

Tina Kotek, Governor

December 11, 2024

Aaron Olson  
Johnson Creek Water Service  
PO Box 699  
Newberg, OR 97132

**Re: Johnson Creek Water Service (PWS ID# 01072)  
Membrane Filtration Treatment Plant – PR# 140-2024  
Conditional Approval**

Dear Aaron:

Thank you for your submittal to the Oregon Health Authority's Drinking Water Services (DWS) of plan review information for the new membrane water treatment plant for Johnson Creek Water Service (JCWS). On October 1, 2024, our office received the treatment plant technical specifications, engineering drawings, and the membrane manufacturer's proposal. On October 15, 2024, a plan review fee of \$3,300 was also received.

The project includes construction of a new water treatment plant building to house a membrane filter packaged plant, and pipeline connections to existing raw water and finished water infrastructure. The new treatment plant will have one AltaPac™ Ultrafiltration Skid - Model UFT51C. The skid will contain 9 membrane modules:

Toray HFUG-2020AN

Additionally, a finished water pumping station will be constructed, and new disinfection and corrosion control chemical feed systems and appurtenances will be included. The membrane filter packaged plant includes space for installation of three additional membrane modules in the future. This plan review covers the treatment plant as detailed in the submitted plans, future additions or modifications will require approval through a separate plan review process.

**The plans are approved subject to the following conditions:**

## General

1. A Land Use Compatibility Statement signed by Lincoln County must be submitted prior to the project receiving final approval.
2. Only materials designed for potable water service and meeting NSF Standard 61: Drinking Water System Components – Health Effects or equivalent shall be used in those elements of the water system which are in contact with potable water.
3. Only products designed for potable water service and meeting NSF Standard 60: Drinking Water Treatment Chemicals – Health Effects or equivalent shall be added to potable water as part of the treatment process.

## Water Treatment Facilities (other than disinfection)

4. Once the new corrosion control system is operational, perform necessary corrosion control studies and analysis as required in OAR 333-061-0034(2) to evaluate the new corrosion control and develop optimum corrosion control and minimum water quality parameters.
5. Laboratory equipment shall be provided so that the water supplier can perform analyses necessary to monitor and control the treatment processes.
6. Sampling taps shall be provided before and following the treatment process and before the first user when any form of water treatment is used at a public water system.

## Disinfection Facilities

7. Provisions shall be made to alert the water supplier before the chlorine supply is exhausted. This requirement can be satisfied by either installing a low-level alarm or by creating a written procedure to check the tank daily.
8. Sample taps shall be provided before and after disinfectant application.
9. Testing equipment shall be provided to determine the chlorine residual.
10. Chlorinator piping shall be designed to prevent the contamination of the potable water system by backflow of untreated water or water having excessive concentrations of chlorine.
11. The disinfectant must be applied in proportion to water flow.
12. Any community system that treats surface water that desires to make significant changes to its disinfection treatment process is required to develop a disinfection profile and calculate a disinfection benchmark according to OAR 333-061-0036(4)(e). The water system must develop a disinfection profile for *Giardia lamblia* and viruses,

calculate a disinfection benchmark, describe the proposed change in the disinfection process, and analyze the effect(s) of the proposed change on current levels of disinfection according to the [USEPA Disinfection Profiling and Benchmarking Technical Guidance Manual](#) and submit the information to the Authority for review and approval.

### Membrane Filtration Process

13. Direct Integrity Testing (DIT) parameters will need to be verified and programmed into the PLC/SCADA system. These parameters include:
  - a. An ongoing **log removal value (LRV<sub>ambient</sub>)** reflective of particle and pathogen removal in the 3 micron or less size range that is calculated every 15 minutes based on current ambient operating conditions and the most recent DIT result. In summary, LRV<sub>ambient</sub> is the performance indicator used to demonstrate the minimum 4.0-log (99.99%) *Cryptosporidium* removal that the membrane filters have been credited with.
  - b. A **maximum pressure decay rate (PDR<sub>max</sub>)**, which is set no higher than 0.237 <sup>psi</sup>/<sub>min</sub> that indicates a failure of the DIT and prompts an automatic shut-down of the filtration skid.
14. Indirect Integrity Testing is performed by continuously monitoring individual filter effluent (IFE) turbidity on each membrane unit. If IFE turbidity readings are above 0.15 NTU for a period of greater than 15 minutes, the associated membrane unit must immediately be taken off-line and a DIT performed.
15. Ensure pressure transducers are both sensitive enough and calibrated frequently enough to produce accurate readings. (See Table A in Appendix A for details)
16. An operations and maintenance manual is developed that includes a diagnosis and repair plan of the modules (e.g., pinning individual lumen) such that the ability to remove pathogens is not compromised.

**When final approval is granted, each membrane filter unit will be granted log removal credits (LRCs) for pathogen removal as shown in Table 1.** The LRCs are based on a verification of the Challenge Study Report for the **Toray HFUG-2020AN** membrane modules.

*Table 1 – Filter Log Removal Credit (LRC)*

Pathogen	Removal Credit (log <sub>10</sub> )
<i>Giardia lamblia</i>	4.0

---

<i>Cryptosporidium sp.</i>	4.0
Viruses	0.0

---

**The LRCs are only valid provided operations are within the limits shown in Appendix A – Explanation of Operating Limits and Terms.** Ensure SCADA/PLC programming accounts for the operating limits in Appendix A (e.g. set system alarms to ensure operating limits are met). **Some of the limits in Appendix A are yet to be determined as indicated by “TBD” and will need to be established prior to Final Approval.**

To remain in compliance,  $LRV_{ambient}$  must be equal to or greater than the LRC for *Cryptosporidium* shown in Table 1.  $LRV_{ambient}$  values displayed in SCADA should be calculated using the formulae and variables shown in the membrane supplier’s calculations. Additional information on the  $LRV_{ambient}$  calculations, and its use as a compliance parameter are included in Appendix B – Demonstrating Compliance and Performance Using  $LRV_{ambient}$ .

Pilot studies are generally required to demonstrate the effectiveness of membrane filtration on the source water to be treated. The pilot study requirement may instead be satisfied after one year of operation of the full-scale treatment plant. JCWS has operational experience with similar membrane systems in the region, and is comfortable with the risks to treatment and associated costs that may arise because a small-scale pilot study was not used to inform the treatment plant design.

**Until we receive verification that the conditions have been met and final approval has been issued, the new water treatment plant is 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 #140-2024 and can be emailed to me at [baxter.call@oha.oregon.gov](mailto:baxter.call@oha.oregon.gov).

If you have any questions, please feel free to email me or call me at 541-393-4374.

Sincerely,

Baxter Call, PE  
Regional Engineer  
Drinking Water Services



ec:

Julie Wray, DWS

Aaron Speakman, P.E., The Dyer Partnership Engineers and Planners, Inc.

Appendix A – Explanation of Operating Limits and Terms

Appendix B – Demonstrating Compliance and Performance Using  $LRV_{\text{ambient}}$

