



Coal mining: Perspective on Room and Pillar

PART IV

Editor's Note: Chris Harbourt is a rural Sidell resident who is writing a series for the Sidell Reporter on the proposed coal mine. Over the next few weeks he will take a look at who Sunrise Coal company is, how their plans will impact the local townships short term and long term, and the positives and negatives about coal mining.

Underground Operations

**By Chris Harbourt, Ph.D.
For The Sidell Reporter**

There has been much speculation in local meetings and news articles over the last few weeks

about exactly what kind of mine Sunrise Coal of Terre Haute, Ind., would be bringing to this area.

There have been conflicting reports about what the operation will do to the farmland. Can people of the Sidell, Allerton, and Homer areas look forward to their farmland sinking, their livelihoods potentially ruined if mining is allowed to proceed? What would a mine in this area look like both underground and aboveground? This article will examine both of these questions by focusing on the type of mine Sunrise would build in this area: the room and pillar mine. This article will focus on the underground operations of a room and pillar mine, saving the aboveground features for a future article.

To put the first question to rest, Sunrise Coal has already stated they will “submit a zero subsidence permit application.” To translate, “subsidence” is the geological term for sinking or shifts downward, perhaps forming a sinkhole or bathtub feature on the land surface. A zero subsidence permit, which is what Sunrise is pursuing, would mean that the mine they propose would have to be designed to ensure that all reasonable measures are taken to prevent any collapse, subsidence or sinking of the surface.

The approach that has been discussed in town meetings, an opposite plan to the Sunrise Coal approach, would be a planned subsidence mine, such as a “long-wall” or a pillar-collapsing retreat mine. From the coal industry’s perspective these controlled subsidence methods are the best way to grab the maximum amount of coal. However, the results from these types of mines are instant damage to the land and permanent destruction of the agricultural potential. Because our farmer landowners would never approve such an intentionally destructive practice to prime farmland, Sunrise will instead pursue a compromise with the room and pillar mine design.

In room and pillar mining, the goal is



Photo provided by Sunrise Coal

A continuous mining machine operating in the Sunrise Coal Carlisle Mine removes coal from a face as it moves into a new room leaving behind pillars. Bolting machines follow shortly after to shore up the mine roof and the process repeats for 16 hours a day.

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to preserve the surface uses of the land by leaving 50 to 55 percent of the coal in place for support. The exact percentages and design of the mine depends on the integrity of the material above the mine, as determined by geologists. Room and pillar mining is site specific and subject to local problems in the coal seam and geology.

If subsidence looks to be a problem from tests, it may not be profitable for the mining company to mine, or it may be too dangerous to mine and not worth the risk. Mining is a business, if it does not make sense or is unreasonably risky they will move on to other coal reserves. Causing subsidence is expensive for the coal company to repair and the landowners have to deal with the loss. Neither the landowners, residents, nor the mining companies desire it. In the case of subsidence no one wins. A zero subsidence plan requires the ground to remain intact and farmable.

One way to get a sense of what a room and pillar mine in our area will look like is to examine a similar mine currently in operation. Sunrise Coal's

Carlisle Mine in Indiana is of similar type and scale to what Sunrise is looking to build in this area. In special cases, Sunrise does grant tours of its operation by arrangement and granted a tour of their Carlisle mine to this reporter on Aug. 27. They allow access to both the surface and underground mine operations.

Rather than being a stereotypical secretive coal company, Sunrise takes time to educate people on modern coal mining. A tour of their facilities reveals them to be a lean business running a busy mine while exploring a major growth decision to expand their operations into Illinois.

Everyone who tours the Carlisle mine sits for a safety training seminar before receiving protective gear and loading into a squat four-foot tall, bus-like vehicle that takes visitors or miners down into the mine. The entrance to the mine is a 16 percent grade tunnel about 2000 feet long. At the bottom of the slope, the tour proceeds down a four-mile corridor through the rooms of the previously mined-out area. A room and pillar mine is also sometimes called a bord and pillar mine, "bord" being an

old-fashioned word for "tunnel," and this gives a better mental image of what the mine looks like.

