Subject:	EPA Comments
From:	Duane Marshall (mrdewy@yahoo.com)
To:	platt.steve@epa.gov;
Cc:	Platt.Steve@epamail.epa.gov;
Date:	Tuesday, September 10, 2013 2:48 PM

September 9, 2013

EPA Region III
Ground Water & Enforcement Branch (3WP22)
Office of Drinking Water & Source Water Protection
1650 Arch Street
Philadelphia, PA 19103

Dear EPA:

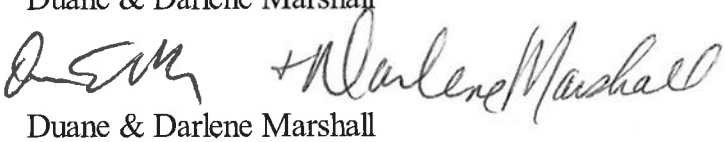
RE: PAS2D020BCLE - Brady Township, Clearfield County, PA

The original copies of our public comments have been mailed and should be delivered before September 11, 2013. Attached to this email, you will find copies of all the documents sent already.

We found a recent news article since mailing our public comments and wanted to share it with the EPA. It is attached for your records and we will mail an original copy to your office. The news article is from September 4, 2013 about Timpson, Texas and seismic concerns related to injection wells. After reading this news article our local residents question if our local water tower has been built to withstand earthquakes and what about buildings and homes. This is just one more article that provides a sound basis to deny this permit. Becoming the next Timpson, Texas is not something that Brady Township residents want to experience especially since many homeowners don't have earthquake insurance.

Sincerely,

Duane & Darlene Marshall



Duane & Darlene Marshall
1070 Highland Street Extension
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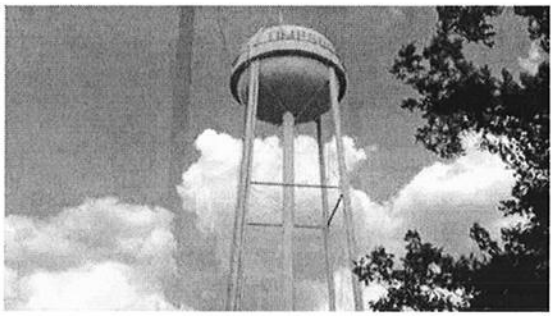
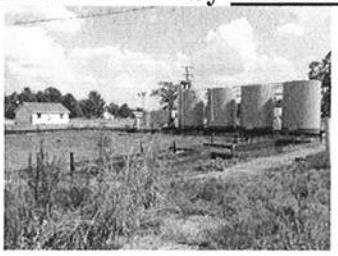
Tremors in Timpson: Residents of Timpson, Texas, discuss a series of earthquakes which have shaken the city since 2011.



Written by Adam Duvernay



A recently closed saltwater injection well outside Timpson, Texas. Such wells, which inject a waste brine created during natural gas production, have been linked to earthquakes like the one that shook Timpson on Sept. 2. / Adam Duvernay/The Tim

TIMPSON, TEXAS — A little tremble didn't shake the folks at a Labor Day cookout on Lake Timpson in East Texas. "I was cooking fish," Timpson, Texas, resident Kevin Bradford said. "One of our local police officers had stopped by on his break. He was eating shrimp when the quake started. He never stopped eating. He just swayed a little bit. We all knew what it was. We didn't get too excited."

The 45-second experience was no minor thing — three miles below the surface of the earth, tectonic pressure released in the form of a magnitude-4.1 earthquake followed almost two hours later by a second rated at 4.3.

Timpson residents are getting used to the earth moving beneath their feet, but the phenomenon is only about two years old. The first quakes started in 2011, usually around a magnitude of 2, but they've returned every few months since and have been as powerful as a 4.8 tremor in May 2012 and a 4.1 in January.

Timpson, which sits in the middle of the North American tectonic plate, should be geologically stable. The last significant shaking in East Texas before 2011 was a magnitude-3 quake 20 miles north 30 years prior, U.S. Geological Survey geophysicist Robert Williams said.
The science surrounding the sudden and continued outburst of tremors there makes no certainties as to the cause, but geologists are pointing to a correlation that makes sense to many of Timpson's residents.

