluation for disinfection N/A

Disinfection Requirement: (sw) 0.5 log inactivation Giardia (sw) 1.0 log inactivation Giardia
 (gw) 4.0 log inactivation viruses (sw) log inactivation Crypto: _____
 (gw) Minimum chlorine residual: _____ mg/l

Yes No

- Does the contact chamber have effluent flow meter or adequate alternative?-see below
If no, how is peak flow determined for CT calculations? _____
- Has a tracer study been conducted or adequate alternative? Tracer Study Date: _____
Demand flow (gpm): _____ Baffling factor (%): _____
Volume used (gal): _____ Results (min): _____
- Adequate alternate method for contact time? Describe: See below

Peak hour demand flow over the past 12 months: gpm = 2,200 gpm (Aug)

Lowest operating volume over the past 12 months: gallons = 1.5 MG tank (1.07 MG) + 12' 1MG Tk (0.75 MG) = 1.82 MG

Yes No

- Is tracer study still valid?- see below for DWS comments on '02 contact time determination.
- (SW only) Are pH, temp, and chlorine residual measured daily before or at the first user? Off high service pumps
- Are CT values being calculated correctly? – using approved Regression formula with 1-log giardia requirement
- Are CT values met at all times (SWTR, GWR 4-log)?

Comments:

Bacti residuals at 0.4 – 0.8 mg/L. Chlorine residual grabs from WTP sink (first user off high service pumps), taken daily to correlate w CL17. Has peak flow measurement capability (sum of high service pump capacity + flow meter reading to low zone), but reports daily peak *plant* flow in monthly reports. Needs to program logic to report peak hourly demand flow instead. '02 Contact time determination is based on fluoride tracer of only 1.5 MG tank, but City now uses both tanks for time, used full tank volume, and plant flow rather than demand flow. Tracer study required. On peak day, with cont. time and min. volumes above used, baffling factors range from 36 % with both tanks, to 62% with only 1.5 MG tank in service. Given tanks are not baffled, system to use 10% effective baffling factor for minimum volume until tracer study completed. Chlorine injected flow proportionally at old plant by injecting directly into clearwell including when old plant used only. First user CT parameters measured at high service pump station even when not pumping. Sample flows via gravity from WTP tanks' exit to taps at pumps.

Treatment

Process Used*	Chemical Added**	Purpose	Location in System	Code***
Coagulation	Alum	Particulate removal	WTP	P240
Rapid Mix	N/A	Particulate removal	WTP	P600
Flocculation	N/A	Particulate removal	WTP	P360
Sedimentation	N/A	Particulate removal	WTP	P660
Filtration, Rapid Sand	N/A	Particulate removal	WTP	P345
Hypochlorination, post	On-site sod. Hypochlorite	Disinfection	Post filtration – WTP	D421
pH/alkalinity adjustment	Caustic soda	Corrosion control	Prior to storage	C503
Fluoridation	Sodium fluorosilicate	Other	Prior to storage	Z380

*See "Treatment Plant Inspection" page for details on filtration. **See "Disinfection" page for details on disinfection equipment. ***See Treatment Codes on back.

Yes No

- Is treatment the same as last survey? (if no, explain in comments) _____
 - Is lab equipment for on-site analysis appropriate? _____
 - Is equipment maintained properly? _____
 - Is redundant equipment available? _____
 - Are chemicals NSF Standard 60 certified or equivalent? (N/A - no chemicals are used)
 - If bypass piping is present, is there a physical separation? (SWTR, GWR 4-log, chemical MCL) N/A
 - Does system practice corrosion control? (voluntary caustic soda, no WQPs, no A.L. Exceedances)
 - Is corrosion control operated within parameters set by DWS? N/A
- Describe method of corrosion control (if applicable)

Caustic soda is from Rhodia, alum from Northstar.
Has current reagents/standards for turbidity (Hach 1720E – Stable Cal 20 NTU), Thermo Orion Model 420 pH, CL17, Hach HQ 440d w/ Thermo stirrer (fluoride), colorimeter.

