

Bureau of Economic Geology  
Carbon Dioxide Injection into Shallow Sedimentary Aquifer Systems to Assess Potential  
Degradation of Groundwater Quality at Geological Carbon Sequestration Sites  
Technical Progress Report

**July 31, 2010**

**Prepared by:** Jean Philippe Nicot, Changbing Yang, and Bridget Scanlon,

**Summary of Activities Performed During this Period: May 1, 2010 – July 31, 2010**

**Task 1: Laboratory Batch Experiments**

Sediment samples were collected from the field test site in Cranfield Mississippi to conduct the laboratory batch experiments. Sediment samples were collected at all depths in the borehole; however, the tests will be conducted on samples from the saturated zone at 180 – 220 ft depths. The laboratory batch experiments are currently being set up.

Preliminary XRD analyses were conducted to qualitatively estimate the mineralogy. More detailed analyses will be conducted in the near future.

**Task 2: Modeling Design of Field Push-Pull Tests**

Data sets are being compiled to conduct the modeling analyses for designing the push pull tests. The CORE2D code will be used. Aquifer permeability, injection amount and rate, mineralogy, and preliminary estimates of mineral dissolution rate constants will be used in initial simulations. Baseline groundwater chemistry data are being compiled from the monitoring well network at the Cranfield site.

**Task 3. Conduction of Push-Pull Tests in the Field**

Although we are not ready to conduct push pull tests at Cranfield for this project, we have been conducting push pull tests in another project related to downhole treatment of arsenic contamination in the Gulf Coast and High Plains aquifers. Wells were drilled in the Gulf Coast that will be used for this study also. Dr. Katherine Romanak visited Dr. Juergen Matter at Columbia University to evaluate the system they used to saturate water with CO<sub>2</sub> and inject it into the aquifer. Although their system was designed for deep injection, we can learn from their experiments and transfer technology to our study.

**Task 4. Modeling of Field Experiments**

This task can only be conducted after the field experiments have been performed.

**Task 5. Communication**

Once we develop preliminary results we will post them on the web site.