

DIRECT PUSH METHODS FOR SITE CHARACTERIZATION OF AN AGRICULTURAL GRAIN STORAGE FACILITY

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Abstract

Direct push (DP) is an alternative to conventional drilling methods such as hollow stem augering (HSA). DP methods do not use rotation of fluted augers to advance tools into the subsurface, but rely on percussion with a hydraulic hammer and hydraulic cylinders to advance the tool string. Because of this, DP techniques generate little if any potentially contaminated waste during sampling and logging activities. DP tools are available for soil and groundwater sampling; and electrical, cone penetration, and contaminant logging. New methods for vertical profiling of groundwater chemistry and hydraulic conductivity are also available.

A field comparison of DP methods to conventional drilling methods was conducted around several grain storage facilities situated on the Smokey Hill River alluvial deposits in central Kansas. DP e-logging and soil sampling methods were compared to and confirmed by HSA augering and split-spoon sampling. After installation of 2-inch monitoring wells by HSA methods, DP methods were used to install small, 0.5-inch prepacked screen monitoring wells. Simple statistical analysis of paired sample results for carbon tetrachloride and other chlorinated VOCs indicated there was not statistically significant difference between the samples from the DP- and HAS-installed wells. Elimination of drill cuttings and minimizing development and purge water can greatly reduce investigation costs and minimize hazard exposures.

Direct push methods have proven to be time-efficient and cost-effective methods for conducting subsurface investigations in unconsolidated soils and sediments. Utilizing these new methods can provide high quality data for accurate site characterization that can yield further cost savings by optimizing selection and application of appropriate remedial methods.

Key Words: direct push, electrical logging, groundwater monitoring