Records Kept:

- | | | | |
|--------------------------------------------------------------|--------------------------------------|--------------------------------------------------------------|-----------------------|
| Yes / No | | Yes / No | |
| <input checked="" type="checkbox"/> <input type="checkbox"/> | Dosages | <input checked="" type="checkbox"/> <input type="checkbox"/> | Flowrate – plant only |
| <input checked="" type="checkbox"/> <input type="checkbox"/> | Raw pH | <input checked="" type="checkbox"/> <input type="checkbox"/> | Treated pH |
| <input checked="" type="checkbox"/> <input type="checkbox"/> | Raw temperature | <input checked="" type="checkbox"/> <input type="checkbox"/> | Treated temperature |
| <input checked="" type="checkbox"/> <input type="checkbox"/> | Raw turbidity and/or particle counts | <input checked="" type="checkbox"/> <input type="checkbox"/> | Treated turbidity |

Comments:

Results from DEQ split fluoride analysis: 4th qtr 2018 – low results - City at 0.1 mg/L, DEQ – ND, goal 0.7 mg/L. back in range for 2nd and 3rd qtr's 2019, after 1Q19 mail error.
Verified using correct formula to calculate daily fluoride dose using percent available fluoride of sodium fluorosilicate. Stores dry fluoride bags in separate room where dispenser is located. Has a 'dumbwaiter' to weigh bags of product.
Adds caustic soda after filtration to boost pH up to between 7.5 and 8, as it can be around 6.3 before caustic addition.

Storage and Pressure Tanks

Number	Name	Tank Type (G)round, (E)levated, (P)ressure	Tank Material (Concrete, Steel, Redwood, Plastic, Other)	Year Built	Volume (gal.)
1	1.0 MG TP Reservoir	G	Concrete	1927	1.0 MG
2	1.5 MG TP Reservoir	G	Concrete	2004	1.5 MG
3	High Level Reservoir	G	Steel	1982	2.0 MG

Total Volume: 4.5 MG

Reservoir Number:	1		2		3					
	Yes	No	Yes	No	Yes	No	Yes	No	Yes	No
Reservoir Features										
Fence/gate?	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
● Hatch secured (e.g. locked, bolted, etc.)?	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	unknown	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
● All tank access points watertight?	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
● Screened vent?	<input checked="" type="checkbox"/>	<input type="checkbox"/>	unknown		<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Overflow?	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
● Overflow protected (screen/flap/valve)?	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Drain to daylight?	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Water level gauge?	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Bypass piping? (● if used for contact time)	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Alarm for high or low levels?	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Separate inlet/outlet?	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Approved interior coating?	N/A		N/A		N/A		<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Exterior in good condition?	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Annual interior/exterior inspection?	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Cleaning schedule?	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Continuously disinfected? (● post '81 redwood)	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Pressure Tanks										
Accessible for maintenance?	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Bypass piping?	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Drain?	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Pressure relief device?	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Air bladder/diaphragm?	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Valve for adding air?	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

Comments

1.5 MG tank (#2) both rooftop hatch perimeter drain port hole outlets unprotected with screen to prevent potential entry of contamination into hatch, see photos next page. Photos of open hatch provided, document both hatch drains free of any evidence of nesting of pests or other sources of potential contamination.
Unable to verify adequate vent screening on 1.5 MG tank and that hatch is watertight and locked for 2 MG tank.
Protected, screened overflow outlet is common for both WTP tanks (tanks #1 and 2).
No interior coating of reservoirs.

Photos of 1.5 MG Treatment Plant Reservoir with Perimeter Hatch Drain and Outlet



Distribution System Information

Service Area and Facility Map

Yes	No		
<input checked="" type="checkbox"/>	<input type="checkbox"/>	Does the system have a service area and facility map (indicate features on map):	
<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/> Water lines (including size and material)	<input checked="" type="checkbox"/> Sources-wells & withdrawal points
<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/> Treatment facilities	<input checked="" type="checkbox"/> Pressure zones
<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/> Storage facilities (reservoirs)	<input checked="" type="checkbox"/> Pressure regulating valves
<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/> Sampling points-routine bactis only	<input checked="" type="checkbox"/> Booster pumps

Distribution Data

Yes	No		Comments
<input checked="" type="checkbox"/>	<input type="checkbox"/>	● System pressure ≥ 20 psi?	<u>3 pressure zones (35 – 80 psi range)</u>
<input type="checkbox"/>	<input checked="" type="checkbox"/>	Water system leakage <10%?	<u>Ranges up to 15 % per water conservation plan</u>
<input checked="" type="checkbox"/>	<input type="checkbox"/>	Hydrants or blowoffs on all dead ends? <input type="checkbox"/> N/A	<u>Both on dead ends.</u>
<input checked="" type="checkbox"/>	<input type="checkbox"/>	Routine flushing? (How often)	<u>Annual by City PWorks.</u>
<input checked="" type="checkbox"/>	<input type="checkbox"/>	Adequate valving?	<u>Older areas less able to isolate due to fewer valves</u>
<input checked="" type="checkbox"/>	<input type="checkbox"/>	Routine valve turning? (How often)	<u>Conducts reverse turning annually w line flushing</u>
<input type="checkbox"/>	<input checked="" type="checkbox"/>	Does the distribution system have asbestos cement (AC) pipe? <i>If yes, verify asbestos sampling is completed on Water Quality Monitoring Page (CWS, NTNC).</i>	<u>Removed in 2013. Ductile iron & PVC left.</u>

