



PROJECT ABSTRACT

Client: Stoller Chemical
Site Location: Jericho, South Carolina
Scope of Work: Sulfate Reducing Bioreactor – Permeable Reactive Barrier

In November of 2008, A&D Environmental Services, Inc. (A&D Environmental) was contracted to perform the trench installation of an in situ Sulfate Reducing Bioreactor (SRBR), within a Permeable Reactive Barrier (PRB). The trench was designed to address and remedy metals contamination in a shallow groundwater system at the Stoller Chemical Site located in Jericho, South Carolina. The system allowed shallow groundwater to passively flow through a permeable reactive barrier to enable the growth of sulfate reducing bacteria thus allowing the target metals to precipitate out as sulfide ions.

A&D Environmental personnel utilized an excavator equipped with an excavator mounted vibrator (EMV) hammer to install a trench system using steel sheet piles. The trench was designed in a rectangular configuration that 380 ft. in length by 12 ft. wide. A total of 11 cells were constructed of varying lengths in order to maximize the rotation of the steel sheets. Once the installation of the sheet piling was completed, a second excavator was utilized to remove soil from each of the cell segments to an approximate depth of 12 ft.

The reactive medium of the SRBR was selected based on their performance in previous bench-scale pilot studies. This proprietary recipe was strictly followed to create the media that was to be used for the PRB. Utilizing a front end loader equipped with a 2.5 cu yd bucket the components of the SRBR were measured out for each cell. The substrate was loaded on to a dump truck in a specific sequence to maximize the homogeneous nature of the bioreactor mix. The bioreactor mixture was transported to the trench and placed within the excavated cells and again thoroughly mixed by an excavator within the cell.

Once the entire volume of the bioreactor material was placed into the trench a monitoring well was installed in the excavation. Each well was constructed of 2 in. diameter PVC, 15 ft. in length which included a 5 ft. screened section. A 6-mil poly sheet was then placed on top of the mixture to assist with the incubation and help drive the system towards anaerobic conditions. Approximately 3 to 4 ft. of soil was used to backfill the cell to about 1 ft. above grade.

The media and groundwater mixture was allowed to incubate within the sheet piling enclosure for a minimum of 14 days. During this incubation period, the pH, specific conductivity, temperature, turbidity, dissolved oxygen, and ORP were monitored daily. A low-flow sampling procedure was utilized to collect field data. At the end of the incubation period, the sheet pile walls of the treatment cells were removed to allow natural groundwater flow to move throughout the PRB.