

## Challenges of Managing a Low Concentration 1,2,3-Trichloropropane Site in California

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**Background/Objectives.** In August 2009, the office of environmental health hazard assessment (OEHHA) established the public health goal (PHG) for 1,2,3-trichloropropane (1,2,3-TCP) at 0.0007 micrograms per liter ( $\mu\text{g/L}$ ), or 0.7 parts per trillion (ppt). In 2017 The California State Water Board approved a 1,2,3-TCP maximum contaminant limit (MCL) of 0.005  $\mu\text{g/L}$  or 5 ppt.

At a former pesticide storage site in Southern California, 1,2,3-TCP has been analyzed in groundwater samples for many years using United States Environmental Protection Agency (USEPA) Method 8260, with laboratory reporting limits of 1  $\mu\text{g/L}$  (1,000 ppt). A groundwater extraction and treatment system has operated for 17 years to remove VOCs from groundwater, including 1,2,3-TCP. The system removed over 400 pounds of VOCs from groundwater, yet 1,2,3-TCP concentrations persist at concentrations up to 100  $\mu\text{g/L}$  or 100,000 ppt (20,000 times the MCL). Sampling of many site groundwater monitoring wells, especially those in deeper water-bearing zones, was discontinued but were resampled considering the MCL. Site closure was anticipated, but is now being renegotiated with the regulatory agency. The persistent low concentrations of 1,2,3-TCP, coupled with the MCL of 5 ppt, present significant challenges for site closure and alternative remediation strategies are now being considered.

**Approach/Activities.** Additional site groundwater samples were collected from 43 site monitoring wells, screened in three distinct water-bearing zones. Samples were analyzed using USEPA Method 524 SIM SLR, with a laboratory reporting limit of 5 ppt.

**Results/Lessons Learned.** Sampling is complete and 1,2,3-TCP was detected below 1  $\mu\text{g/L}$  (the laboratory reporting limit used for many years) in many more site monitoring wells, including those screened in the deeper water-bearing zone. As expected, the 1,2,3-TCP plume is more extensive, both laterally and vertically. Detections, especially in the deeper zones, have significantly affected the site conceptual model and may delay closure, which was previously anticipated. Additional remediation options, such as targeted injection-based technologies, zero valent zinc, and others are currently being evaluated, as groundwater extraction and treatment will not be effective to further reduce 1,2,3-TCP concentrations.