Cross Connection Control (CWS, NTNC, and TNC)

Yes	No	N/A		Comments
<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	● Assemblies tested annually? (CWS, NTNC, TNC)	<u>See below.</u>
<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	● Ordinance or enabling authority? (CWS)	<u>DWS has '10 copy w/ all req'd elements</u>
<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	● Annual Summary Report submitted? (CWS)	<u>See below</u>
<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	● Certified Cross Connection Control Specialist? (CWS ≥ 300 connections)	<u>Travis & Chelsea Starner</u>

Comments:

2018 ASR shows all RPs and DC's tested and passed or replaced. Has more RPs than high hazards.

Residents test their own assemblies. City provides list of certified testers. Testers also test the industrial assemblies, mainly for medical facilities. City sends reminder letters, folks have until June to sample before City tracks and eventually threatens lock-off if not tested.

City also tests reduced pressure assembly at water plant protecting finished water used as carrier (mixing) water for all chemical injection at plant. Finished water used to backwash new plant's filters and filtered water in 26,000 clearwell used to backwash old plant's filters. Both sources of backwash water protected with reduced pressure assembly.

Asbestos schedule closed in 2016 with last sample in 2013, after all A/C pipe removed.

Water Quality Monitoring

Contaminant	N/A	Number & Frequency	Next Tests Due
Entry Point Sampling:			
Arsenic	<input type="checkbox"/>	Twice every 9 years(1–each source)	2020 both
Inorganic Chemicals (Including Nitrite) (sw)	<input type="checkbox"/>	Twice every 9 years(1–each source)	2020 both
Inorganic Chemicals (Including Nitrite) (gw)	<input checked="" type="checkbox"/>		
Nitrate	<input type="checkbox"/>	Twice annually (1 – each source)	2020 - both. . .
Radionuclides (Community Water Systems Only):			
Gross Alpha	<input type="checkbox"/>	Twice every 9 years(1–each source)	2025-Abiqua, 2026-Silver
Radium 226/228	<input type="checkbox"/>	Twice every 9 years(1–each source)	2025-Abiqua, 2026-Silver
Uranium	<input type="checkbox"/>	Twice every 9 years(1–each source)	2025-Abiqua, 2026-Silver
SOCs	<input type="checkbox"/>	2 cons qtrs. Every 3 years (2-ea.src)	2020 (4 total samples, 2 ea Ck)
VOCs (sw)	<input type="checkbox"/>	Twice annually (1 – each source)	2020 both
VOCs (gw)	<input checked="" type="checkbox"/>		
Distribution System Sampling:			
Coliform Bacteria	<input type="checkbox"/>	10 sites a month	ongoing
Asbestos (for AC pipe/asbestos geologic areas) ...	<input checked="" type="checkbox"/>		
TTHMs and HAA5s (at 879 W. Main & 400 Schemmel Ln)	<input type="checkbox"/>	2 per quarter (Jan, Apr, July & Oct)	1 st qtr (Jan), 2 nd qtr (Apr). . 2020
Lead and Copper # sites: 30	<input type="checkbox"/>	Once every 3 years-summer	June – Sept 2020
Other Sampling:			
TOC	<input type="checkbox"/>	Raw & filtered -quarterly	1 st , 2 nd qtr '20
Turbidity	<input type="checkbox"/>	Once every 4 hours-CFE	ongoing
Source Water Coliform	<input checked="" type="checkbox"/>		
Other (specify) <u>alkalinity</u>	<input type="checkbox"/>	Raw - quarterly	1 st , 2 nd qtr '20
Yes <input checked="" type="checkbox"/> No <input type="checkbox"/>	● Is all required monitoring current?		
<input checked="" type="checkbox"/> Yes <input type="checkbox"/> No	● Are samples collected at the correct locations in the system?		
Be sure to take filtered TOC represents both filters – will need to take each IFE of old plant, if old plant in use, as No true CFE for old plant exists.			
Yes <input type="checkbox"/> No <input type="checkbox"/>	● Have all MCL violations or LCR AL exceedances been addressed? <input checked="" type="checkbox"/> N/A No MCLs or AL Exc's.		
<input checked="" type="checkbox"/> Yes <input type="checkbox"/> No	● DBP's collected at correct locations? <input type="checkbox"/> N/A – Yes, at 879 W. Main.		
<input checked="" type="checkbox"/> Yes <input type="checkbox"/> No	● Does the system have a written coliform sampling plan?		
	Does the plan include:		
	Yes <input checked="" type="checkbox"/>	No <input type="checkbox"/>	
	<input checked="" type="checkbox"/>	<input type="checkbox"/>	Sample collection protocol
	<input checked="" type="checkbox"/>	<input type="checkbox"/>	Distribution map
	<input checked="" type="checkbox"/>	<input type="checkbox"/>	Sample site locations
	<input type="checkbox"/>	<input checked="" type="checkbox"/>	Rotation schedule
	<input type="checkbox"/>	<input checked="" type="checkbox"/>	Repeat locations
	<input type="checkbox"/>	<input type="checkbox"/>	Source locations <input checked="" type="checkbox"/> N/A