"We never had these before they started punching all them holes in the ground," lifelong resident James Box, 64, said.Timpson and the surrounding area are home to more than 20 commercial saltwater injection wells, sites used to dispose of a brine waste product created during the extraction of natural gas. The wells inject the wastewater thousands of feet into the earth, and their presence has been linked to unusual earthquakes across the country.

"Putting fluids in the ground near faults has caused earthquakes in the past, no doubt about it," Williams said. "There are relics of former tectonic upheavals everywhere. We don't know where all the faults are, and we don't know which are susceptible to being reactivated."

There are 59 commercial saltwater disposal well sites in Louisiana, 16 of which are approved for construction and will need further approval to begin operation once completed, according to the Louisiana Department of Conservation. There are four active wells in Caddo and three in Bossier. In DeSoto Parish, Stallion Oilfield Services has been granted approval to construct a saltwater injection well. It's the second in the parish.

The police jury adopted a resolution opposing the construction of the well June 10 and sent it to Baton Rouge on June 12. But that resolution arrived after public comment closed May 30 and couldn't be factored into the permitting process, Department of Conservation spokesman Patrick Courreges said. Juror Ernel Jones said he planned to bring the issue to the jury after the publication of an Aug. 9 article in The Times concerning that well. He never did, however, conceding there wasn't enough support to fight the state. He said he's given up trying to stop Stallion from operating that well but may try to block others in the future.

"When you're raising hell to deaf ears, what's the point? In Texas and Louisiana, it's hard to get anything against the oil companies. They're oil states," Jones said. "The earthquakes are my biggest concern here in DeSoto. They're not going to stop at building one or two of those wells. They're going to keep coming. We're going to be Timpson all over again. People need to stop looking at just the money and see what might happen to the parish."

The USGS is actively studying the relation of saltwater injection wells and the appearance of earthquakes in historically stable geologic zones, Williams said. There are thousands of such well sites across the country, but only a handful of oddly placed earthquake zones in proximity. Areas like Prague, Okla. — which registered three earthquakes above magnitude-5 between Nov. 5 and 8, 2011 — have little history of geologic tremors, but have recently become hotbeds for injection sites. Arkansas, Ohio and Colorado have reported similar events.

Scientists recognize the relation, but earthquakes on the continent's interior are not well understood, Williams said. It isn't unheard of for "swarms" of interior-continent quakes to appear and last for a few months to four years, he said. "It's a lot of speculation. We're still learning why particular interior spots become active. It's well studied but poorly understood," Williams said. "There are a lot of factors to understand better. We have a ways to go."
The Texas Railroad Commission, the state's authoritative body on oil and gas, is following the study of injection well and earthquake correlation, spokeswoman Ramona Nye said. In an email, she said commission staff have "not identified a significant correlation between faulting and injection practices."

"As epicenters are reported, RRC staff evaluates the area to see if there are any Underground Injection Control wells nearby. For some reported epicenters, there have been no UIC wells nearby. If there is a UIC well nearby, RRC staff conduct physical inspections of the area, as well as a review of UIC well permit restrictions to ensure compliance with Commission Statewide Rules," she said. "Following this recent seismic event, commission staff on Tuesday inspected

two nearby commercial disposal wells and found no violations of commission rules, and the wells were found to be operating within their permit conditions."

In Timpson

Laura Carroll keep breakables off the walls these days — her home on Timpson Lake has been shaken one too many times. "I don't have a picture left with glass in it in my house," Carroll said. "There was a lot of talk about the earthquakes in the beginning. A lot of people were wondering. I guess we're used to it now." Monday's quake only knocked a few items off shelves and dropped several decorative metal stars to the ground, she said. A quake earlier this year damaged their chimney, dropping bricks onto the roof, which splintered three rafters.
Her husband, Paul, made the repairs himself. Earthquake insurance was never a necessity.

