September 24, 2019

Chief John Benson

Boulder Mountain Fire Protection District

1905 Linden Dr.

Boulder, Colorado 80304

Transmitted via email to Chief Benson, chief@bouldermountainfire.org

RE: DRAFT PFAS Home Water Filter Research Findings

This report of PFAS Home Filter Research is provided as a service to the BMFPD. The information conveyed relates to commercially-available in-home point of use filtration systems.

Westwater has reviewed literature to evaluate PFAS treatment technologies and also evaluate potential natural groundwater constituents that can decrease PFAS filter effectiveness. Westwater has also reviewed pre- and post-filtration PFAS analytical data from home filter systems installed by the US Air Force (USAF) Peterson Air Force Base (PAFB) for Fountain Valley residents using groundwater for drinking and cooking.

**Filter System Technology Findings:**

Westwater’s findings indicate that granular activated carbon (GAC), anion exchange (AIX), and reverse osmosis (RO) water filters are the main commercially-available in-home PFAS filters. However, GAC and AIX filters are less effective than RO at removing shorter-chain PFAS compounds (consisting of fewer than 8 carbon atoms). Additionally, GAC and AIX filters need to be changed every 3 – 6 months and these systems are more susceptible to water hardness, the total dissolved solids (TDS) concentration, and naturally-occurring organic materials (NOM) such as humic acid leached from decayed leaves. RO can also be affected by hardness, TDS, and iron, however RO appears to be much more robust and is the most effective method for removing a broad spectrum of PFAS compounds (short- and long-chain PFAS molecules). RO is not as affected by TDS and NOM as the GAC and AIX filters. The RO membrane only needs to be changed every two to three years. The attached Technical Brief provides information on interference by naturally-occurring groundwater constituents.

The USAF installed filter systems in Fountain Valley homes located in the PFAS plume area where groundwater is used for drinking and cooking. According to the USAF, the Colorado Department of Public Health and Environment (CDPHE) recommended the USAF install the Watts Premier WP-4V VOC-reducing RO System. This filter system is designed for homes served by private wells and has four filter stages: 1) a sediment filter, 2) a GAC filter, 3) a RO membrane filter, and 4) a “VOC Block” filter which removes volatile and semi-volatile organic compounds (VOCs and SVOCs). Westwater reviewed PFAS analytical data for water samples collected pre- and post-treatment by the home filter systems provided by the USAF. Of 14 PFAS compounds analyzed, groundwater typically contained eight different PFAS compounds including PFOS and PFOA. After 6 to 9 months of operation, there were no PFAS compounds detected in water treated by the Watts Premier WP-4V 4-stage RO filter systems.

Since the USAF installed the filter systems in Fountain Valley homes the Watts Premier WP-4V model filter system has been discontinued. However, according to the manufacturer, the “Watts Premier RO-PURE Plus” filter system is a 4-stage RO filter system that is the “comparable replacement” to the Watts Premier WP-4V and features the same four stages listed above. The filter system manuals for both the Watts Premier WP-4V (used by USAF in Fountain) and the Watts Premier RO-PURE Plus (“comparable replacement”) models do not specifically mention PFAS compounds in the lists of contaminants removed from water. The manufacturer’s testing data presented in the manuals for both models indicate these filter systems are effective at removing a variety of metals and other contaminants from groundwater.

The Watts Premier RO-PURE Plus filter system can be purchased for about $250 retail and requires about $100 per year for replacement filters. The information presented here is for review purposes only, Westwater makes no warranties or guarantees regarding the effectiveness of the filter systems for removal of PFAS or other compounds from water.

Sincerely,



 Andy Horn, PG

Principal Hydrogeologist

Westwater Hydrology LLC

Attachments:

Westwater Technical Brief: PFAS Filtration Literature Review

Watts Brand Model: RO-PURE Plus Installation, Operation, and Maintenance Manual