In Situ Remedy for PFAS-Contaminated Source Zone, Groundwater and Sediment

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Background/Objectives. This paper will provide background and description of the use of a new adsorbent media for remediation of a PFAS-contaminated source zone, down gradient groundwater and contaminated sediment. Recent advances in the field have led to the development and demonstrated effectiveness of an innovative adsorbent media. This media has proven to be effective on treatment of PFAS contaminated soil, groundwater and sediment.

In May 2009 PFOS was included in Annex B of the Stockholm Convention on Persistent Organic Pollutants. The same year PFOS and PFOS-related compounds were included in the Convention on Long-Range Transboundary Air Pollution (CLRTAP). There have been many types of PFAS compounds released into the environment since there commercial introduction. The most typical compounds include perfluorooctane sulphonate (PFOS) and perfluorooctanoic acid (PFOA). The many derivatives of these compounds are generally referred to as per and polyfluoroalkyl substances (PFAS).

Several technologies are available for treatment of PFAS. However, limited success has been demonstrated in the field. Many variables effect the performance of the treatment technology. PFAS may be treated by filtration, mechanical separation or destructive technologies. More work is needed to verify the range of conditions where these technologies may be successful. Recent testing on a new adsorbent media has demonstrated a removal efficiency of between 85-93% when tested with water containing three concentrations of PFAS ranging from 550 to 5500 PPT. This testing is encouraging and indicative of an effective treatment technology. Results from bench and pilot scale demonstration testing will be used to develop a conceptual design for a contaminated source zone, groundwater and sediment remedy.

Approach/Activities. A conceptual design for the remedy will be presented. Laboratory and field scale pilot testing results will be used to validate design considerations for in situ stabilization of a PFAS contaminated source zone, a passive groundwater treatment system (permeable reactive barrier), and an active sediment cap.

Results/Lessons Learned. The bench and pilot scale tests successfully demonstrated that PFAS contaminated soil, groundwater and sediments can be effectively treated using in situ treatment methods. The tests confirmed that adorptive media can be used to provide effective long-term protection from PFAS transport into the environment. In situ remedies provide cost effective alternatives to excavation and disposal and pump and treat alternatives.

The conceptual design for the in situ remedy utilizing adsorbent media offers new methods for managing PFAS contaminated sites in cost effective sustainable way, allowing early action on complex sites to mitigate the continued release of these compounds into the environment.