There was no major damage inside city limits Monday, said Larry Burns of the Timpson Public Works Department. The cost of the earthquakes in property damage, he said, has been minimal so far. "But it seems to be a matter of time before a big one hits," Burns said. After a quake, Burns and his small crew go street by street checking for damage. Since 2011, there have been minor gas leaks associated with ruptured pipes and a few busted sewer and water mains. Residential chimneys sustained some damage, and gravestones at a nearby cemetery have toppled, he said.

The city council has discussed, but not adopted, new building standards to protect against earthquakes, Burns said. Adding new construction standards would mean a great cost to locals who want to remodel or build. One of the big concerns, he said, is the city's water tower. Although it was designed to survive high winds — something Williams said is beneficial to earthquake protection — Burns said anything over a magnitude-5 quake could cause serious structural damage. "The water tower wasn't built to earthquake standards. There was no need for it," Burns said. "It was built in 1996, and so far it hasn't moved."

Ricky Askins said he was inside his home for every quake since they began two years ago, but he was standing in his fields Monday when the earth started moving. "The cows started bawling. The dogs started howling," Askins said. "It took me a second to realize what it was. As soon as I realized it was an earthquake, it scared me then." Askins said he believes the quakes are related to the millions of gallons of brine which have been injected into Shelby County, but not everyone in town agrees.

"Some people say it's the fracking, but I don't think the changes they're making are enough to cause earthquakes," said Paul Spinuzzi, who lives just outside Timpson. "The only thing I can think of it's just another time for geological change in this area. It's happening all over the United States."

Duane Marshall
1070 Highland Street Extension
DuBois, PA 15801

September 9, 2013

EPA Regions III
Ground Water & Enforcement Branch (3WP22)
Office of Drinking Water & Source Water Protection
1650 Arch Street
Philadelphia, PA 19103

Dear EPA:

RE: PAS2D020BCLE - Brady Township, Clearfield County, PA

This letter is in response to the opportunity for public comments on the seismic issue with the disposal injection well. This permit should be denied due to the proximity of a known fault. The Guy-Greenbrier fault in Arkansas was an unknown fault until it was affected by an injection well. They now require new wells to be 1 to 5 miles from known faults. Steve Horton from the University of Memphis Center for Earthquake Research and Information wrote in a study published in "Seismological Research Letters" in the March/April issue "Given the strong spatial and temporal correlation between the two wells and seismic activity on the fault it would be an extraordinary coincidence if the recent earthquakes were not triggered by the fluid injection. For these reasons, I conclude that fluid injection triggered the recent seismicity."

I don't believe we should take this risk with the information we already know concerning faults and injection well locations.

Thank you for hearing my concerns on this matter.

Sincerely,

Duane Marshall

Darlene Marshall
1070 Highland Street Extension
DuBois, PA 15801

September 8, 2013

EPA Regions III
Ground Water & Enforcement Branch (3WP22)
Office of Drinking Water & Source Water Protection
1650 Arch Street
Philadelphia, PA 19103

Dear EPA:

RE: PAS2D020BCLE - Brady Township, Clearfield County, PA

This is a letter with public comments on the seismic issues dealing with the Brady Township Underground Injection Control Permit PAS2D020BCLE. Previously comments were submitted by me in December 2012 with a request the permit be denied based on numerous reasons.

Public hearing testimony produced additional proof that the permit should be denied due to faults, deep old gas well locations, local coal mines, syncline, and residential area. Another public hearing should be held for this public comment period. We request a public hearing be held due to the prior hearing beginning over an hour later than commenters expected. We know some left and didn't get a chance to make comments due to the lateness of the comments given.

Testimony proved our coal mines go all over below our area and city. The coal mines have water that flows into the Sandy Lick Creek next to our mall, which was stated by a Sandy Township Supervisor. Just one leak of the disposed waste into mines below our homes could create an explosion due to the methane trapped below ground. An explosion would create seismic activity as a result of the injection well activities.