Comments:
 Samples twice per period (one from each creek, as uses Silver and Abiqua Ck's independently), SOC's - 2 conc. qtrs./period ea. Ck. For a total of 4 samples each period.
 LCR: Hitting mainly similar sites in '14 and '17- but sampling at some commercial locations (e.g. City Hall) – review 141A form and tiered locations to sample at tiered homes ideally. Remember to certify lead notification w/ sample letter. Goes from 20 to 30 sites ev. 3 years with increase over 10,000 population. DBP's reduced schedule jumps to 2 dual sets/quarter from 2 sets/year, at 10,000 pop. With samples at both W. Main & 400 Schemmel Ln. Asbestos schedule closed as a sample came in after 2013 when all A/C pipe removed.
 Raw & filtered TOC, and raw alka req'd – as both plants 2.5-log giardia removal rated. Can stay on reduced schedule as raw TOC < 2 mg/L average. City completed LT2 round 2 *E. coli* monitoring, in bin 1 – no further source monitoring needed.
 Bacteria: Sample the 10 monthly throughout month, not all on same day, and rotate to other sites month to month to hit new locations, if possible.

Management & Operations

O&M Manual and Emergency Response Plan

Yes No

- | | | |
|-------------------------------------|--------------------------|------------------------------------------------------------------------------------------------------------------------|
| <input checked="" type="checkbox"/> | <input type="checkbox"/> | ● Does system have an operation and maintenance manual? '09 WTP & '15 distribution SOPs |
| <input checked="" type="checkbox"/> | <input type="checkbox"/> | ● Does system have an emergency response plan? – '05 ERP |
| <input checked="" type="checkbox"/> | <input type="checkbox"/> | Do any system components have auxiliary power?
If yes, describe: Diesel generator at plant, Edison Rd pump station. |

Operator Certification

Yes No N/A

- | | | | |
|-------------------------------------|--------------------------|-------------------------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <input checked="" type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | ● Is the DRC identified and certified at the appropriate level? Steve-T; Travis-Dist.
If the DRC is a contract operator, how do they work with the system? |
| <input checked="" type="checkbox"/> | <input type="checkbox"/> | <input checked="" type="checkbox"/> | ● Does system have written protocols for under-certified operators? |

Plan Review/Master Plan

Yes No N/A

- | | | | |
|-------------------------------------|-------------------------------------|--------------------------|-------------------------------------------------------------------------------------------------------------------------------------------|
| <input type="checkbox"/> | <input checked="" type="checkbox"/> | <input type="checkbox"/> | ● Have all major modifications been approved by DWS? – see below. |
| <input checked="" type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | ● Does the system have a current (<20 yr. old) master plan? (Not required if < 300 connections)
What year was the plan completed? 2010 |

Compliance Status

Yes No N/A

- | | | | |
|-------------------------------------|--------------------------|--------------------------|-------------------------------------------------------------------------------------------------|
| <input checked="" type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | ● Is water system in compliance (all orders resolved and not a priority non-complier)? |
| <input checked="" type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | ● Does the system issue public notice as required? – but remember to include M&R's in CCR-below |
| <input checked="" type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | ● Are consumer confidence reports sent to users each year? |

Comments:

Three projects in use without final approval - Conditional approvals for 3 waterline projects granted in 2015-16: 2/11/16 conditional for Steelhammer Street lines (PR 1-2016), 8/25/15 cond. For Steelhammer subdivision lines (PR 128-2015), and 7/13/15 cond. For Castlebrook Estates lines (PR 100-2015)
Mike White, PE, maintains waterline PR exemption. PR exemption granted in April 2016 for future line projects with City P.E. Paul Eckley, after the conditionals for these 3 projects. City to respond to all conditional letters so DWS may issue final approval for all 3 projects.

