

Horizontal Air Sparge Wells Remediate Contamination Without Affecting Critical Operations



IPEC Conference, Houston TX

October 15th, 2014

Mike Sequino, Directional Technologies, Inc.

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Technologies, Inc
Horizontal Directional Drilling Services





Site Background

- The site is a bulk storage terminal that supplies jet fuel to the nearby Orlando International Airport. The facility operates 24/7 and fuel service to the airport could not be interrupted.
- Groundwater contamination had spread below terminal's office building, parking lot, fuel dispensing racks, and part of the highway adjacent the facility.
- Installing an elaborate network of vertical wells and an piping trenches was simply not possible without disrupting business operations and losing millions of dollars a day.
- Horizontal remediation wells became the remedy of choice to minimize disruption to ongoing activities and to access contaminated areas beneath structures.



Location Map



Site Location

**International
Airport**

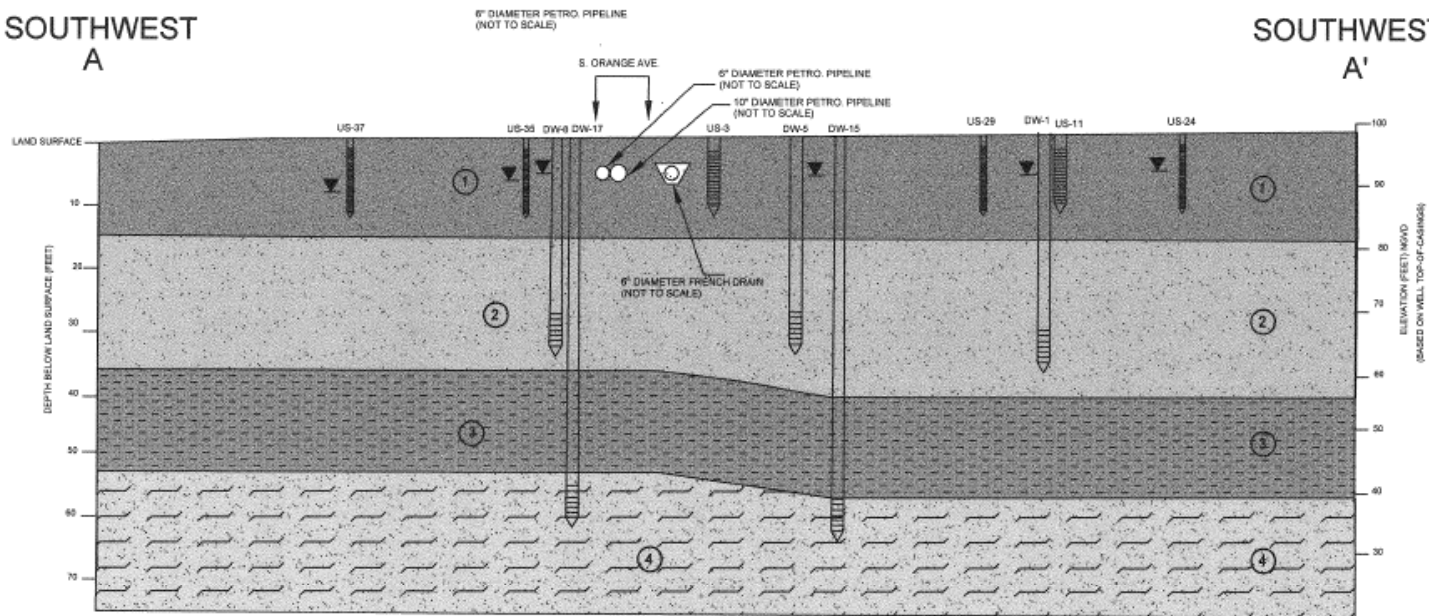


Subsurface Conditions

- Several lithographic units were present beneath the site.
 - 0 to 15 feet bgs – dark brown, fine grained sand
 - 15 to 35 feet bgs – light gray, silty sand
 - 35 to 55 feet bgs – greenish gray clay
- Depth to water was approximately 8 to 10 feet bgs.
- The target zone was impacted water above the clay unit.

SOUTHWEST
A

SOUTHWEST
A'



SAND(SP/SM): Fine Grained, Dark to Medium Brown, Occasionally Silty



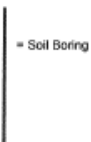
SILTY SAND (SM): Fine Grained Sand, Brown to Gray



CLAY (CH): Greenish Gray to Dark Gray



SILTY SAND (SM): Fine Grained Sand w/Shell Fragments, Greenish Gray



= Soil Boring



= 2" Diameter Monitoring Well



= 1" Diameter Monitoring Well



Groundwater Elevation: As measured in December 2009 for US-24 and March 2010 for US-37