The pillars in question are not the spindly columns that hold up the average porch roof. Rather, the pillars are 40 foot square giants separated by 20 foot-wide rectangular tunnels. The passageways are narrow and just tall enough for a person to stand. Being in it, the mine seems to be more pillar than room. Although it appears they have hardly removed any of the coal at all, 50% of the total coal that was once in the now empty rooms has been hauled away.

The plot at right shows the basic layout of the Carlisle mine room and pillar design. The precise arrangement and structure of the pillars is calibrated to the material above the coal and is optimized to prevent subsidence, with larger pillars often flanking a long room of smaller pillars.

At the cutting face, where the mine is operating in full swing, 20 ton electric shuttle cars zip around in the dark mine, driven by miners who make maneuvering 11 foot wide equipment carrying 15 tons of coal look effortless. The four-foot tall shuttle cars dump their load on a nearby conveyor that transports the coal to the surface. Continuous mining machines with large rotating cutters scrape coal off the face and pour it into the shuttle cars, filling one in just a few seconds.

A bolting crew follows the cutter. Their job is to drill thumb-size holes on a four-foot grid up into the mine roof. They then insert five-foot long bolts into the roof and secure them with fast-drying epoxy. This bolting process turns the rock above the mine into something like a pre-stressed concrete beam that might be used to hold up a highway overpass. Doing this helps support the mine roof to keep the miners safe as operations continue further into the mine.

Within the Carlisle mine, there are

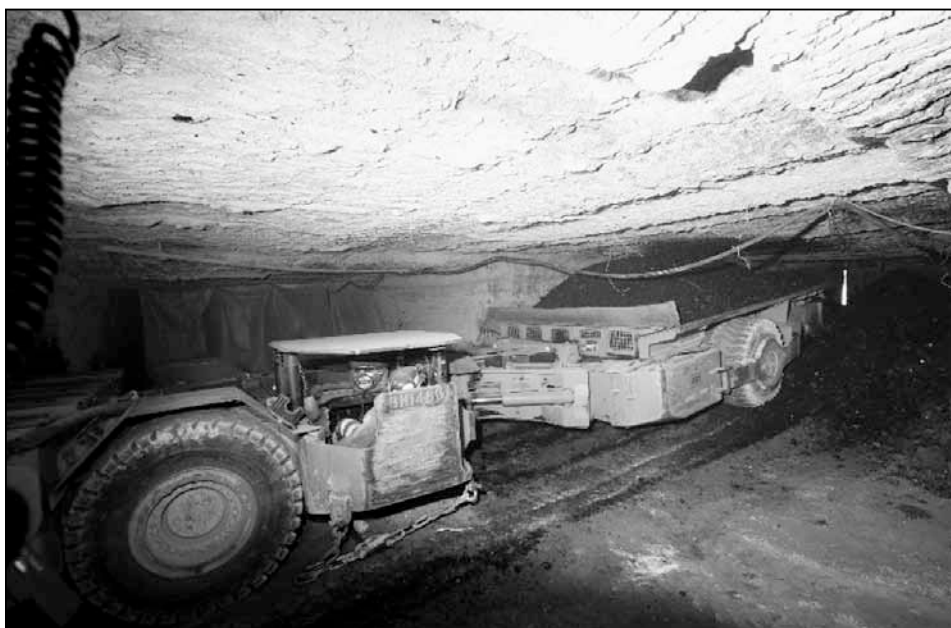


Photo provided by Sunrise Coal

Custom underground mining vehicles like this shuttle car operate in the Carlisle Mine, delivering 15 ton loads of coal from the cutting equipment at the cutting face to a conveyor belt which moves the coal to the surface.

