RSSCT and Field Pilot-scale adsorption columns for PFAS removal: A Comparative Study
Krishishvar Venkatesh; Shahnawaz Sinha; Chao Zeng; Ariel Atkinson; Naushita Sharma; Harsh Ashani; Annika Hjemstad; Partho Das; Paul Westerhoff
School of Sustainable Engineering and Built Environment, Arizona State University, Tempe, Arizona, USA

Background
Physical removal via adsorption is a preferred solution for many drinking water utilities using groundwater containing parts-per-trillion (ppt) levels of PFAS. However, it is a challenge to select the right adsorbent that treats a range of higher- to lower- chain length PFAS.

Overview of our project

Capacity of different packing materials on PFAS removal

PFAS Adsorption based on functional group

PFAS Adsorption based on chain length

Rapid Small Scale Column Tests (RSSCTs )
1. 18 different RSSCTs were performed on six Arizona groundwaters to evaluate capacity of GAC and IX Resins in removing PFAS
2. To evaluate the effects of carbon chain length and functional groups on PFAS breakthrough behavior.
3. Validate constant diffusivity (CD) versus proportional diffusivity (PD) RSSCT approach to field scale results.

Field Pilot Scale
1. Two GACs and an IX Resin Packed Bed Columns
2. Two RO units: silver NP coated comparing silver sulfidation to control silver ion release.

Preliminary RSSCT Results
This site has rapid breakthrough vs other GW sources

Conclusion and Next Steps

Treatment Modules Currently in operation

MobileNEWT deployed to Tempe’s Wellsite

Field Pilot Testing

MobileNEWT deployed to Tempe’s Wellsite

Acknowledgements

• Carollo Eng and local drinking water utilities in Arizona.
• National Science Foundation (EEC-1449500) Nanosystems Engineering Research Center on Nanotechnology-Enabled Water Treatment (newcenter.org)
• Salt River Project