

Groundwater Gauging during Local Flooding as a Proxy for Aquifer Pumping Tests to Demonstrate Hydraulic Connectivity

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Background/Objectives. The Subject Site is located on private property approximately 0.33 miles southwest of the Client's pipeline crossing of the Red River, and approximately 4.5 miles northwest of Powhatan, Louisiana in actively farmed cropland. A historical release of liquid petroleum hydrocarbons was discovered during soil removal activities at the Site. Initially, the affected aquifer at the Site was classified as a Class 1B aquifer and cleanup standards were developed for the chemicals of concern (COCs). Operation of an in situ air sparge and soil vapor extraction remediation system at the Site was underway but achievement of State Site-specific cleanup standards wasn't anticipated for many years. Regional flooding of the Red River in northwest Louisiana, USA in spring 2015 brought floodwaters to within 30 feet of our project area of interest (AOI) directly affected the aquifer undergoing remediation at the Site. We sought to utilize the local effect of regional flooding to demonstrate that the affected aquifer at our Site has a direct hydraulic connection with the nearby Red River. Demonstrating this connection would allow for a change in groundwater classification of the affected aquifer and early Site closure.

Approach/Activities. Historical groundwater elevation measurements gathered during five years of quarterly monitoring were used to establish a local representative groundwater elevation within the AOI aquifer. During the Red River flooding, groundwater elevation measurements were obtained within multiple monitoring wells at the Site in addition to surface water elevation measurements of the Red River. The on-site survey was used to correlate floodwater elevations with groundwater elevations measured within select AOI groundwater monitoring wells. Supporting measurements were made during subsequent Site visits as floodwaters receded.

Results/Lessons Learned. Hydraulic connectivity between the Red River and the affected aquifer was demonstrated through observed elevation change of groundwater within AOI monitoring wells and corollary change in elevation of the Red River as flooding receded. The State regulatory agency allows for consideration of hydraulic connectivity of aquifers to surface water bodies in determination of groundwater classification for risk evaluation. The correlation between the elevations of water within monitoring wells at the Site and the Red River identified during the June 16, 2015 Site visit, established that a direct hydraulic connection exists which may influence aquifer testing results. This connection, in addition to the Red River being the nearest downgradient point of exposure (POE) for the affected AOI and the Red River's designation as a Class 3A Drinking Water (DW) source in this area, provided sufficient evidence to reconsider the groundwater classification at the AOI. The State concurred with the reclassification of groundwater as a Class 3A DW and accepted the revised cleanup standards for the on-site COCs. This resulted in immediate cessation of active remediation at the Site and a potential savings for our client upwards of \$100,000. Currently, our client is awaiting a No Further Action determination for the project.