Over Twenty Years of 1,4-Dioxane Data at Multiple Sites: What Really Happens Long Term?

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Background/Objectives. 1,4-Dioxane has been identified as an emerging compound for many years now. It is commonly encountered at many sites, including industrial and government facilities, as an industrial solvent stabilizer. However, it is also an unintended by-product in a range of processes and is found in numerous household products and food additives. Long term remediation and site management activities have been managed for a chemical manufacturing client with 1,4-dioxane present at several locations. Data has been gathered at some of these sites for over twenty-five years. These sites have included locations with periods of pump and treat activities, phytoremediation, geosynthetic covers over landfill areas, insitu remediation, and areas of undisturbed long term monitoring. This collection of extensive data sets creates a unique opportunity to observe what happens to 1,4-dioxane over time and compare groundwater trends and plume behaviors under a variety of conditions.

Approach/Activities. Groundwater trend plots have been developed for hundreds of monitoring locations across three sites located in North and South Carolina. Over 5,000 data points were evaluated with results spanning from 1990 through 2017. The trend plots were evaluated to determine general frequencies of increasing, stable, or decreasing trends in concentration. Where possible the influence of remedial measures was evaluated qualitatively or quantitatively.

Results/Lessons Learned. The overall evaluation indicates that 1,4-dioxane concentrations tend to stabilize and decline slowly but steadily over time. The influence of remedial technology varied dependent on geology. degree of contact, depth of contamination, concentrations, and time. The presentation presents visual and numeric results to show expected behaviors over a multi decade period. Data will continue to collected and evaluated through early 2018.