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Foremost Environmental Solutions



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**Maxwell Air Force Base:
Montgomery, Alabama**

BioLuxing Case Studies



System Type:

Chemical Reactive System, Jet-assisted V and Y Panels of Zero Valent Iron (ZVI). Installed with teaming partner H. Wallace Baker of GeoBase, Inc.

Location:

Maxwell Air Force Base, Montgomery, AL

Client:

Radial International, Austin, TX: US Army Corps of Engineers

Project Description:

FOREMOST Environmental Solutions, Inc. (FES) successfully demonstrated the installation of Permeable Reactive Treatment System (PeRT) wall panels 75 feet below ground surface (bgs), using their patented technique of jet assisted hydraulic fracturing to inject a reactive slurry containing zero-valent iron filings and other materials. This X-PeRT System was completed in July 1998 as a pilot study at Maxwell Air Force base.

Boreholes were advanced and poly-vinyl chloride (PVC) casings grouted and set to depths ranging from 75 to 80 feet below ground surface (bgs). A high-pressure jet cutting tool was used to cut slots through the PVC casing. The slots were aligned to produce "V" and "Y" panels that increased the contact time between the contaminant and treatment slurry by about 30 times that of a normal 3-4 inch treatment wall.

The jetting tool was inserted into the bottom of the casing and lifted out with hydraulic jacks as the casing and soils were cut with the high-pressure water jets. A 20-foot high vertical PeRT wall was emplaced between 55 and 75 feet bgs. About 20 tons of zero-valent iron filings, humates, enzymes, and a guar gum were pumped underneath a packer into the well behind the water jets. This design was developed as a treatment technology for the TCE in groundwater. The enzyme breaks the guar gum water polymer, leaving the iron filings in place to hold open the slots or fractures and to treat the groundwater as it passes through the wall.

FES used Radio-wave Imaging Method (RIM) to monitor the location and thickness of the wall panels. Imaging wells were installed 80 feet deep at selected locations up-gradient and down-gradient of the wall panels. A radio-wave signal depression provided a measure of the extent and thickness of the slurry panels. The RIM monitoring of three of the panels indicated that these panels were about 2 to 3 inches thick and extended from 5 to more than 10 feet from the injection hole. The field installation was completed in 14 days. Concentrations up-gradient to the PeRT system varied from 400 to 700 parts per billion (ppb) TCE. As the groundwater flowed through the PeRT system, the concentration was reduced to less than 40 ppb in about 6 months with no adverse signs of deterioration or hampered groundwater flow. This was the first time vertical treatment walls had been constructed with iron filings using this technique. While the system was effective and efficient, Foremost has not used the system again because BioLuxing at similar depths has proven to be less costly, more efficient, and safer.