

DESIGNING FOR AND MANAGING HIGH MASS RECOVERY DURING AN ERH REMEDY

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Background/Objectives:

The site is a former chemical manufacturing facility in southern California that has more than 3 acres of land impacted by dense non-aqueous phase liquid (DNAPL), a portion of it mobile which was targeted for the electrical resistance heating (ERH) remedy (the treatment area is approximately 29,000 square feet). The full-scale remedy in the treatment area combines in situ thermal remediation (ISTR) and soil vapor extraction (SVE), collectively comprising the ERH system, to remove the volatile organic compounds (VOCs), thereby rendering the DNAPL immobile.

Approach/Activities:

TRS Group (TRS) had pilot tested SVE and ERH in unsaturated and saturated soils, respectively. A passive vapor barrier wall, using wells along the southern periphery of the treatment area, was installed to aide in preventing the migration of off-site contaminants into the treatment area during SVE and ERH operations. Pilot testing led to a more thorough understanding of the site and changes in the conceptual site model. Due to the size and estimated mass recovery, the project team decided to split the ERH treatment area into two phases and include redundant mass recovery and treatment systems in the full-scale design. To enhance remediation and reduce costs, TRS utilized two steam regenerated granulated activated carbon (SRGAC) units to regenerate carbon onsite, as opposed to typical carbon changeouts.

Results/Lessons Learned:

TRS has completed Phase 1 of ERH and expects to complete heating of Phase 2 in December 2025. The presentation will include an analysis of how pilot testing affected the full-scale design and analysis of results. In addition to a significant reduction of carbon usage, the vapor treatment approach incorporated flexibility to switch between multiple vapor extraction locations and duplicate vapor treatment systems to enhance mass recovery. As part of the presentation, the team will analyze the performance of the two SRGAC units and present total activated carbon used with attendant cost savings. Operation of the SRGAC units has saved over 3 million pounds of carbon disposal to date. In addition to SRGAC performance, the results discussion will include a summary of mass removal details, operational limitations, liquid treatment and disposal to an on-site groundwater treatment system, and hot soil sampling with rotary sonic methods. This presentation will highlight the lessons learned and results for what is predicted to be removal of more than 600,000 pounds total VOCs, currently TRS' largest mass removal project to date.

About The Author

Patrick Joyce, TRS Project Manager, has experience in environmental consulting and in situ thermal remediation (ISTR) industries. His ISTR experience includes both electrical resistance heating (ERH) and thermal conduction heating (TCH) technologies. Mr. Joyce has implemented thermal projects at remote sites, including in the middle of Alaska, to very active sites, such as a four-lane highway and a shopping center, which remained open to the public during construction and operations, and a high-profile Superfund site in Southern California. Patrick lives in Reno, Nevada, and enjoys camping, kiteboarding, and remodeling a cabin in his spare time.

