

## Coal slurry research may help West Virginia community

*by Caleb Fleming, CT news editor*

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Virginia Tech scientists have developed a technology that removes water from coal slurry ponds, lowering the amount of toxic waste potentially seeping into the water table and poisoning wells. Mining and mineral engineering professor Roe-Hoan Yoon has been researching technologies relating to slurry for 30 years, beginning when he first came to Tech.

Yoon's latest advancement is the most complete and includes microcell technology and the use of a hyperbaric centrifuge. The design combines air pressure and centrifugal force to lower the level of moisture found in fine coal.

"In fine coal slurry there are three components," Yoon said. "One, of course, is water, one is coal and the other is ash. Coal is what you want, so you have to remove the ash, which we do with microcell. Then we remove water using the centrifuge we have just publicized, and what is left is coal that you can sell."

Yoon added that without these two technologies, coal slurry has to be disposed of in alternative methods, potentially contaminating the environment.

"The way they dispose of this slurry is by making a big pond, like the Duck Pond here, and throwing the coal into it. Then the pond sometimes overflows when there is heavy rain, and it goes to the river and somebody's backyard."

The design patented by Yoon and his team has been licensed to Decantor Machine Company in Tennessee, and it has been employed in several different locations.

The research directed by Yoon could have vast benefits in some West Virginia communities where toxic wastewater may have poisoned the water table, causing kidney failure, cancer and gallbladder disease.

Slurry is often legally injected in worked-out coalmines in close proximity to residential areas, causing potentially adverse health effects.

In Prenter Hollow, a community in Boone County WV, resident Patty Sebock said that 98 percent of the area's inhabitants no longer have gallbladders because of disease that she believes is caused by high metal content in well water.

Sebock's husband -- who had worked in coalmines -- has severe kidney problems, and has not made it back to the job in nearly four years. Her 21-year-old son battled dental disease as a toddler because the home's water would strip enamel from his teeth and cause immediate rotting.

"I knew when I moved here that my water had iron in it, but I had no idea what else," Sebock said. "Around here it's called hard water. When we did some sample testing, which we couldn't test for heavy metals because it's so expensive, it had manganese. Manganese takes enamel off your teeth."

And in the last three months Sebock said that the Hollow has lost two more members, this time from the same family.

“A woman started out with having her gallbladder removed, and later they found out she had cancer spread throughout her body,” Sebock said. “Within a month and a half, her father died (from cancer). It’s just constant -- every day people are running to the doctor and being diagnosed with cancer.”

Trisha Feeney, an employee with the Sludge Safety Project in West Virginia, said that there are two lawsuits underway right now regarding water contamination from coal.

“Neither has gone to trial,” Feeney said. “The burden of proof has been put on two of the poorest counties in the country to show whether the process (of deposition) is contaminating the water.”

Sebock added that the motive behind a lawsuit filed by her community is the high cost of testing water for metals.

“Lawyers told us that when they got the tests back the chemicals were well above a toxic level for safe consumption and that they contained arsenic and lead,” Sebock said. “They did a small sampling, not everyone’s well, but when you live in a close area the water table is mostly the same. Your kidneys can only handle so much of this toxic stuff before your body starts to store it in different places.”

Feeney said that a study done in 1985 in eastern Kentucky concluded that it is impossible to determine where slurry moves underground, but that it is more likely to come out where people are drawing water.

“We have found correlation of toxins such as heavy metals in drinking wells near where slurry was injected underground,” Feeney said.

But while Sebock agreed and was convinced that contaminants in the community water supply was to blame for the health concerns in Prenter Hollow, there is still no concrete evidence to confirm her suspicions.

Jason Bostic, Vice President of the West Virginia Coal Association, highlighted the legality of the coal company’s practices. Bostic added that the association has heard allegations, not complaints, of site-specific coal slurry migration into domestic well water.

“Those allegations have been investigated by numerous agencies, and no link was found between coal slurry injection, active mining and water well contamination,” Bostic said.

Bostic noted that coal mining might not be the only hazardous extraction method occurring in the Appalachian communities that allege malpractice by the industry.

“There is construction, as well as oil and gas-well drilling adjacent to coal mining,” Bostic said. “It’s possible that the wells were not great quality when they were drilled, and they may have drilled into aquifers, or other undisturbed coal seams. They would see impacts from the coal in your water. The wells may also have degraded over time.”

And while the coal association denies that they may be responsible for instances similar to that in Prenter Hollow, Sebock refuses to accept the lack of accountability.

“The way I see it, the coal company puts the expense on the communities and state and people instead of taking responsibility for what is theirs,” Sebock said. “As a property owner, if something of theirs leaks and destroys things, why aren’t they responsible?”

New technologies may not be in time to make a difference in Prenter Hollow, but still could help make strides for an industry that is often viewed in a negative light.

Yoon's system reduces the total water content in coal slurry to less than 20 percent and would help clean the environment while simultaneously harnessing the energy of coal ridden with moisture.

Yoon now plans to study methane found underwater.

"We want to study the ways that we can recover methane gas from the ocean floor," Yoon said. "There is a lot of methane in the form of hydrate, frozen in ice, and we want to find a way to recover it."

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