

Small-Scale Field Test Demonstrating CO₂ Sequestration in Arbuckle Saline Aquifer and by CO₂-EOR at Wellington Field, Sumner County, Kansas

Award Number: DE-FE0006821

Project Summary:

The project aimed to conduct a stacked reservoir injection pilot study to further evaluate the feasibility and efficacy of long-term carbon dioxide (CO₂) storage in saline reservoirs and the use of CO₂ in enhanced oil recovery (EOR) operations in the mid-continent. The stacked pilot study was planned to inject up to 70,000 metric tons of CO₂ into multiple formations. State-of-the-art monitoring, verification, and accounting (MVA) tools and techniques were used to monitor and visualize the injected CO₂ plume and establish best practice methodologies for MVA.

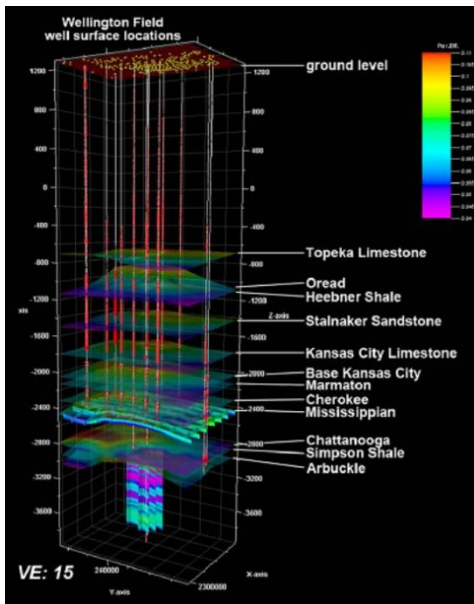


Figure 1: 3D model of Wellington Field extended from the Precambrian basement to surface.

Prime Performer:

University of Kansas Center for Research

Principal Investigator:

Yevhen Holubnyak

Project Duration:

10/1/2011 – 9/30/2017

Performer Location:

Lawrence, Kansas

Field Sites:

Wellington Field, Kansas

Program:

Carbon Storage

Project Outcomes:

The CO₂-EOR and geologic storage in Mississippian carbonate reservoirs was successfully deployed. Approximately 20,000 metric tons of CO₂ was injected in the upper part of the Mississippian reservoir to verify CO₂-EOR viability in carbonate reservoirs. CO₂-EOR progression was monitored weekly with fluid level, temperature, and production recording and formation fluid composition sampling. As a result of this pilot CO₂ injection, the observed incremental average oil production increase was approximately 68 percent with only approximately 18 percent of injected CO₂ produced back. Simple but robust monitoring technologies proved to be very efficient in detecting and locating CO₂. This case study proves that CO₂-EOR could be successfully applied in Kansas carbonate reservoirs if CO₂ sources and associated infrastructure are available. The incremental EOR oil production cost were determined to be \$60 per barrel.

Presentations, Papers, and Publications

Final Report: [Small Scale Field Test Demonstrating CO₂ Sequestration in Arbuckle Saline Aquifer and by CO₂-EOR at Wellington Field, Sumner County, Kansas](#) (December 2017) Yevhen Holubnyak, Lynn Watney, Jennifer Hollenbach, Tiraz Birdie, Mina Fazelalavi, Tandis Bidgoli, Drew Schwab, Alex Nolte, George Tsoflias, John Victorine, Brandon Graham, John Doveton, Jason Bruns, Brett Blazer, Dana Wreath