

## **Integrated Rock Physics Studies and 3D Seismic Surveys to Evaluate CO<sub>2</sub> Sequestration in the Sacroc Field, Texas**

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The SACROC field is located in Scurry County, Texas and lies on the northeastern edge of the Permian Basin. It is the seventh largest onshore oil field in North America containing approximately 2.73 Billion Bbls of original oil in place. The main producing units are the Pennsylvanian aged Cisco and Canyon Formations. These are highly heterogeneous reef complexes that contain massive amounts of bedded bioclastic limestone and thin intercalated shale beds. The average porosity is 7.1% with a permeability of approximately 31 mD. The depth to this reef complex is approximately 2040 meters. These units are a part of the larger carbonate platform called the Horseshoe Atoll. The site is the oldest CO<sub>2</sub> enhanced oil recovery site in the United States with over 140 million metric tons of CO<sub>2</sub> injected since 1972. Recently, the National Energy Technology Laboratory of the United States Department of Energy has funded a combined carbon sequestration and enhanced oil recovery project at the site. In the first phase of the study, laboratory measurements of reservoir properties were collected at varying reservoir conditions. These measurements were then used to model the anticipated seismic response of the reservoir, which was then compared to 3D seismic data collected before a CO<sub>2</sub> flood. In the final phase of the study, successive surveys will be used to map CO<sub>2</sub> migration and assess the integrity of the overlying caprock, which are marine shale units of the Permian aged Wolfcamp Formation.