We presented information on abandoned, old, deep, gas wells that causes potential to contaminate USDWs (Underground Sources of Drinking Water). Especially as an engineer presented at the public hearing that the faults would flow waste directly to two old, deep, gas wells. Old casings would allow waste to migrate up into USDWs. These faults would be affected by the pressure of waste injected underground and it was stated these faults could contain (confine) the waste disposed. The confining layer above the injection zone as defined in the permit application was noted by this engineer at the public hearing as inaccurate and much thinner than stated. Many factors had been researched by residents and stated as concerns including the local faults.

USDWs in the area also were demonstrated to be interconnected through various water sources and flow studies. At a Brady Township water authority meeting we learned of a local water tunnel that flows to our city reservoir, which was cause for concern. Local residents presented that old, deep, gas wells in the area affect their water sources when any work is done on these wells. Residents are extremely concerned about USDWs getting contaminated from the old, deep, gas wells and from seismic activities due to faults being lubricated by fluid or fluid flowing along the faults.

Darlene Marshall
1070 Highland Street Extension
DuBois, PA 15801

A supervisor from Brady Township presented information about the underground resources potentially being currently full of brine. This is due to the knowledge of the amount of brine that has been removed previously for the old, deep, gas wells. Residents realize how often the brine had to be removed from the deep gas well located on the Atkinson property. Waste, brine and gas below ground under our homes will all work to create pressure on the fault lines in the review area. This will cause things underground to change without anyone knowing the particulars, so we request this permit be denied on the potential of the fault lines being lubricated by waste or pressure causing the faults to shift. We know historically from experience seismic activity has occurred from waste disposal as I stated in my prior public comments.

The location of this proposed disposal injection well is near residents with private water wells, the Brady Township water supplies and the City of DuBois water supplies. These factors combined with a fault in the review area make this site a risky chance on issuing a permit for disposal of waste. If any USDWs or coal mines become contaminated due to waste it will not be enough to state "we told you to deny the permit" since properties will be ruined and lives would be placed in danger.

Studies have found concerns that disposal injection wells have been tied to seismic activity and the US Geological Survey states more research must be done. Combining all these factors: an already fractured area due to old, deep, gas wells; faults; syncline; the potential of disposal fluids leaking into USDWs or flowing along the identified fault near coal mines; new pressures on this fault potentially causing sympathetic reactions to earthquakes; seismic activity migrating disposed fluids into local coal mines and USDWs with grave affects to our area; local Marcellus Drilling activities planned for area; and different changes in pressures and activities have the potential to contaminate USDWs especially due to seismic activities created by waste disposal.

This area has felt the ground move due to earthquakes and man-made seismic activities: once due to a natural gas home explosion that rocked our area; at least once recently due to an earthquake from another state; and local coal mining in the area. At least four coal companies are operating in our area, which has affected foundations of residents homes including one of our own family members. Any of these type of seismic factors would compromise the integrity of the well casing and allow USDWs or coal mines to be contaminated. Man-made seismic events are happening in Clearfield County so this permit should be denied since further study should have been done. Local specific studies should be done for an area before it is assumed that "seismic events are extremely rare." Our local area has already experienced seismicity concerns.

Risk should be taken into consideration and given to this being an unacceptable risk to even allow a permit to be considered. This permit should be denied based on all the facts already presented that question the seismic issues and given that our precious water resources shouldn't be jeopardized or threatened. Just knowing we lack sufficient specific studies on injection wells located in residential areas with proximity to reservoirs, private wells and multiple municipal water wells. The statement has been proven invalid that seismic events are extremely rare in Clearfield County.

Darlene Marshall
1070 Highland Street Extension
DuBois, PA 15801

Residents refuse to believe monitoring pressure protects against failure after seeing the results of the Irvin well overpressurized for three months. USDW damage must be proven by the residents and this is unfair when residents are unaware that anything is happening or even made aware quickly enough. If they can overpressurize for three months without anyone knowing at the EPA or locally what does that state about protection for our residents if we allowed this disposal well to be permitted near our USDWs. Residents have stated they'd live in fear of drinking the water daily if an injection well is installed.

Monitoring pressure is insufficient to protect residents from an injection well failure since damage to a water source will have happened before shutdown procedures would be taken. This permit should be denied because of what happened at the Irvin injection well, since our area risk is higher.

