Highly Complex In Situ Thermal Remediations

Lauren Soos lsoos@thermalrs.com, TRS Group, Inc.

In situ thermal remediation (ISTR) is a powerful and effective source area removal tool that is commonly applied at sites with varying degrees of complexity. In addition to the specialized ISTR design and equipment, recent applications have included construction under active manufacturing buildings and operation under active railroad tracks. This presentation will highlight the various tools used during ISTRs implemented in highly complex settings.

At a New Jersey Site, the 28,000 cubic yard (yd^3) treatment volume, or source area, was identified under a very active manufacturing facility. Approximately 65% of the source area is outside the footprint of the former molding room, the only location the current property owner (non-liability holder) is allowing access to during ISTR activities. To extend the ISTR subsurface infrastructure to the entire source area, drilling is conducted from the former molding room, which has a 16-foot ceiling height restriction. The facility's sensitive manufacturing and presence of significant manufacturing equipment precludes the use of vertical drilling outside of the former molding room. Further complicating installation, the depth of the source zone ranges between 60 and 120 feet below grade in glacial till with a high density of cobbles and boulders.

To address the site challenges, roto-sonic drilling technology combined with limited access mast conversions, including five foot drill flights, were utilized during ISTR subsurface installation. Angled drilling, up to 225 linear feet in length, with ranges between 24 to 80 degrees from horizontal were stacked on top of each other, with only two feet of separation, in an arrangement called ISTR fans. Although the treatment volume is only 28,000 yd^3, the project team will install almost five miles, or 24,000 linear feet, of ISTR subsurface infrastructure, while working during second and third shifts, as not to impact facility operations. Additionally, TRS designed a unique ISTR heater element technology, focusing on improved heating efficiency, linear footage wattage flexibility and protection in angled applications.

At a Maryland Site, the 49,000 cubic yard treatment volume was beneath and divided by a public roadway, private and government land, wetlands and two CSX railroad tracks. These site features added significantly to the complexity of the ISTR system design, construction and operation. Consequently, various ISTR features were implemented to manage the complexities, including early stakeholder engagement, flexible ISTR subsurface infrastructure, vapor capture plenum and elevation and track deflection monitoring.

The presentation will focus on the technical complexities of constructing and operating full scale thermal remedies at these sites, describe the various tools available for complex ISTR implementations, share lessons learned, provide the results of the ERH remediations, and describe the next phase for the sites.