

CS04: Sampling Comparison

Vertebrae and Vertical Results

SITE

Former Industrial Parts Manufacturer, Confidential Location in South Florida

CONTAMINATION

Solvents, mainly cis 1,2 Dichloroethene and Vinyl Chloride in ground water

OBJECTIVE

Vertebrae™ Well Systems accurately and repeatedly sample under obstacles and buildings, but how do the wells compare with standard vertical monitoring well sample data? Answer - nearly identical.

This case study illustrates how comparable Vertebrae™ data is to nearby monitoring wells. The sampling data not only shows clear high definition iso-contours as it transects the distal plume, it also shows excellent correlation with the nearby data.

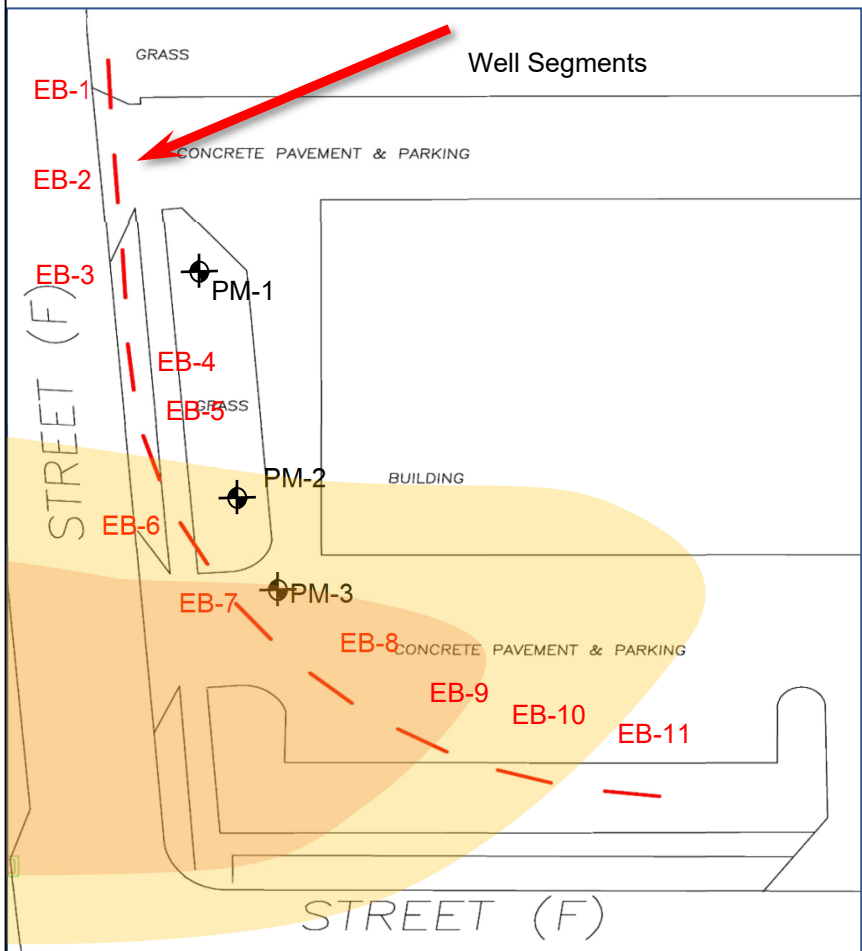
BACKGROUND

A release occurred at a Manufacturer in South Florida. The plume traveled under the building, under a roadway and under an adjacent property. A Vertebrae™ Well System was chosen for use as remedial delivery system. The well was oriented across the distal plume to provide an oxidative wall to eliminate down gradient migration.

Vertebrae™ Well System with 11 segments (shown in red in the graphic to the right) was installed for sampling and injections. The drilling had to turn 90 degrees to complete the well path, showing just how tight the HDD can be steered. The Vertebrae was installed with zero business impact. The well system was placed at approximately 11 ft bls, above a clay layer at approximately 13 ft bls.

Monitoring wells installed in the area are general installed to 13 ft bls, and usually sampled with tubing at approximately 10 ft bls.

The goal was to compare nearby monitoring wells to sampled Vertebrae™ in order to better understand the extent of contamination. Three wells (PM-1, PM-2, and PM-3) were near (5-15 ft.) the installed vertebrae well segments (EB-3, EB-6, and EB-7 & EB-8) which were used in the comparison.



Prior to any remediation, the *Vertebrae*TM well segments were sampled (EB-1 through EB-11). Sampling was completed using standard protocol, including insitu parameter water quality stabilization. The nearby monitoring wells were also sampled during the same event.

The sampling density using the *Vertebrae*TM Well System produced data on 10 ft centers providing a high level of precision for plume contours. This density is much greater than traditional monitoring well data at 30 or more horizontal feet per sample. In a class of its own, it's the only High Resolution Horizontal Tool capable of producing clearer, more precise iso-contours (See case study VC5 to see high resolution iso-contours).

SAMPLING RESULTS

The sample results indicate there is excellent correlation between data from the monitoring wells and the *Vertebrae*TM well segments. This was expected as they are merely traditional wells oriented horizontally and they are sampling the same representative groundwater. Interesting, the distance between the compared data types correlated precisely, indicating that the difference in the data was only due to the difference in the position in the plume. The closest two samples (less than 5 ft apart from each other) showed only 7% change in concentration, 260ppb to 280ppb for cis-1,2 DCE.

Case Study VC4: Sampling Results

Wells	Cis-DCE (ppb)	Separation Distance (ft.)	% Difference between PM and EB well
PM-1	16	8	32%
EB-3	22		
PM-2	280	5	7%
EB-6	260		
PM-3	270	15	30%
EB-7	200		
PM-3	270	10	16%
EB-8	230		

CONCLUSIONS

*Vertebrae*TM is an excellent tool to accurately and repeatedly sample under obstacles and buildings. The reliance on such data under a building is better than screening level data; it is comparable and quantifiable for mass and plume characterization precisely like any other monitoring well data. Cost effectively, it can be constructed with higher density to provide higher resolution characterization and yield more effective remedies.

The Impressive Benefits

- *High definition accuracy*
- *Analytical precision*
- *Zero business disruption*
- *No obstacles to stand in its way - Say good bye to Data Gaps!*

As more sites utilize *Vertebrae*TM for sampling, especially in hard to reach places, we expect users to appreciate the benefits and chose *Vertebrae* characterizations over traditional assessment.