The USGS has stated injection well studies need to be done. So this permit should be denied based on this information alone. Since this proposed injection well is located in a residential area that is near so many private wells, multiple municipal water sources and our local reservoir.

The permit should be denied based on the prior public hearing testimony presented since local residents demonstrated fault lines present in the review area caused concern of potential for seismic activities. The fault lines cause concern that fluids traveling along the fault will flow towards abandoned, old, deep, gas wells and abandoned coal mines through old gas well casings. A syncline is also located in the area.

The permit should be denied due to the changes in underground pressures potential affecting the faults and causing seismicity concerns. Fluids may lubricate the faults causing activity.

We request this permit be denied because the EPA, Windfall or residents are all unable to predict the future beneath us (underground). Taking a chance is an unsafe risk with USDWs, coal mines, properties and water sources.

This permit should be denied due to a study previously submitted in December that provided information on injection wells and seismic activities that had occured. One article in Science Magazine on July 12, 2013 citied William Ellsworth from the Earthquake Science Center, U. S. Geological Survey, Menlo Park, California. Other studies and recent happenings in four states cause grave concerns that reinforce denying this permit. Enclosed is two articles that concern residents especially knowing Arkansas residents already experienced earthquakes and have decided to file suits against injection well operators. Ohio has experienced earthquakes in an area that never had prior seismic activities recorded before an injection well operated.

Residents appreciate the EPA reviewing all the information presented and explaining the EPA process. The residents are counting on the EPA denying this permit and setting an example that residents research shows substantial risk to USDWs through seismic issues sufficient to deny this permit. Residents shouldn't need to provide this evidence since the original maps for the permit showed a fault through the area. All the articles on file for this public comment period are insufficient evidence with all

the actual happenings having taken place since residents started researching this issue two years ago. Let us not repeat history like Colorado, Oklahoma, Texas, Ohio or Arkansas has experienced just deny the permit.

Two articles are attached to this testimony to demonstrate seismic concerns and backup the residents request to deny this permit. The main points are stated here in my letter and highlighted in the attached article.

An article by Charles Choi in Live Science titled "Confirmed: fracking practices blamed for Ohio earthquakes" tells us that Ohio experienced quakes from injection wells. It states, "Before January 2011, Youngstown, Ohio, which is located on the Marcellus Shale, had never experienced an earthquake, at least not since researchers began observations in 1776. However, in December 2010, the Northstar 1 injection well came online to pump wastewater from fracking projects in Pennsylvania into storage deep underground. In the year that followed, seismometers in and around Youngstown recorded 109 earthquakes, the strongest registering a magnitude-3.9 earthquake on Dec. 31, 2011. The well was shut down after the quake."

The Choi article also tells us it has been long know that injection of waste can trigger earthquakes and it stated, "Scientists have known for decades that fracking and wastewater injection can trigger earthquakes. For instance, it appears linked with Oklahoma's strongest recorded quake in 2011, as well as a rash of more than 180 minor tremors in Texas between Oct. 30, 2008, and May 31, 2009."

The "Confirmed" article also tells us that injection well activity activated earthquakes based on injection and states, "The new investigation of the Youngstown earthquakes, detailed in the July issue of the journal Geophysical Research Letters, reveals that their onset, end and even temporary dips in activity were apparently all tied to activity at the Northstar 1 well. For instance, the first earthquake recorded in Youngstown occurred 13 days after pumping began, and the tremors ceased shortly after the Ohio Department of Natural Resources shut down the well in December 2011. In addition, dips in earthquake activity lined up with Memorial Day, the Fourth of July, Labor Day, Thanksgiving and other times when injection at the well was temporarily stopped."

Choi tells us earthquakes started immediately after injection well operations began. "Earthquakes were triggered by fluid injection shortly after the injection initiated — less than two weeks," researcher Won-Young Kim, a seismologist at Columbia University's Lamont-Doherty Earth Observatory in Palisades, N.Y., told LiveScience. "Previously, we knew (of) unusual earthquakes around Youngstown, Ohio, only on March 17, around 80 days after injection began. If we had better seismographic station coverage, or if we were more careful, we could have caught those early events."

