

Pump-and-Treat System at a Large Dilute Plume: Opportunities and Challenges for Drinking Water End Use

Julie Chambon, Ph.D. (jchambon@geosyntec.com) (Geosyntec Consultants, Oakland, CA, USA)

Kirk Craig, PE (Geosyntec Consultants, Phoenix, AZ, USA)

Brian Petty, PE (Geosyntec Consultants, Huntington Beach, CA, USA)

Jennifer Nyman, PhD, PE (Geosyntec Consultants, Oakland, CA, USA)

Background/Objectives. In drought stricken areas such as the southwestern United States, where populations are predicted to continue to increase significantly for decades to come, the scarcity of available drinking water is an ever-growing threat. Today in California, heavy fees are imposed on impacted groundwater that is extracted and not used as drinking water or restored and reinjected into the aquifer. A large VOC and 1,4-dioxane dilute plume in Puente Valley Operable Unit (PVOU) Superfund Site, located in the San Gabriel Basin in southern California, presented opportunities to develop, design and implement a pump and treat system for drinking water end use, that will both achieve the remedial action objectives at the Site and meet the local requirements for beneficial use of the extracted groundwater by providing a valuable new potable water supply that will decrease the region's reliance on imported water.

Approach/Activities. The groundwater extraction and treatment system (GETS) design is supported by the development of a regional groundwater flow model for the San Gabriel Basin that helped constraining the required extraction rates to achieve the remedial action objectives at the Site and support obtaining approval by USEPA for the proposed remedy. The GETS is designed to extract and treat up to 2,000 gpm of groundwater. Because of the large dilute plume, the influent concentrations at the GETS are anticipated to be within 10 times the maximum contaminant levels, which, combined with the high anticipated extraction rates presented a unique opportunity to design a treatment system to treat extracted groundwater to drinking water standards. The GETS will remediate several contaminants in the groundwater aquifer by utilizing a complex interaction of treatment technologies including:

- granular activated carbon for treatment of VOCs,
 - ion exchange resin for treatment of perchlorate,
 - advanced oxidation for treatment of 1,4-dioxane, and
 - reverse osmosis for treatment of naturally occurring total dissolved solids and selenium.
- Due to the site's location and the end use of the treated water, numerous local, state and federal permitting requirements are associated with the design, construction and operation of the system including permitting under the California Division of Drinking Water's 97-005 Policy. The extensive 97-005 permitting process is required due to the effluent from the GETS being discharged directly for use as potable water.

Results/Lessons Learned. This presentation will discuss the opportunities and challenges associated with developing, designing and implementing pump and treat systems for drinking water end use at large dilute plumes and what we can learn from the policy associated with drinking water end-use implemented in California.