Oregon Health Authority

Application for Waiver from Construction Standards for Public Water Systems

Water System Name	Corbett Water District	PWS ID	4100359
Project or Facility	slow sand filter media replacement	County	Multnomah

Need for waiver identified: ☐ Water System Survey Date of Survey
☒ Plan Review #

Construction standard requested to be waived: OAR 333-061-0050 OAR 333-061-050 (1) (e)

As provided under OAR 333-061-0055, the Department may grant waivers from the construction standards prescribed by these rules:

(a) When it is demonstrated to the satisfaction of the Department that strict compliance with the rule would be highly burdensome or impractical due to special conditions or causes; and

(b) When the public or private interest in the granting of the waiver is found by the Department to clearly outweigh the interest of the application of uniform rules; and

(c) When alternate measures are provided which, in the opinion of the Department, will provide adequate protection to the health and safety of the public including the ability to produce water which does not exceed the maximum contaminant levels listed in rule 333-061-0030.

Describe situation that conflicts with the standard. In the slow sand treatment process, as the media has been removed to regenerate the filter bed, the overall bed depth needs to be replaced as a semi routine process. Inquires to replace the media show high costs and long lead times with media that has current certification.

Describe why meeting the standard is highly burdensome or impractical. There is only one supplier currently certified. Reviewing the criteria for getting NSF-61 certification results that other suppliers are not interested in obtaining the certifications.

Describe proposed alternate measure that provide adequate protection to public health and safety. This alternative testing protocol is to provide an equivalent method to NSF 61 testing. In this case the specifics are for slow sand filter media. This protocol is modified to more closely resemble the actual operations of a slow sand media in the form of media preparation for use in a slow sand filter and to use standard laboratory testing method used on all community water system as opposed to the general test batteries listed in NSF 61.

Testing protocol, the following exerts are from NSF 61 (2023 ed.) in the areas regarding the testing of sand filter media.

"7.5.3.1 Filtration, adsorption, and well packing media

Wetted filtration, adsorption, and well packing media (excluding diatomaceous earth, perlite, and PAC products, and other media of < 0.25-mm diameter) shall be placed in a conditioning chamber (a glass column with a minimum inner diameter of 2 in). The amount of media conditioned shall be sufficient to meet or exceed its specific weight per volume ratio (see Table 7.2) {anthracite and gravel: c —≤ 3/8-in diameter particles 625 ± 25 g/L} and to generate sufficient exposure water to complete the selected analyses. Reagent water shall be directed slowly upward through the conditioning system until the entire amount of media is flooded. The media shall then be backwashed at a flow rate that fluidizes the media or attains sufficient transport velocities to remove extraneous particulate matter; the maximum wetted media expansion rates for various process media products are indicated in Table 7.3. {sands 20 ± 5%} Filtration, adsorption, and well packing media shall be subjected to the prescribed backwash for 30 ± 2 min.

7.5.1 Analytical summary

An analytical summary shall be prepared for each product. The analytical summary shall consist of the formulation-dependent analytes identified in accordance with Section 3.3 and the applicable product-specific minimum test batteries listed in Table 7.1. {sand filtration metals, a GC/MS

(base neutral acid scans) see footnote b Metals: antimony, arsenic, barium, beryllium, cadmium, chromium, copper, lead, mercury, selenium, thallium.

b These products are not typically regenerated or reactivated at remote locations. Therefore a minimum test battery has not been established. A full formulation review would be required for these products if they are evaluated under this standard.}

7.5.2 Wetting

POE system media receive wetting as specified in Section 7.5.5.4. Process media that receive conditioning shall be immersed completely (wetted) in reagent water prior to conditioning and exposure. The weight of the sample to be wetted shall be at least equal to the amount of media required to perform the exposure at the specified weight-to-volume ratio (see Tables 7.2 and 7.3).

7.5.3 Conditioning (backwashing)

POE system media receive conditioning as specified in Section 7.5.5.4.

7.5.3.1 Filtration, adsorption, and well packing media

Wetted filtration, adsorption, and well packing media (excluding diatomaceous earth, perlite, and PAC products, and other media of < 0.25-mm diameter) shall be placed in a conditioning

chamber (a glass column with a minimum inner diameter of 2 in). The amount of media conditioned shall be sufficient to meet or exceed its specific weight per volume ratio (see Table 7.2) and to generate sufficient exposure water to complete the selected analyses. Reagent water shall be directed slowly upward through the conditioning system until the entire amount of media is flooded. The media shall then be backwashed at a flow rate that fluidizes the media or attains sufficient transport velocities to remove extraneous particulate matter; the maximum wetted media expansion rates for various process media products are indicated in Table 7.3. Filtration, adsorption, and well packing media shall be subjected to the prescribed backwash for 30 ± 2 min." (end of quoted exerts)

Exceptions:

The containers are not glass, all containers are of NSF 61 certified materials that are common in use in the drinking water industry. Specifically, the conditioning chamber is a clear 4-inch PVC pipe. Simular to Filter pilot testing facilities.

