ROSE RUN STRUCTURE AND ISOPACH MAP OF OHIO AND KENTUCKY

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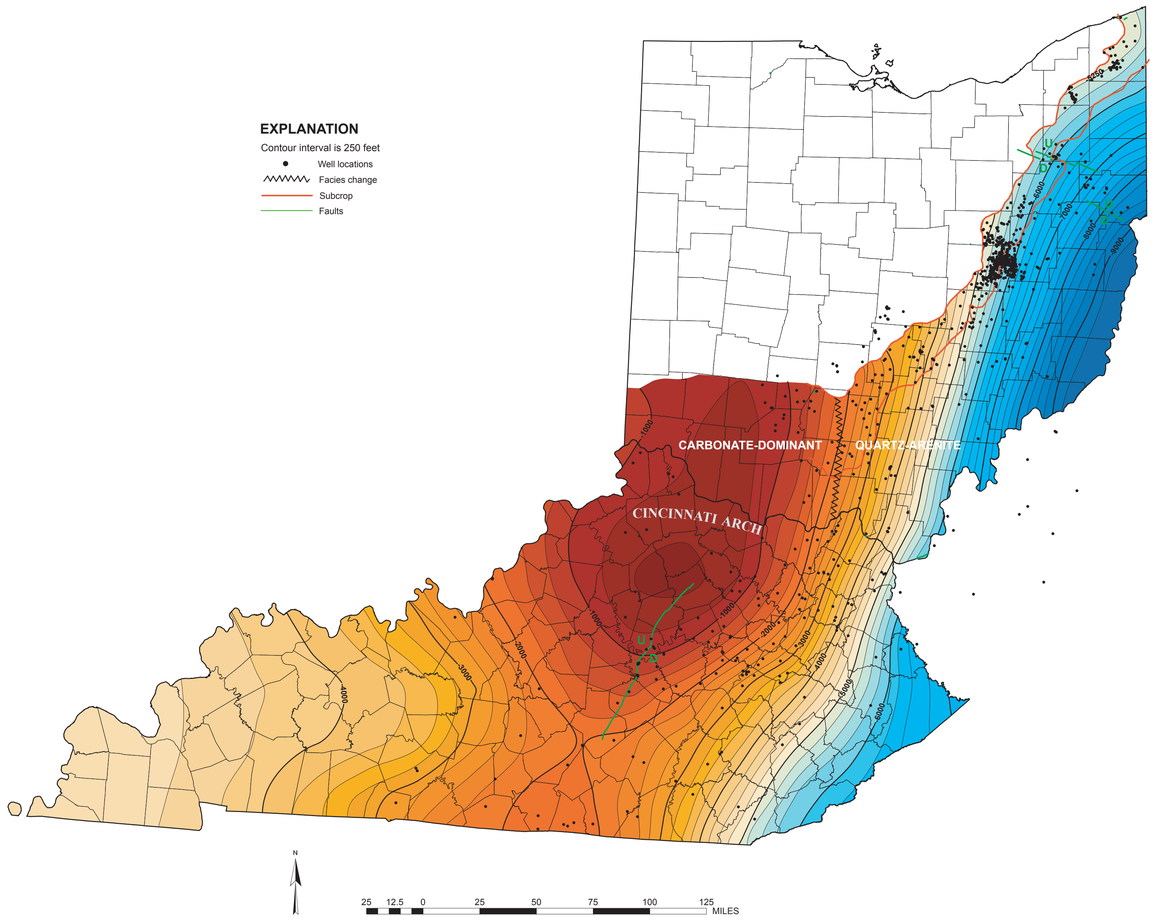
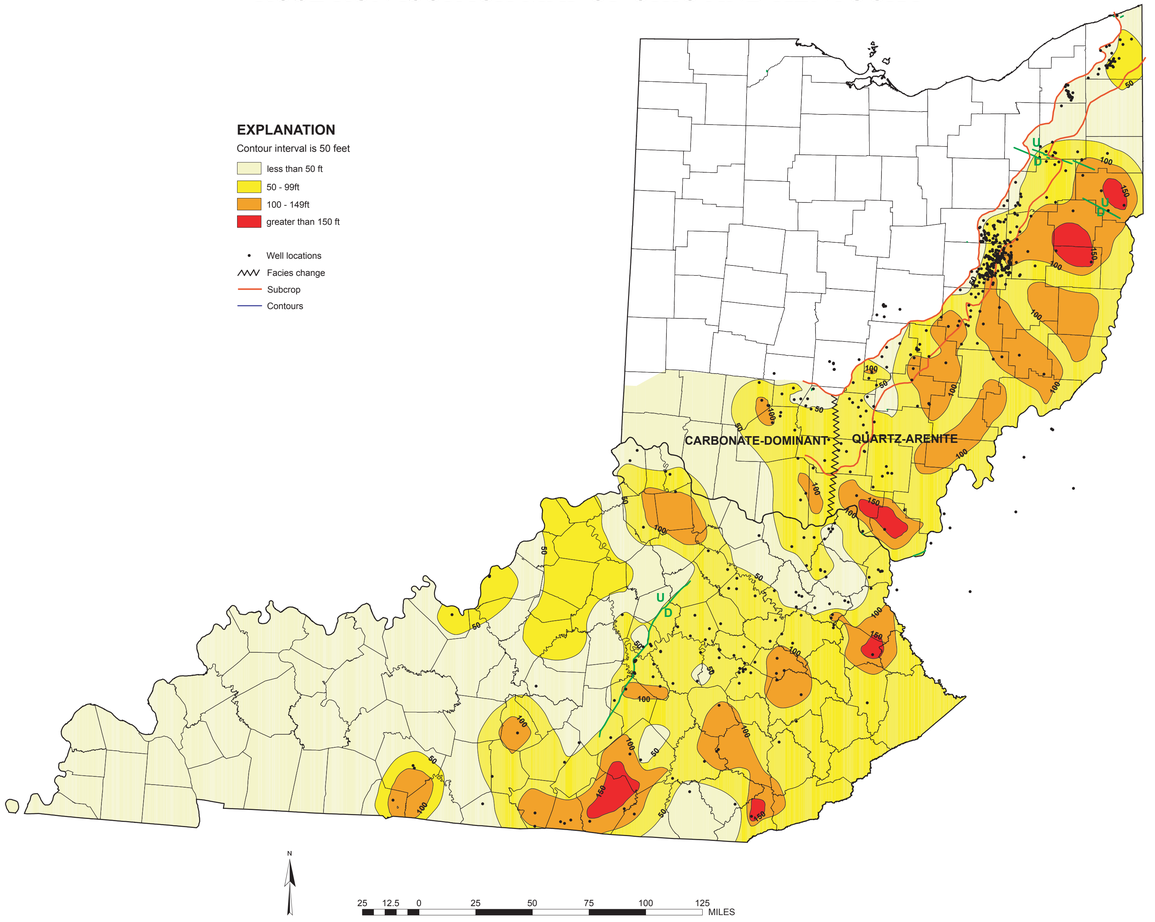


