Case Study: VC5

Vertebrae Data in High Definition

SITE
Confidential Site in South, FL

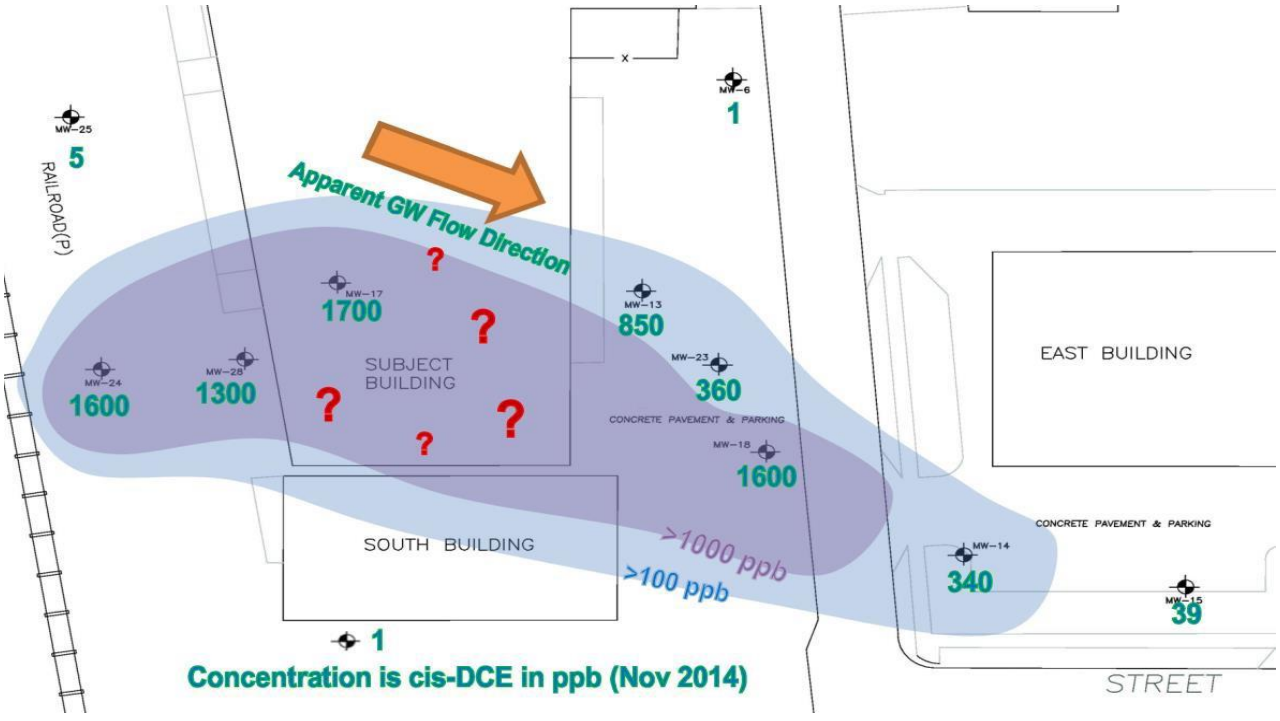
CONTAMINATION
Solvents

OBJECTIVE
One age old issue for proper site characterization is inaccessibility. Most sites have some type of building or structure in the way of completing an easy assessment. Often a building lies near or directly on top of a source of contamination where it matters most. Some buildings lend themselves to gathering limited data where others make it very difficult to get any data whatsoever. Data gaps can end up causing significant problems leading to prolonged remediation and higher costs. Even though assessment is a hot topic and High Resolution Site Characterization (HRSC) is making great advances in more complete more accurate assessments, this problem is not addressed.

BACKGROUND
This was the case at this south Florida site. An active 80 ft wide building with an assortment of equipment and small hallways would lead to a very costly and disruptive interior assessment. When the cost we examined, this path was deemed inappropriate. Instead, one vertical well was installed inside the building (MW-17) and four wells outside the building to try and complete the characterization. This was insufficient defining mostly only the distal impacts, and Vertebrae well systems were utilized to aid in the assessment.

Vertebrae[tm] is a multipurpose nested well installed by Horizontal Directional Drilling (HDD). Vertebrae[tm] was installed and sampling providing a clearer point of released a more accurate representation of the plume, thus allowing a surgical treatment plan to move forward. The provided data has the clarity and spacing similar to HRSC tools.

PRE-INSTALLATION DATA
- Five monitoring wells, screened from 5-15, characterize the plume, MW-17, MW-28, MW-13, MW32I, and MW-18.
- The most impacted well reports a concentration of 1,2 cis-DCE at 1700 ppb at MW-17.

