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Ability of Aluminum-Based Adsorbent to Remove PFAS from Groundwater

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Background/Objectives. Aqueous film forming foams (AFFFs) are a class of fire-fighting foams that contain per- and polyfluorinated alkyl substances (PFAS). In 2009, some PFASs were listed as persistent organic pollutants (POPs) by the Stockholm Convention due to their potential toxicity effects. PFASs have been detected at numerous airport sites across the USA, often present at concentrations that exceed the USEPA drinking water guidelines.

Granular activated carbon (GAC) is one of the currently used water treatment technologies but it has been shown to exhibit relatively quick breakthrough rates for some of the C7-C8 PFAS compounds such as perfluorooctane sulphonic acid (PFOS) and perfluorooctanoic acid (PFOA) and has a relatively low binding affinity for smaller chain C3-C4 compounds.

In this study, the ability of a novel aluminum hydroxide-based adsorption product, RemBind™ Plus, was tested to evaluate the removal of PFAS compounds from the contaminated groundwater at a US Air Force Base.

Approach/Activities. PFAS-impacted groundwater has been loaded to 0.1% RemBind Plus semicontinuously in a 30-gallon batch reactor. RemBind Plus and groundwater were stirred for 1 hour before being decanted and filtered and sent to two separate laboratories for analysis of an extended suite of PFAS compounds, including PFOS and PFOA, using LC-MS/MS. Several batches of water were treated sequentially without changing the adsorbent media to enable a breakthrough rate to be calculated. Spent media was washed with small volumes of various solutions to investigate the potential for on-site media regeneration.

Results/Lessons Learned. At the time of submitting this abstract, final results from the trial were unavailable. In the final presentation, the following will be presented and discussed:

- Asdorption capacity
- Calculated breakthrough rates
- Optimal addition rates
- Commercial and practical viability of the process
- The capacity for on-site media regeneration
- Challenges that need further investigation/optimization.