



NORTH DAKOTA  
CarbonSAFE

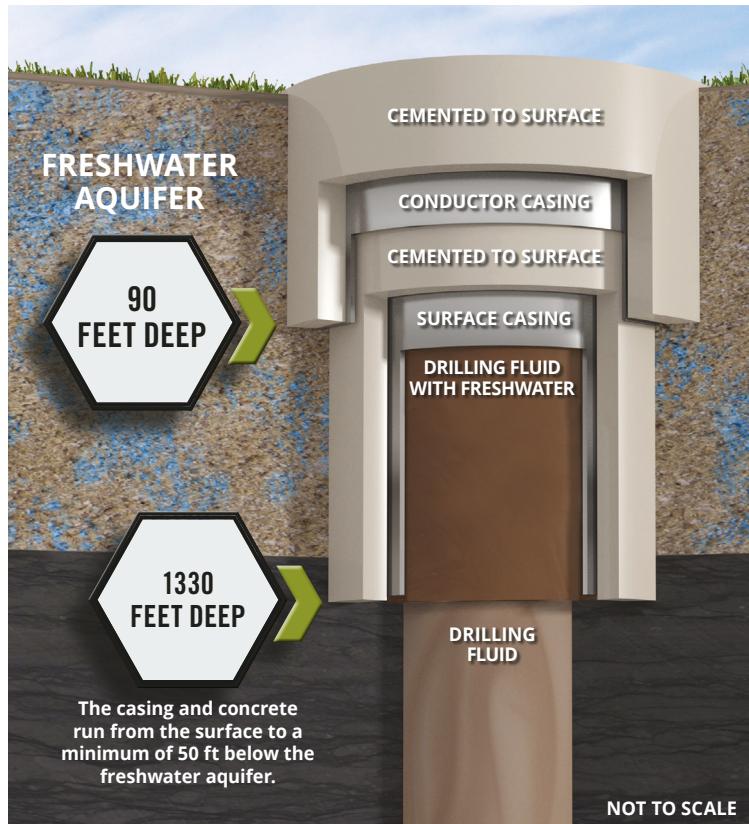
INVESTIGATING SAFE, PERMANENT GEOLOGIC STORAGE OF CO<sub>2</sub> IN NORTH DAKOTA

# ACTIVITY FAQS

## Geologic Study in Central North Dakota

### What Is Happening?

As part of the North Dakota CarbonSAFE project, rock cores and geologic data will be collected from an exploratory hole at Milton R. Young Power Station near Center, North Dakota, in September 2020.



As required under the permit, groundwater resources are protected by layers of steel casing and concrete.



North Dakota CarbonSAFE is focused on the assessment of geologic storage near Young Station and developing the information necessary for permitting.

### What Is Involved?

Drilling, sampling, and data collection will follow the same procedures as the holes drilled to assess oil, coal, and water resources in North Dakota.

**Obtain Permits** – Drilling the exploratory hole requires a permit from the North Dakota Industrial Commission (NDIC) Oil & Gas Division and a temporary use permit from Oliver County. The permits focus on groundwater protection. Permits for the drilling were granted in August 2020.

**Prepare Drill Site** – Pad preparation entails leveling and laying aggregate on a 400- × 400-ft area to make a flat, stable work area for drilling equipment. The pad was prepared in July.

**Drill the Hole** – Drilling takes place in four stages. Stage 1 involves digging a hole 90 ft deep, which is lined with steel pipe (conductor casing in the figure). Stage 2 involves drilling a 13½-in.-diameter hole to about 80 feet below the bottom of the freshwater zone. The hole is fitted with steel pipe (surface casing) to protect drinking water. Stage 3 continues drilling to a depth of nearly 4000 ft (just above the potential zone for storage and its overlying shale seal). In Stage 4, the coring stage, multiple cylinders of rock (called cores) are cut using a special hollowed-out drill bit. Stages 3 and 4 are repeated for the second and third target zones, yielding a total of about 1300 feet of core.

### What Are the Benefits of Drilling a Test Hole?

Information collected from this research activity will be added to existing data to help scientists assess whether the deep rock formations underlying Oliver County could safely and permanently store CO<sub>2</sub> from Young Station and to develop information necessary for permitting.



Specialized equipment travels the hole from bottom to top to collect data about the rock layers, their fluids, and their pressures in a technique called wireline logging.



Rock core cut from about 1 mile below the surface.

► Multiple cylindrical rock samples called cores will be retrieved from three sections of the hole using a specialized coring drill bit.



## Why Permanently Store CO<sub>2</sub>?

Permanent geologic storage of CO<sub>2</sub> captured from industrial processes will allow us to continue to have reliable, affordable energy while addressing environmental concerns. CCS is best suited for large stationary facilities such as coal-fired power plants, cement plants, oil and gas refineries, and agricultural processing plants.

**North Dakota CarbonSAFE** is assessing safe, permanent, geologic storage of carbon dioxide. Led by the Energy & Environmental Research Center at the University of North Dakota, partners include the U.S. Department of Energy National Energy Technology Laboratory and Minnkota Power Cooperative.

### For More Information:

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### Learn More at:

<https://undeerc.org/NDCarbonSafe> and [www.ProjectTundraND.com](http://www.ProjectTundraND.com)

**Gather Downhole Data** – After the core samples are removed, a truck with specialized instruments will run sensors into the hole, a technique called wireline logging. This standard industry practice collects data about the rock layers, their fluids, and their pressures.

**Plug the Hole** – After data collection, the test hole will be plugged with concrete and the surface casing cut off 4 ft below ground level.

## What Happens Next?

The rock cores and wireline logging data will be analyzed and the data added to a computer model of the subsurface. Geologists will use those results to determine how the CO<sub>2</sub> will move into the rock layers and to provide information needed for the CO<sub>2</sub> storage permitting process.



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