The "Confirmed" article states that, "Ancient fault - The earthquakes were apparently centered in an ancient fault near the Northstar 1 well, and Kim suggested pressure from wastewater injection caused this fault to rupture. The quakes crept from east to west down the length of the fault — away from the well — throughout the year, a sign that they were caused by a traveling front of pressure generated by the injected fluid."

Darlene Marshall
1070 Highland Street Extension
DuBois, PA 15801

The Choi article findings state, "In the future, we need to find better ways to image hidden subsurface faults and fractures, which is costly at the moment, Kim said. If there are hidden subsurface faults near the injection wells, then sooner or later they can trigger earthquakes. In the future, operators of such wells may look for earthquakes for about six months after the beginning of operations, Kim said. However, there are cases when triggered earthquakes occurred nearly 10 years after the injection, he noted."

Mica Rosenberg wrote on Tuesday, August 27, 2013 an article titled "Insight: Arkansas lawsuits test fracking wastewater link to quakes" that states our concerns. "Seismologists say fracking can cause tiny micro earthquakes that are rarely felt on the surface. The process of disposing of the wastewater, though, can trigger slightly larger quakes when water is pumped near an already stressed fault, even one that hasn't moved in millions of years, according to the U. S. Geological Survey."

The "Insight" article stated, "Steve Horton from the University of Memphis Center for Earthquake Research and Information worked to set up seismic monitors around eight disposal wells. They found that 98% of the 2010-11 swarm of small quakes occurred within 3.7 miles of two of the wells." It was concluded earthquakes were triggered by wastewater fluid injection and an unknown fault was identified, so they declared, "a permanent moratorium on new injection wells in almost 1,200 square miles around the fault."

Rosenberg stated, "In a November 2012 draft report, the EPA said it was studying injection-induced seismicity in central Arkansas; north Texas; Braxton County, West Virginia; and Youngstown, Ohio. In Texas, operators in 2009 voluntarily plugged two disposal sites after regulators started investigating whether the wells touched off several quakes around the Dallas Forth-Fort Worth International Airport. Virginia's Department of Environmental Protection in 2010 reduced the rate of wastewater injection allowed after a series of small tremors. And in Ohio, officials shut down five injection wells in Youngstown following a 4.0 earthquake on New Year's Eve 2011 in an area that had never experienced seismic activity before, the EPA report said."

We have a known fault in our area so this should be cause to deny this permit based on all this recent data. If seismologists have long known a problem exists with injection wells, residents shouldn't need to prove this permit should be denied. Thank you for your consideration of all this information.

Sincerely,

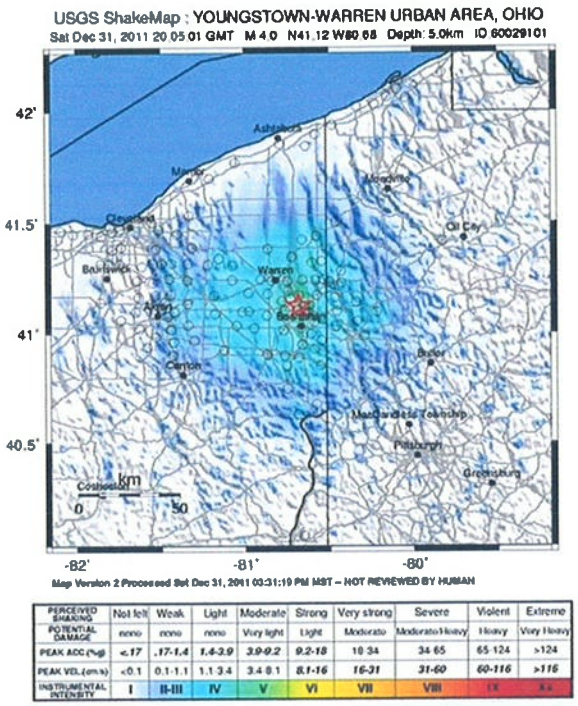
Darlene Marshall

Darlene Marshall

Confirmed: Fracking practices to blame for Ohio earthquakes

Charles Q. Choi, LiveScience

Sep. 4, 2013 at 3:54 PM ET



USGS

This map shows the intensity of shaking in the area of a magnitude-3.9 earthquake that struck near Youngstown, Ohio, on Dec. 31, 2011. Research has linked this earthquake to the underground injection of wastewater from fracking.