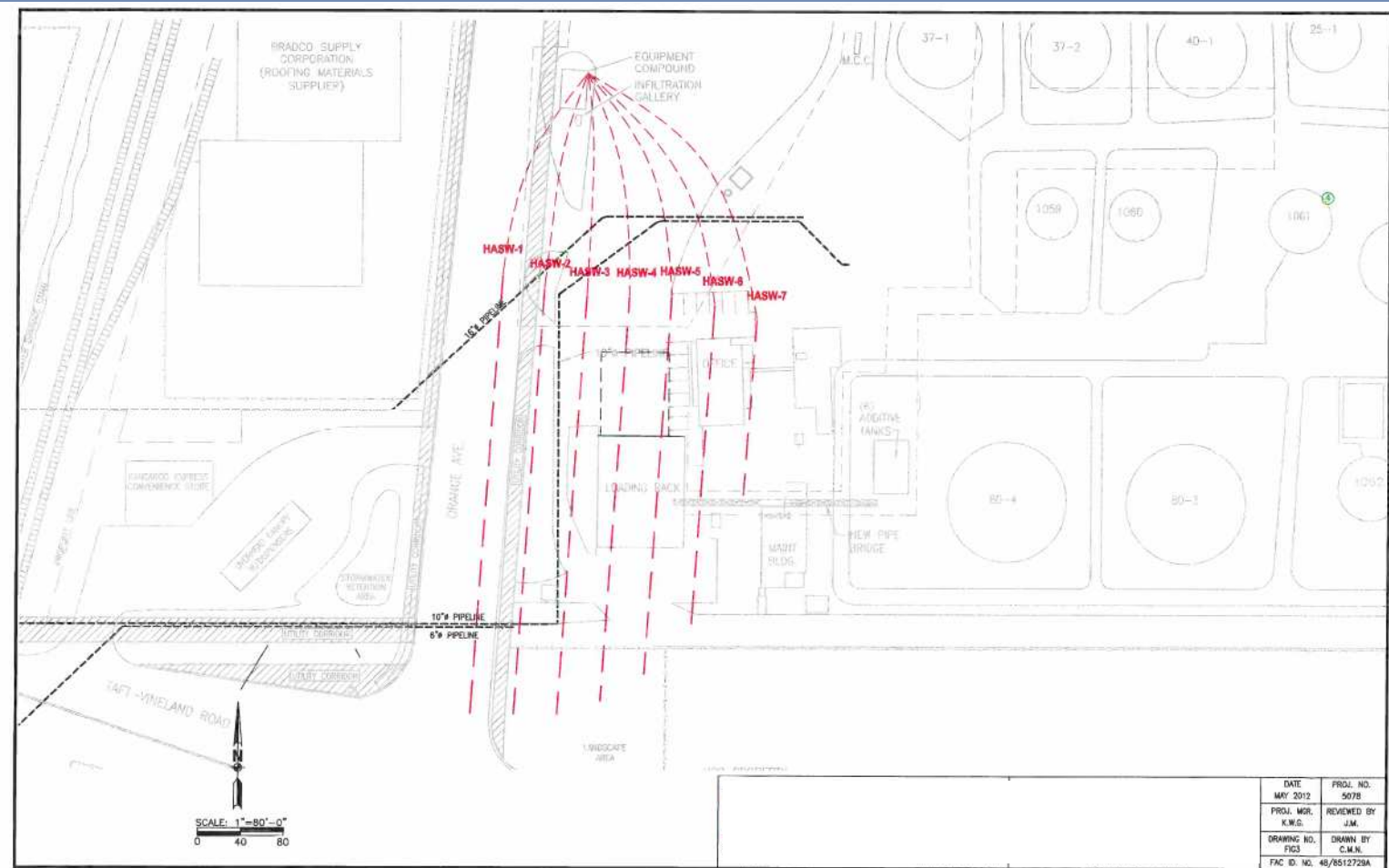
Groundwater Elevation: As measured in April 2011 for US-35 and DW-1
Groundwater Elevation: As measured in December 2010 for US-43



Remedial Design

- Seven air-sparge wells were designed to cover the extent of groundwater contamination based on a flow rate of 0.5 scfm/lineal foot of well screen and a calculated zone of influence of 20 feet.
- The wells were spaced on 30-foot centers to provide overlapping zones of influence.
- Well lengths ranged from 400ft - 640ft. Screened intervals also varied depending on the length of the well and position within the impacted groundwater plume.
- 3in HDPE pipe and screen was installed.
- The screen was specially designed to distribute airflow and pressure evenly throughout the screened intervals.
- Target depth for the wells was 35-feet bgs.

Remediation System Piping and Layout



Bore Path





Remedial Design Cont.

- The 7 wells were installed from a common starting point where they subsequently plumbed into the on-site remediation system
- 3,800 linear feet of remediation piping in total- all without affecting the flow of tanker trucks in and out of the facility
- Only 15 ft of trenching, a feat not possible with a vertical system



Well Screen Demonstration Prior to Installation





Conclusion

- Horizontal Remediation Wells will not only save the responsible part a fortune in operation and quarterly monitoring costs, but also saved them millions of dollars a day by keeping business operations running during install
- By using horizontal wells, there was better access to the plume and far more screen contact
- HRWs= Rapid Results!

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Technologies, Inc
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Horizontal Remediation Wells

Horizontal Remediation Technologies • Installation • Design • Engineered Well Screens • Services



Founded in 1992, Directional Technologies, Inc. has installed over 1,000 horizontal remediation wells throughout the world.

Corporate Headquarters in Wallingford, CT
Branches offices in Philadelphia, PA; Ashby, MA; Atlanta, GA; Destin, FL



Mike Sequino • mike@directionaltech.com • 203-294-9200