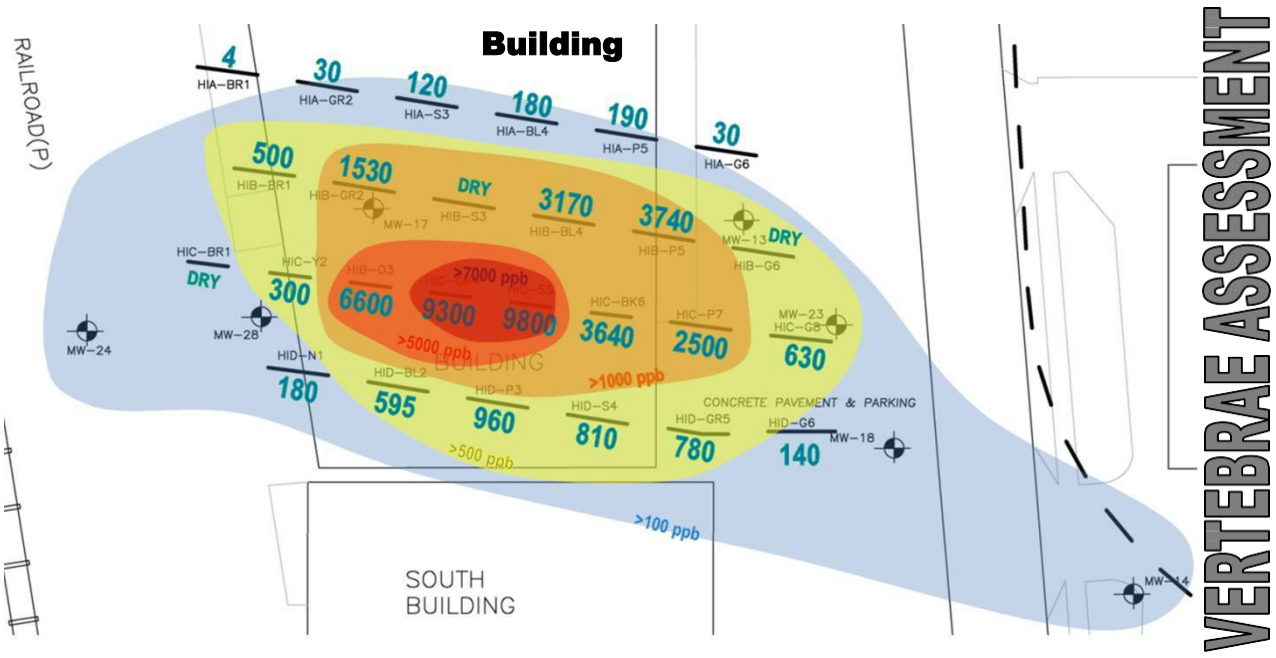


LITHOLOGY

- Silty sand and sandy clays typical of Florida reside in the top 15 ft.
- The lithology transitions to a clay confining layer at 15 to 17 ft bls.

VERTEBRAE™ ACTIVITIES

- Four HDD bores were advanced to install a total of 26 well segments under the building in 7 days.
- The wells were installed directly on top of the clay confining layer at the site. It was known that the solvents sank down to this layer and the most concentrated sample results would be collected from this depth (approximately 15 ft bls).
- These wells were developed and sampled after the development water cleared and insitu parameters stabilized.



The data collected is invaluable. Most of all, from the collected data, the true 'hot' zone under the building has been identified (a floor drain), as well as a better estimate of mass present. This data also provides clear iso-contours of the plume.

VERTEBRAE™ BENEFITS

- The wells are installed from outside the building, but precisely where they are needed under the building.
- The horizontal spacing can be engineered. Wells could be installed 10 ft on center to allow increased precision similar to HRSC data collection. In this case study, the wells were approximately 25 ft on center.
- The wells are multi-purpose. The original intent of the installation at this site was for treatment. The sampling performed after installation confirmed screen placement for future treatment. The screens will allow excellent ChemOx treatment at the precise depth it is needed with ample control to target and remedy the site quickly. However, if speed is not an issue, treatment can be bio or extraction of the groundwater. The wells are truly multipurpose.
- Unlike most HRSC tools, these wells can be resampled again and again. This allows monitoring of the site conditions instead of having to recomplete a HRSC event. In instances such as this site, not all the wells have to be used for treatment; some can be reserved for sampling only.
- The installation occurs congruent to the lithology and plume shape. It allows better treatment and less overall drilling. This is valid even when a building is not the issue.
    - **Vertebrae™ simply provide a better overall solution over vertical wells.**
- Only one vault is needed per well group minimizing unsightly well pads.
- The cost was reduced using these wells, not increased.

The benefits are extraordinary for Vertebrae™. This is changing the way the industry thinks about data gaps.

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