ROSE RUN ISOPACH MAP OF OHIO AND KENTUCKY



Structure and Isopach Mapping of the Cambrian-Ordovician Rose Run Sandstone in Ohio and Kentucky--Basic Tools for Characterization of Hydrocarbon Reservoirs for CO_2 Sequestration

The Rose Run sandstone, a unit of the Knox Dolomite, is laterally persistent throughout the mapped area, except where it terminates along the northeast-southwest trending subcrop. This subcrop trend developed from the westward truncation of Knox units along the regional Knox unconformity. A facies change occurs where the quartz arenite-dominated Rose Run changes to a carbonate-dominated unit in southern Ohio on the west flank of the Waverly Arch. The quartz arenite-dominated Rose Run, stratigraphically below the Beekmantown dolomite, also extends southward into Kentucky.

Deposition of the Knox interval occurred on a broad platform of low relief that was subjected to periodic sea level changes, which resulted in a mixed siliciclastic-carbonate sequence. Lithologically, the Rose Run interval consists of a stacked sequence of up to five sandstone units interbedded with thin, low-permeability dolomite and carbonaceous shale. In the mapped area, the subsea depth to the Rose Run interval ranges from -500 to -9,250 feet. The gross thickness typically ranges from 50 to 150 feet and averages 100 feet.

In the absence of open fractures or faults, an effective confinement zone is present above the Rose Run sandstone for CO_2 sequestration. The immediate confining units for the Rose Run sandstone consist of the overlying Ordovician Beekmantown dolomite, the Wells Creek Formation, the Black River Group and the Trenton/Lexington Limestone. In Ohio, these units can attain a total thickness up to 1,500 feet, depending on the location in the Appalachian basin and proximity to the subcrop. Between the top of the immediate confining units (Trenton/Lexington Limestone) and the base of the lowermost Underground Source of Drinking Water (Mississippian-Pennsylvanian), these overlying rocks have an additional thickness up to 4,000 feet.

The Rose Run is an excellent candidate for CO_2 sequestration based upon its reservoir characteristics. These include high porosities (average 9 percent) and permeabilities (average 5 md) (Baranoski and others, 1996), adequate thickness, lateral continuity over regional areas, and its occurrence at depth with thousands of feet of overlying sequences of carbonates, shales, and sandstones. These good reservoir qualities have made this interval an important hydrocarbon-producing unit in eastern and central Ohio, and one of the most active exploratory plays in the Appalachian basin. Thus, Rose Run oil and gas fields also have potential for value-added sequestration through CO_2 injection.

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Midcontinent Interactive Digital Carbon Atlas and Relational dataBase