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Is There Space Inside Solid Rock?

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Is There Space Inside Solid Rock?



Stephen F. Greb, David C. Harris, and J. Richard Bowersox

Porosity

Although rocks are solid, some contain microscopic holes called *pores*. Pores are tiny open spaces between the mineral grains and natural cements that make up a rock. As much as 30 percent of a rock's volume can be open pore space (even if it looks solid).

Permeability

If pores spaces in a rock are connected, then the rock is *permeable*. The degree to which gases and fluids can travel through a rock are a measure of its permeability.

Reservoirs

Beneath the surface, porous and permeable rock layers can form natural reservoirs, which may contain fresh groundwater, salt water (brine), oil, or natural gas within the tiny pores and cracks in the rock.

Seals and Confining Intervals

Fluids and gases stay trapped in reservoir rocks if they are overlain by rocks lacking permeability, called *impermeable* rocks.

Every year, thousands of wells are drilled into underground reservoirs in search of water, oil, and natural gas. The gases and fluids are trapped inside of tiny pores and cracks in the reservoir rock.

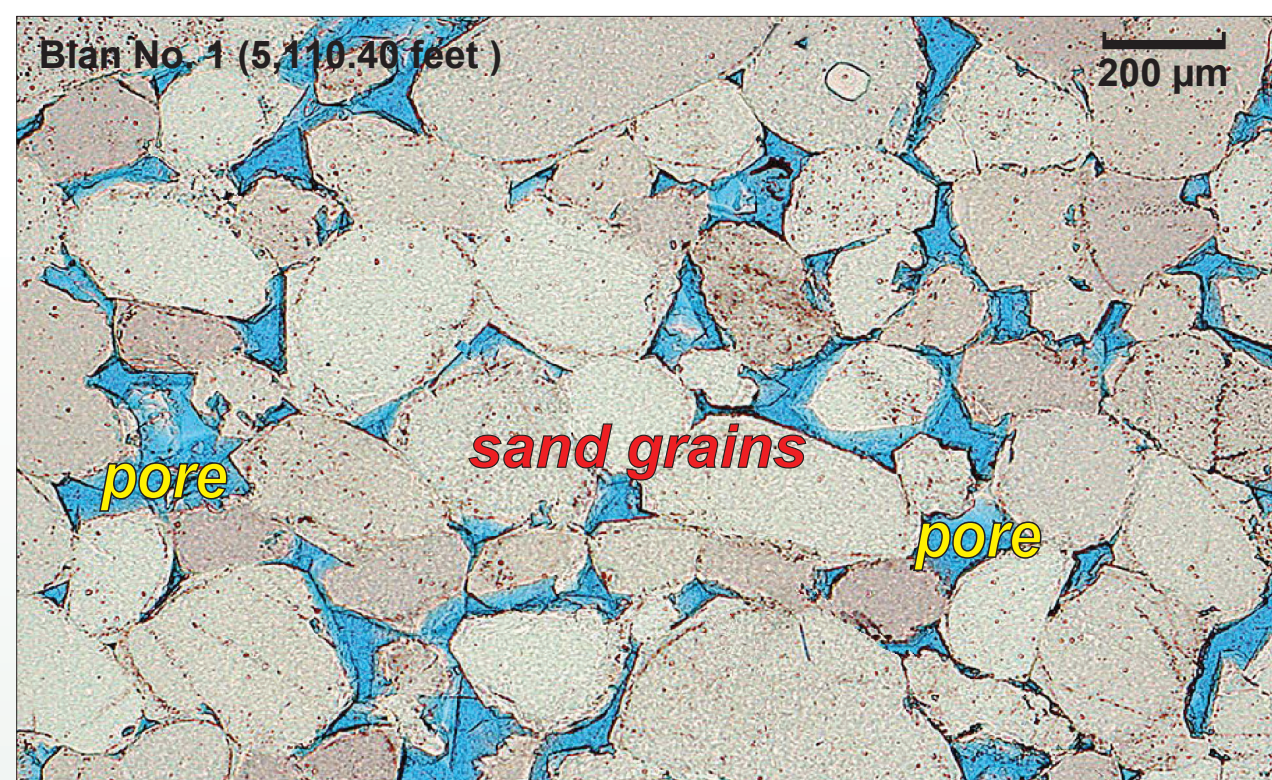
Drilling is regulated and monitored to ensure safety and protect the environment, especially underground drinking water.



Microscopic Views



This microscopic view of a sandstone shows the light colored sand (mineral) grains that make up the rock. Natural cements (darker colors) occur between grains. There are no spaces or pores between the grains. This rock has low porosity and permeability.



This microscopic view of a sandstone shows pores (stained blue) between the sand grains that make up the rock. Some of the pores are connected, which means the rock is permeable.

If fluids and gases can be safely removed from underground reservoirs, then we should also be able to safely store manmade gases such as carbon dioxide (CO₂) in those reservoirs.

Injecting manmade CO₂ into deep underground reservoirs with demonstrated seals or confining intervals may be one way to curb greenhouse gas emissions.