

PQ: *...many drilling companies are sending their wastewater to treatment facilities that handle industrial wastes.*

CAPTION:

SPDES application for the Mallula Well contains water tests, maps, and correspondence with the EPA. (photo by Sue Heavenrich)

Disposal Wells Raise Questions about Environmental Health

by Sue Smith-Heavenrich

Sometime in the next few weeks, Fortuna will inject thousands of gallons of Trenton Black River brine water into the Mallula Well in Van Etten for a 48-hour injectivity test. The results of that test will give engineers an indication of whether the Mallula Well is suited to serve as an injection well. If so, residents along Rumsey Hill Road may see an increase in truck traffic bringing wastewater from Trenton Black River and Marcellus gas wells for disposal.

Last week's article, "Injectivity Testing to Happen at Mallula Well" outlined the process that Fortuna Energy Inc. will undertake during the injectivity test. Both the US Environmental Protection Agency (EPA) and NY Department of Environmental Conservation (DEC) require permits for well testing and underground injection.

Disposal of wastewater produced in drilling gas wells is not trivial. At this time, many drilling companies are sending their wastewater to treatment facilities that handle industrial wastes. But the lack of facilities in our region, and the distance to haul the waste, make this option increasingly expensive. In areas where there are no treatment facilities, a cheaper alternative could be using old wells, depleted of gas, as injection wells.

The EPA regulates injection/disposal wells as "class II" wells under their Underground Injection Control (UIC) programs. "Most" of the injected fluid is salt water, EPA points out, brought to the surface during extraction of oil and gas. But, notes the EPA, the brine produced from gas wells can contain toxic metals and radioactive substances.

On their website, the EPA explains that this brine water "can be very damaging to the environment and public health if it is discharged to surface water or the land surface." Their solution to preventing surface contamination is to inject the brine into deep wells.

Residents Concerned About Potential Problems

The prospect of having a disposal well in their neighborhood has many residents concerned about environmental health. Even though the DEC and EPA each regulate different aspects of the injection (disposal) wells, some people are worried about the possibility of an accidental spill. Others question whether the regulations are protective enough of human health and the environment.

Fort Worth, Texas, perched atop the Barnett Shale play, has had a moratorium on disposal wells since 2006. There have been cases of salt water (brine) spills in Parker

County, home of Fort Worth, and incidents in which injected brine has bubbled out of the ground in neighboring Wise County.

Six counties to the east, near the Louisiana border, two injection wells were found to have contaminated the local drinking water. Water tests confirmed that residential water was contaminated with barium, toluene, benzene and other toxic chemicals.

An injection well in Repton, Alabama contaminated local water wells causing illness in many residents. Thomas McKenzie, who recently moved to this region, used to live down the road from the disposal well. He talked about his experiences in a telephone interview.

Shortly after moving into the house he experienced light-headedness, irregular heartbeats, uncontrollable weight gain, skin lesions, and had an elevated liver count. A few months later his sister, who lived down the road, became ill with similar symptoms, and a neighbor girl became very ill with liver disease. After a number of doctor visits, a neurologist suggested that exposure to chemicals might explain the symptoms.

McKenzie and his sister began following trucks and discovered the disposal well not far from his home. "The workers were wearing protective suits," McKenzie said. "We learned later that this was an injection well for brine from the gas wells, and that there was a spill at that well."

When McKenzie and his sister canvassed the neighborhood, driving the four-mile length of the road, they learned that many of their neighbors were suffering similar symptoms. But even after obtaining well water tests the residents could not get the state or the EPA to admit that there was a problem.

Environmental Health Expert Weighs In

Last month Dr. Theo Colborn, a world-renowned environmental health analyst, spoke via a remote link to an educational forum in Binghamton, NY, focused on health, land, law and natural gas. Colborn's research focuses on the gas exploration and extraction in western states. But, she pointed out, many of the chemicals used by companies drilling for gas in Colorado are similar to what is being used in the eastern US.

Drillers on the western slope of Colorado are using 215 or more products to drill the wells, fracture (frack) the rock, and process the gas. These products contain some 278 chemicals, Colborn explained. Of these chemicals, 93 percent are known to have adverse health effects – many are endocrine disruptors.

An endocrine disruptor is a man-made chemical that, when absorbed into the body, mimics hormones or blocks hormones disrupting the body's normal function. It may change the level of natural hormones or stop production of hormones altogether. By changing the way hormones travel through the body, endocrine disruptors affect the way that hormones control our health. Some of the problems that have been related to these synthetic chemicals include infertility, ADHD, autism, diabetes, thyroid disorders, and even childhood and adult cancers that have been found to be linked to fetal exposure to the chemicals.

Of the 124 soluble chemicals used in gas extraction, 88 percent of them cause damage to skin and sensory organs such as eyes, 75 percent are linked to respiratory damage, and 45 percent cause neurological damage. Others cause immune disorders, and are linked to diseases such as Lupus.

In addition to the chemicals used in fracking, the drilling process itself may produce a number of pollutants including heavy metals such as arsenic and mercury, and radioactive materials that come up in the brine water.

Disposing of Brine

One of the issues that DEC and gas companies must address is the lack of adequate local facilities that can handle the hazardous materials in both the produced (brine) water and the frack water that comes back out of the wells. While deep disposal wells offer one solution, injecting wastewater may not be the cheapest alternative.

According to David Burnett, a professor of petroleum engineering at Texas A & M, gas companies could save a lot of money by recycling their wastewater – sending it through something like a closed loop system – and reusing it to drill other wells. For Texas drillers it costs between \$0.85 - \$1.50/barrel to recycle the water compared to \$2 - \$3/barrel for transporting and disposal.