The media is conditioned using the same protocol as commissioning the media for use. Media is placed for use, and water is flowed forward and to waste using raw water and backwards to waste using clear water (the backwards water has been filtered and without a fluidizing uplift) until the outlet water is clear at flows up to 0.1 gpm/sf, and there is an indication of Schmutzdecke on the surface of the media. This may take weeks or months to accomplish, to assist the media may be seeded for Schmutzdecke using biomaterials from the operating filters. (the backwashing will not be performed). The top layer will be removed as this is normal maintenance activity on slow sand filters and during the startup of new media.

The reagent water will be raw water from the specific source, in this case Gordon Creek. Standard reagent water is demineralized then hardened to 100 mg/l. The Gordon Creek water starts with a hardness significantly less than 100 mg/l and will only be modified to adjust the pH, the hardness will be left as is. (more corrosive therefore conservative). The raw water will be tested also using the same methods and protocols as the 3 samples to provide a baseline. The pH will be adjusted but the 2 mg of free chlorine will not be added as chlorine is not in the treatment process at this point, in fact chlorine is specifically excluded as a treatment process in this stage.

The exposure ratio is significantly higher than the protocol in each vessel, 2 gallons of sand will be in the container with 3.3 gallons of water and sand, resulting in 13.1 kg of media to less than 12.5 liters of media and water resulting in 1040 grams/liter. Each vessel will provide about 2 gallons of water for testing. 1.3 gallons above the sand and 0.6 of a gallon in the sand. The water above the sand will be exposed during the filling and draining process, while the water in the sand will be exposed for the full duration of the test. This complies with the contact area provisions in NSF61. 3 vessels per pH target will be used to obtain the necessary volumes needed for the standard testing protocol.

The exposure time is listed as 1 hour in NSF61 for media, but in the case of slow sand filters a 24-hour exposure time is more appropriate, so this protocol will follow the table N-1.5 with extraction waters to be filled and held for 24 hours on each cycle, decanted and discarded twice with the 3rd extraction water used for analysis. The reagent water will have the following pH targets 5.0, 7.5, and 10.0. There is no clear requirement listed in any chart or table on media testing, we will use the most conservative targets. The soaking process starts on a Saturday with daily processes to achieve sample delivery on a Tuesday to follow laboratory scheduling.

The testing will use standard VOC, SOC, IOC, Lead, Copper, used in the regular testing of drinking water for community water systems, metals (antimony, arsenic barium, beryllium cadmium chromium copper lead mercury selenium thallium) are covered by IOC testing. GC/MS testing covers the VOC and SOC in the contaminants of concern in drinking water. The three standard radiological tests will also be performed Gross Alpha, Radium, and Uranium.

As additional assurances, if requested by the client (Corbet Water) the following tests are available.

PFAS polyfluoroalkyl substances

Strontium byproduct of atom bomb fabrication

Iridium byproduct of atom bomb fabrication

The water is cold as it is received from the source, the water will be heated by routing the water through a tube submerged in heated water to bring the water to specified temperature conditioning, this heating which increases the corrosivity of the water has the added benefit of getting the Schmutzdecke growing quicker. During the extraction process, the room, reagent water, and contents will be kept at least at the prescribed temperature. The room will continue to be heated for the duration of the preparations and extractions. It is not expected that the room will require cooling, as the water from the source is rarely above the testing temperature.

All chemical testing will be performed by ORELAP laboratories. The media processing will be conducted by Hydra Engineering and System Staff. Hydra Engineering will also perform particle size analysis using gradated sieves, which will also test the product during delivery and installation.

If any further questions do not hesitate to contact me or Ana at Corbet water.

David Jacob PE, Oregon 16,0008

Attach plans of proposed waiver request or additional supporting information and
- Email your regulator; or
- Email dws.planreview@dhsoha.state.or.us; or

David Jacob
Signature

6/4/2024
Date

- Mail:
  Oregon Health Authority
  Drinking Water Services #640
  PO Box 14450
  Portland, OR 97293-0450

Name David Jacob PE
Address PO Box 327
City/State/Zip Rhododendron OR 97049
Telephone Number 503-310-9262

☐ Comments:

☐ Attachments:

OHA Use Only

Waiver ID 477-2024

Entered into waiver database ☑

☑ Plan Review Coordinator's notes: Proposed alternate measures appear to provide adequate protection to public health and safety.

After due consideration the above requested waiver from the construction standards of OAR 333-061-0050 is hereby:

☒ Approved
☐ Denied

Comments: Note that if chemicals that may be attributed to PVS piping are detected, the test must be repeated using glass containers.

Kari Sabin

6/12/2024

Drinking Water Regional Manager Signature
Oregon Health Authority

Date

Waiver database updated ☒