



July 13, 2022

Bart Stepp, PE  
City of Silverton  
306 S Water Street  
Silverton, OR 97381

**Re: WTP Upgrades (PR#52-2022)  
City of Silverton (PWS ID#00823)  
Conditional Approval**

Dear Bart:

Thank you for your submittal to the Oregon Health Authority's Drinking Water Services (DWS) of plan review information for the Water Treatment Plant Upgrades for the City of Silverton. On March 28<sup>th</sup>, 2022, our office received at set of drawings, standard details, specifications and a package filter plant brochure. On May 31<sup>st</sup>, 2022, our office received a plan review fee of \$3,300.

The project includes the installation of two Trident Package Water Treatment System units and the piping and appurtenances to connect to the existing raw water supply and clear wells. Two filter sampling effluent pumps will be installed pre- and post-chemical injection between the filter units and the clear wells. Three backwash pumps will be installed, along with the piping associated with connection to the Package Treatment System. Three skid mounted transfer pumps will be installed for delivering aluminum sulfate, sodium hydroxide and sodium hypochlorite from the existing chemical storage tanks. The project also includes the installation of a skid mounted fluoride tank and water softening system along with two fluoride pumps on a separate skid.

In order to meet the requirements for safe drinking water, all surface water treatment must provide the following pathogen removal:

At least 99 percent (2-log) reduction of *Cryptosporidium*, at least 99.9 percent (3-log) reduction of *Giardia lamblia* cysts, and at least 99.99 percent (4-log) reduction of viruses is required for water treatment. The proposed package treatment system will achieve the required 2-log removal credit for *Cryptosporidium*, as well as 2.5-log removal of *Giardia lamblia*. The remaining 0.5-log inactivation of *Giardia* will be achieved through contact time

with chlorine disinfection. The 4-log inactivation of viruses will also be simultaneously achieved through contact time with chlorine disinfection through the clearwells.

**The plans are approved with the following conditions:**

- Under OAR 333-061-0060(1)(b), submittals must be prepared by a Professional Engineer registered in Oregon. Drawings stamped by a registered Professional Engineer must be submitted prior to construction.
- With the installation of new treatment, a corrosion control assessment must be conducted with two 6-month rounds of sampling lead and copper required. The number of monitoring sites must be the original number of sites before reduction. This would be 40 sites for the City of Silverton.
- Chemicals to be added for treatment must be NSF Standard 60 certified, or equivalent. Please provide documentation showing NSF 60 certification, or equivalent.
- Information must be submitted for the make and model of any in-house instruments or equipment used for regulatory compliance.
- All wetted components must have NSF Standard 61 certification.
- Each filter must have turbidity monitoring for the individual filter effluent, and a combined filter effluent monitoring point before the clearwell. It appears each filter train has a sample pump and analyzers but it is unclear what the analyzers are measuring.
- When one filter is out of service, flow controls must prevent the remaining online filters from exceeding the allowable filter loading rate of 4 gpm/ft<sup>2</sup>. See table below.
- A narrative explaining how a filter profile will be generated each quarter and available for regulatory inspection must be submitted. See attached turbidity profile for an example.
- Documentation or SCADA screenshot(s) must be submitted showing high and low alarm setpoints for chlorine and turbidity. This includes call-out and automatic shutdown, backwash, filter-to-waste, etc.
- Once construction is complete, a tracer study to determine contact time in the clearwell is required. A proposal for conducting the tracer study must be submitted to Chantal Wikstrom at [Chantal.T.Wikstrom@dhsola.state.or.us](mailto:Chantal.T.Wikstrom@dhsola.state.or.us).

I also have the following comments:

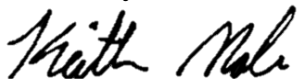
1. DWS has conducted an evaluation of the two Westech Trident units according to the submitted plans (and US EPA's 1998 Optimizing Water Treatment Plant Performance Using the Composite Correction Program, Section 4.2.2.4 – Rating Individual Unit Processes) to determine the following:

- a. Each unit is rated at 2.5-log *Giardia* reduction at a flow of 1,389 gallons per minute (gpm) or 2.0 million gallons per day (MGD).
  - b. The two units are rated at a 2.5-log *Giardia* reduction conventional filtration plant for a total flow of 2,777 gpm or 4.0 MGD.
  - c. Both the clarification and filtration phases of the combined two units should not exceed 2,777 gpm.
  - d. A summary of the evaluation is provided in the table below on page 3.
2. The operations and maintenance manual and written standard operating procedures need to be updated to reflect the new treatment operations.
  3. The emergency response plan must be updated with any changes that come from the installation of the filters.
  4. The operator certification level for the plant will remain the same, requiring Treatment Level 3 certified operators to run the water system.

**Until we receive verification that the conditions have been met and final approval has been issued, the Water Treatment Plant Upgrades are not approved for use.** Upon completion of the project, the engineer must verify in writing that construction was completed according to the submitted plans. If substantial changes are made, a set of as-built drawings must be submitted. Documentation demonstrating how the above conditions were met should reference Plan Review #52-2022 and can be emailed to me at [keith.male@dhsosha.state.or.us](mailto:keith.male@dhsosha.state.or.us).

If you have any questions, please feel free to call me at (503) 939-1322.

Sincerely,



Keith Male, EIT  
Regional Engineer  
Drinking Water Services

ec: Julie Wray, DWS  
Carrie Gentry, PE, OHA/DWS  
Chantal Wikstrom, OHA/DWS  
Guy Davis, City of Silverton  
Craig Massie, PE, Jacobs Engineering

enc: Treatment Evaluation Summary Table (below)  
Turbidity profile example

**Summary of Trident Package Water Treatment System Evaluation**

	Clarification Area (ft <sup>2</sup> )	Surface Overflow Rate (gpm/ft <sup>2</sup> )	Theoretical clarification flow (gpm   MGD)	Filter Area (ft <sup>2</sup> )	Filter Loading Rate (gpm/ft <sup>2</sup> )	Theoretical filtration flow (gpm   MGD)	Peak Rated Flow Capacity (gpm   MGD)
Single Unit	140	8	1,120   1.615	280	4	1,120   1.615	1,389   2.0
Both Units	280	8	2,240   3.23	560	4	2,240   3.23	2,778   4.0