

Companies eye gas from coal

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After some 35 years of the most massive coal mining anywhere in the world, there remains 400 to 500 years worth of supply in the Powder River Basin in Wyoming and Montana, according to the Bureau of Land Management.

Draglines and shovels might be able to expose less than 10 percent of the massive black rock that lies wedged under northeast Wyoming, dipping toward the base of the Big Horns and exposed close to the surface 100 miles east.

Some experts estimate that within 12 years, half of the Powder River Basin's annual production could come from coal seams deeper than 500 feet. But just how deep the industry can use conventional surface mining methods depends on the future price of coal and developing technologies.

On Monday, a Casper-based company announced a partnership with British Petroleum to test whether the geological and economic conditions exist to step beyond conventional mining and use a recovery method that relies on drill bits instead of shovels. The companies plan to develop underground, or in-situ, coal gasification technology in the Powder River Basin.

"The point is that of all the coal resources in the world, only 5 percent are available for conventional surface mining," said John Wold, chairman and CEO of GasTech Inc. "So we're interested in coals that are deeper than 500 feet down to about 2,300 feet."

Underground coal gasification involves the injection of air or oxygen into a coal seam, stimulating a reaction to produce various gases, which are brought to surface for power generation or used as feedstock for the production of liquid hydrocarbons and other products.

Coal gasification is the same process pushed to the forefront of the global discussion about how to use coal in ways that don't emit carbon dioxide into the atmosphere -- one of the key factors in global warming, according to the world's top scientists. In the coal gasification process, gases can be isolated, therefore presenting an opportunity to isolate CO₂ for underground storage, or sequestration.

GasTech holds leases to about 13 billion tons of state-owned coal spanning 125 sections in the basin. Each section encompasses about 100 million tons of coal -- enough to support a commercial-scale gasification project.

"We thought about this project two or three years ago, and it took some time to bring in a partner, so we're really pleased to have BP join us," said GasTech President Stephen Morzenti.

Preliminary work is under way to analyze the feasibility of a pilot project in the basin. Commercial-scale development could follow, based on the success of a pilot.

Morzenti and GasTech Chairman and CEO John Wold both have extensive experience in oil and gas, as well as in in-situ uranium production.

Much like in-situ uranium mining, underground coal gasification is largely a matter of manipulating and monitoring the underground water reservoir. Morzenti said the oxygen stimulation occurs under the water table in the coal, so there's little chance of igniting an underground coal seam fire.

Some Powder River Basin coal seams are 100 feet thick, so engineers would likely gasify coal in a "room-and-pillar" manner to avoid significant ground subsidence.

"If you keep your extraction to 65 percent, then 35 percent is pillars, and you can control (subsidence)," Morzenti said.

Underground coal gasification was pursued in the Powder River Basin in the late 1970s, and near Hanna and Rawlins,

according to the Wyoming State Geological Survey.

"It is feasible -- it's just a question of economics. If it can be shown economic and within environmental stipulation, it certainly can be done," said Nick Jones, Geological Survey coal specialist.

Today's energy economy is driving renewed interest in underground coal gasification, particularly in Australia, according to local energy officials.

"One of the advantages of (underground coal gasification) is economics. You don't have to mine the coal. You can target deep, unminable reserves," said Vijay Sethi, vice president of Western Research Institute in Laramie.

Wold said gasifying Wyoming's deep coal deposits is simply an extension of the state's existing coal industry, and wouldn't compete with current surface mining. But even mine officials say they face an engineering challenge as the industry leases coal deeper than 500 feet below the surface.

Because of the basin's discontinuous layers of sand and clay that lies over the coal, and because the coal seam can be more than 100 feet thick in areas, there's little opportunity for underground mining in some parts of the basin.

Wold said underground coal gasification targets reserves believed to be otherwise "unminable."

So far, no decision has been made about where in the Powder River Basin BP and GasTech might pursue a pilot project. Wold said if the coal gas is used for electrical generation, they may consider locations where power lines are available. If the gases are going to be used for liquefaction, they may favor areas where pipelines might be available.

Morzenti said a siting decision could be made within the next few months.

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