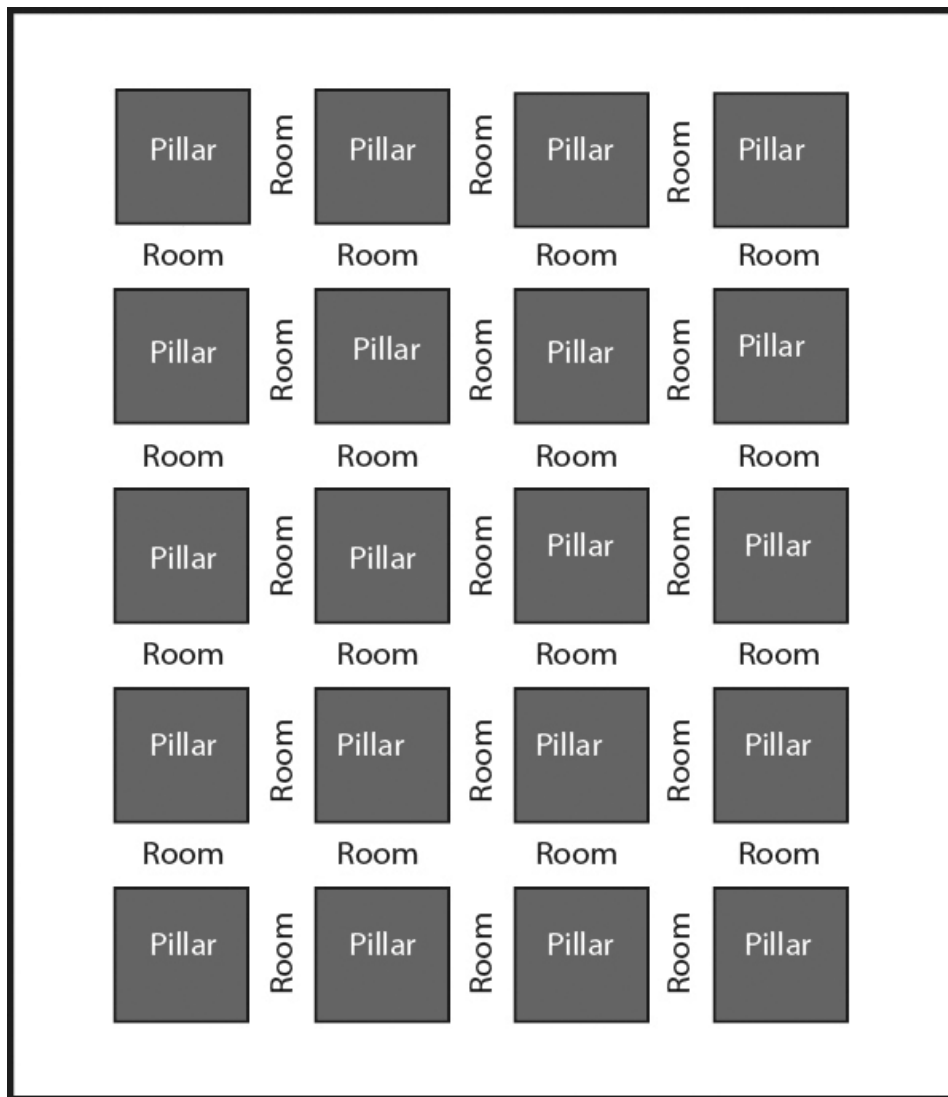
four of these cutting and loading operations, called “mining units.” They operate in two shifts, with the third shift devoted solely to maintenance and spreading limestone rock dust. They use the limestone rock dust to coat the mined-out areas, sealing off gasses and stabilizing the surfaces for mine safety.

Most amazing is how clean and quiet the mine is. The machinery does not make a deafening roar, no noticeable groundwater leaks in from above, the floors are kept dry and clear, the air is clear of the clouds of choking dust that coal mines always feature in movies and television shows, and nowhere can be found that spooky feeling, as though the Earth is waiting to swallow everything in an instant.

Instead, the mine is a vast, clean industrial area, with safety measures for the workers, a relatively quiet working environment, dry floor, no leaks, battery powered mining cutters and cars, and very little to no dust, all operated by professionals who seemed comfortable in the mine environment.

The second part of this article will examine the room and pillar mining operation looking at the surface activities of this type of mine and will examine what you can expect to see at the mine access point, how the miners will store waste material, and how they will handle transportation of coal to electric power customers.

Future articles will look deeper into long-term safety concerns posed by the room and pillar mine and will feature information from geologists knowledgeable in both the immediate and long-term effects of this type of mine. These experts will be able to elaborate on Sunrise Coal’s claims of long-term stability and talk about what future landowners of this area may face if the room and pillar mine proceeds.



Room and pillar mining diagram drawn to scale. In central Illinois and Indiana these rooms are typically 20 feet wide with pillars 40 feet square. Dimensions vary slightly depending on local conditions in the rock immediately above the mine and the coal strength in the pillars. cutting equipment at the cutting face to a conveyor belt which moves the coal to the surface.