

Vertical Shaft Excavation to Remove Contaminated Soil with Passive Vent Tube Backfill Completion

Fred W. Blickle, PE (fred.blickle@ghd.com) and Tom Kinney, CPG
(GHD, Emeryville California)

Background/Objectives. A southern California site contaminated with chlorinated volatile organic compounds (CVOCs) includes soil excavation with off-site disposal as part of the overall remedy for soil and groundwater. Contamination originated from a former solvent vapor degreasing unit used by a light manufacturing company which shut down operations in 2008, although the degreaser was taken out of service in 1999. The site is currently used as a warehouse for storage and shipment of safety equipment. Soil contamination extends to the top of the water table, which occurs at approximately 15 feet below ground surface (bgs). Although the soil contamination is fairly tightly contained in a 9 ft by 9 ft area, Class C soil at the site would require a much larger excavation to provide stability down to 15 ft bgs. Accordingly, an approach was developed to remove soils through excavation in an area that's approximately 19 by 20 ft to 5 ft bgs, and then extend the excavation down to 15 ft bgs with auger tubes, to remove soil in a 9 ft by 9 ft area. Upon completion, passive soil venting was required due to the presence of CVOCs in groundwater and daily occupancy of the building. Accordingly, an innovative approach was designed to provide vertical venting tubes for site soils.

Approach/Activities. Auger flights, 1 ft in diameter, were specified to be used to remove soil in the 9 ft by 9 ft area, to 15 ft bgs. Augers are planned to be extended individually to 15 ft bgs, following which soil will be removed and containerized for disposal. As the auger is removed, the hollow tube will be filled with pea gravel. This process will be repeated until all of the target soil is removed. The center tube will be equipped with a vertical vent pipe to provide a preferential pathway for any subsurface vapors that may remain. The vertical pipe will be connected to the horizontal venting system, which then will connect to the exterior vent.

Results/Lessons Learned. The project design has been approved by the regulatory agency and implementation is scheduled for September 2017. It is anticipated that this design will provide a shorter timeframe to implement at a lower cost, as well as provide a very protective venting system for any residual CVOCs. The final paper will include discussion of construction, results and lessons learned.