Has 1 M&R violation in past 3 years. No coliforms in Nov '18

2017 CCR looks good. DWS has 2018 CCR

With only 1 violation in past 3 years (Nov 2018 – no coliforms), report any M&R violations in CCR – this 2018 one not in 2018 CCR.



CITY OF SILVERTON PUBLIC WORKS

306 S. Water Street | Silverton, Oregon 97381

March 2, 2020

Chantal Wikstrom

Drinking Water Services

Oregon Health Authority

800 NE Oregon Street, Ste. 640

Portland OR 97232-2162

RE: City of Silverton, PWS ID. #4100823

Water System Survey – Corrective Action Plan

Dear Ms Wikstrom:

Based on the Water System Survey conducted by the Department, on December 10, 2019, the following actions have been taken by the City to correct or address the deficiencies/violations identified:

1. Treatment

Turbidity monitoring for WTP No. 1 appears to be a mixture of the effluent from the two individual filters rather than a “combined” sample. As the flow through the filters may fluctuate, individual filter sampling may not accurately reflect combined turbidity.

Therefore, the “combined” turbidity reporting for WTP No. 1 has been modified to indicate the higher of the effluent turbidity values of the two filters in service. The reporting modification will be in place whenever WTP No. 1 is brought into service.

2. Disinfection

In 2002, following the completion of construction of the 1.5 MG reservoir, plant operators conducted a chlorine contact time (CT) tracer study, using the fluoride dose as the chemical agent. Using the results of the study, operators worked with the OHD (Scott Curry) to establish a formula to be used for reporting the daily CT. However, the procedures used to conduct the study were not reviewed and approved by the OHD.

Therefore, the City will submit a CT study plan and procedure to the OHD, by May 4, 2020, for review and approval. Once approved, the CT study will be scheduled for the week of August 10, 2020, to take advantage of peak summer community water demands.

3. Storage

The inspection and access hatches of the 1.5 MG reservoir includes metal tracks designed to collect rainwater and prevent the rainwater from entering the interior of the reservoir where finished drinking water is stored by exiting weep holes. The hatches are normally secured by padlocks and the tracks were clean and well maintained at the time of the Survey. However, the OHD is concerned pests may gain entrance to the reservoir via the weep holes.

Therefore, operators have installed steel wool in the weep holes to deter pests but still allow for the drainage of rain water.

Regarding the presence of adequate screening for the 1.5 MG reservoir rooftop vent, please find enclosed a copy of the construction specifications for the reservoir as it pertains to "Vents". A plan to provide a photograph of the screening is still being developed.

Regarding the condition of entrance and inspection hatch for the 2.0 MG steel reservoir, operators climbed to the top of the tank, on February 10, 2020, and verified that the hatch was padlocked and watertight.

4. Management & Operations

The OHD has not received waterline completion certification for Steelhammer Street, Steelhammer subdivision, and Castlebrook Estates subdivision. Enclosed is a copy of waterline construction certification for the Castlebrook Estates subdivision. The City has not completed the investigation of the certification status for the Steelhammer projects. Jeff Bolton, PE, Multi-Tech Engineering Services, Inc., has been contacted about the missing certification. He indicated he is familiar with the project, he has the paperwork sitting on his desk, and he intends to submit the certification by March 13, 2020.

5. Water Quality Monitoring

The OHD noted that a concentration for Benzene was missing from the City's VOC monitoring report. Waterlab indicated a clerical error had occurred, quickly made a correction, and sent the corrected report to OHD.

The OHD also noted that a nitrate sample had not be collected and reported for the Silver Creek source. Operators switched to the Silver Creek source on December 12, 2019, and obtained a sample for nitrate testing. The sample results were sent directly from Waterlab to the OHD.

Chantal, I hope you will find this information useful. If you have any questions or need additional information, please do not hesitate to contact me, at sssterner@silverton.or.us, or 503-991-6359.

Sincerely,

Steve Starnier, Water Quality Supervisor