

## Comingled Plumes

**Site:** Former gas station at 3400 York Street, Denver, CO. USTs were removed in 2011 and 2012 and a new convenience store had been built in early 2013 just prior to injections.



**Soil contamination characteristics:** Soil lithology is composed mainly of approximately 30 feet of low to medium plasticity clay and 10 feet of silty sand overlying 5 feet of low plasticity clay. The site is underlain by claystone bedrock that appears to dip northwest.

**Groundwater contamination characteristics:** Groundwater is typically encountered at approximately 45 feet below ground surface (bgs). Groundwater flow at the site is towards the northwest and appears to be controlled by the slope of the claystone bedrock. Groundwater has been historically contaminated by benzene, toluene, ethylbenzene, total xylenes (BTEX) and methyl tertiary butyl ether (MTBE) at concentrations in excess of Tier 1 Risk-Based Screening Levels (RBSLs).

**BOS 200® Treatment:** Vista GeoScience conducted a BOS 200® injection pilot test near source well MW-1R in May 2013. 1800 pounds of BOS 200® were injected into 12 locations around MW-01R between 40-49' at staggered 2' intervals. Injection pilot test data demonstrated that BOS 200® could be injected into the subsurface soil at the site and post injection groundwater sampling indicated significant reductions to BTEX and chlorinated solvent concentrations in groundwater samples collected from well MW-1R.

Based on the positive results of the pilot test, CGRS recommended full-scale implementation of injections of BOS 200®. CGRS oversaw the full-scale injection of BOS 200® between November 18 and 21, 2013 by Vista GeoScience. Approximately 4,625 pounds of BOS 200® were injected at staggered 2-foot injection intervals that ranged from 40 to 48 feet bgs or 41 to 49 feet bgs.

**Results:** The client notes that "The data shows that the BOS 200® injections worked very well, even on the chlorinated solvents [comingling from an upgradient dry cleaner source.]" An NFA will be requested in 2015 once post-injection monitoring requirements have been fulfilled.