



PlumeStop® Liquid Activated Carbon™ Technology Multi-Site Performance

Introduction

PlumeStop® Liquid Activated Carbon™ is an innovative bioremediation technology that can rapidly achieve low groundwater remediation targets for all types of organic contaminants. From May 2014, when PlumeStop became commercially available, until April 2016 (the time of this performance review), the technology has been applied on more than 50 sites to date within the US, Canada, and Europe (Belgium, UK, Sweden and Italy).



Evaluation Approach

In May 2016, remedial performance evaluation was undertaken for all sites for which data had been made available by the client companies – a total of 24 sites. All data were pooled, and the monitoring points within the expected zone of influence of the technology assessed. These comprise wells within the treatment grid and/or those within advective distance from the grid or application (flowthrough) barrier. Up-gradient controls and wells outside the treatment areas were omitted. Performance histograms of the full data set are presented in Figure 1 (initial reductions) and Figure 2 (stability to date).

Site Details

Site Type: 24 sites within US, Canada and Europe

Contaminants of Concern: Organic contaminants

Remediation Approach: *In situ* Sorption and Biodegradation



Reductions Achieved

Approximately 90% of all target wells recorded reductions of over 80% within the first 90 days (Figure 1). In addition, two thirds of the target wells (65%) registered reductions of greater than 95% within the first 90 days. The majority of these were remediated to below method detection limits (MDLs). Within this set, reductions of >99% and >99.9% were reported with reasonable frequency.

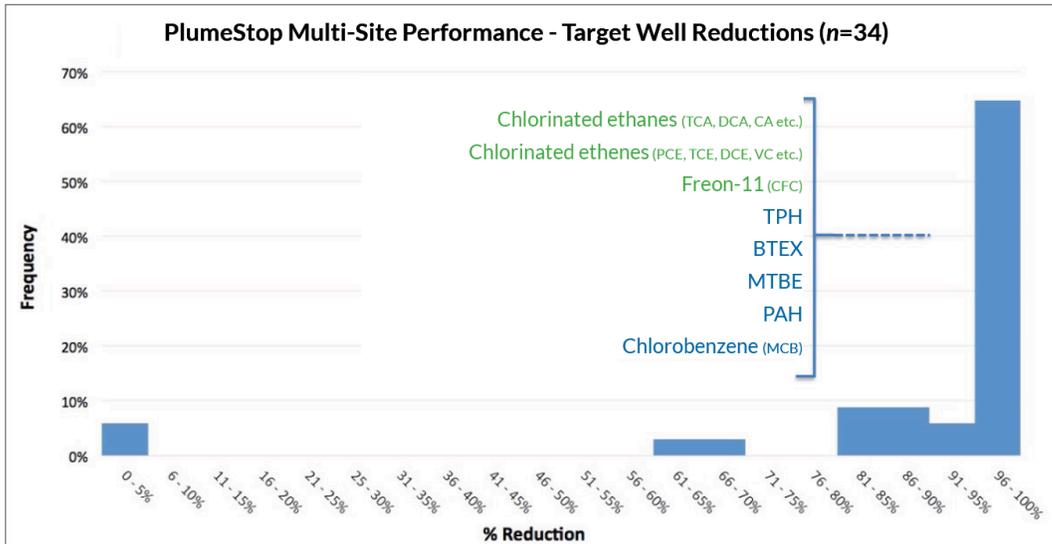


Figure 1 - PlumeStop Multi-Site Performance Data - Initial Reductions

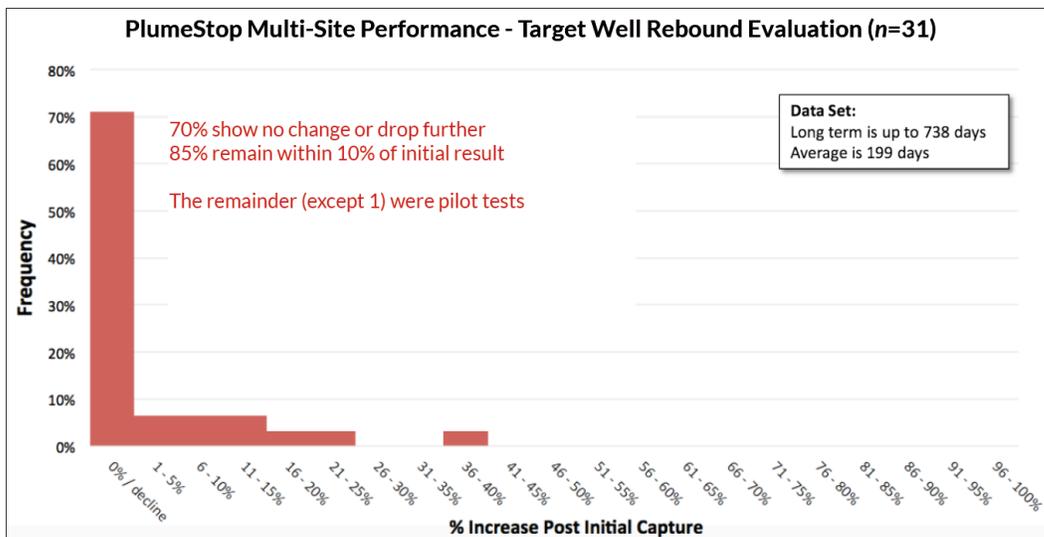


Figure 2 - Long-term performance showing little rebound in groundwater concentrations

Long-Term Performance

Post-capture stability data i.e. a measurement of any rebound following initial sorption, are summarized in Figure 2. The total contaminant concentration data from the most recent monitoring events (i.e. sum of all species) are compared with the corresponding initial reductions presented in Figure 1. Changes in contaminant composition, such as transformations to daughter products, are therefore included in the assessment.

The frequency of bracketed concentration increases post initial capture are presented as a histogram, with percentage changes reported with reference to the pre-treatment baseline (i.e. 100% increase post initial capture indicates a return to the pre-application starting concentration). The data reveals that no significant rebound in contaminant concentrations is observed after treatment.



Conclusion

Following six years of development in the laboratory, PlumeStop has been available for commercial use for around two years now. During this time 50 sites have been completed, with an increasing number moving through design phases for projects around the world. This review of the data so far available, shows that the performance for our clients matches that observed during the development of the product.

PlumeStop is able to consistently achieve >95% reductions, to very low concentrations, within weeks to months of application. These low groundwater concentrations are then maintained, without significant rebound, due to the combined adsorbed and biological degradation processes provided by the treatment.