Wastewater from the controversial practice of fracking appears to be linked to all the earthquakes in a town in Ohio that had no known past quakes, research now reveals.

The **practice of hydraulic fracturing, or fracking**, involves injecting water, sand and other materials under high pressures into a well to fracture rock. This opens up fissures that help oil and natural gas flow out more freely. This process generates wastewater that is often pumped underground as well, in order to get rid of it.

A furious debate has erupted over **the safety of the practice**. Advocates claim fracking is a safe, economical source of clean energy, while critics argue that it can taint drinking water supplies, among other problems.

One of the most profitable areas for fracking lies over the geological formation known as the Marcellus Shale, which reaches deep underground from Ohio and West Virginia northeast into Pennsylvania and southern New York. The Marcellus Shale is rich in natural gas; geologists estimate it may contain up to 489 trillion cubic feet (13.8 trillion cubic meters) of natural gas, more than 440 times the amount New York State uses annually. Many of the rural

communities living over the formation face economic challenges and want to attract money from the energy industry.

Youngstown quakes

Before January 2011, Youngstown, Ohio, which is located on the Marcellus Shale, had never experienced an earthquake, at least not since researchers began observations in 1776. However, in December 2010, the Northstar 1 injection well came online to pump wastewater from fracking projects in Pennsylvania into storage deep underground. In the year that followed, seismometers in and around Youngstown recorded 109 earthquakes, the strongest registering a **magnitude-3.9 earthquake** on Dec. 31, 2011. The well was shut down after the quake.

Scientists have known for decades that **fracking and wastewater injection can trigger earthquakes**. For instance, it appears linked with **Oklahoma's strongest recorded quake** in 2011, as well as a rash of **more than 180 minor tremors in Texas** between Oct. 30, 2008, and May 31, 2009.

The new investigation of the Youngstown earthquakes, detailed in the July issue of the journal Geophysical Research Letters, reveals that their onset, end and even temporary dips in activity were apparently all tied to activity at the Northstar 1 well.

For instance, the first earthquake recorded in Youngstown occurred 13 days after pumping began, and the tremors ceased shortly after the Ohio Department of Natural Resources shut down the well in December 2011. In addition, dips in earthquake activity lined up with Memorial Day, the Fourth of July, Labor Day, Thanksgiving and other times when injection at the well was temporarily stopped.

"**Earthquakes were triggered by fluid injection** shortly after the injection initiated — less than two weeks," researcher Won-Young Kim, a seismologist at Columbia University's Lamont-Doherty Earth Observatory in Palisades, N.Y., told LiveScience. "Previously, we knew (of) unusual earthquakes around Youngstown, Ohio, only on March 17, around 80 days after injection began. If we had better seismographic station coverage, or if we were more careful, we could have caught those early events."

Ancient fault

The earthquakes were apparently centered in an ancient fault near the Northstar 1 well, and Kim suggested pressure from **wastewater injection** caused this fault to rupture. The quakes crept from east to west down the length of the fault — away from the well — throughout the year, a sign that they were caused by a traveling front of pressure generated by the injected fluid.

The researchers did note that of the 177 wastewater disposal wells of this size active in Ohio during 2011, only the Northstar 1 well was linked with this kind of seismic activity, suggesting this ability to cause earthquakes was rare. Kim personally felt injecting wastewater deep underground "is a fairly good method of massive fluid waste disposal."

Kim stressed these earthquakes are not directly related to fracking of rock for natural gas. "They are due to injection of waste fluid from fracking," he noted.

Insight: Arkansas lawsuits test fracking wastewater link to quakes

By Mica Rosenberg

GREENBRIER, Arkansas | Tue Aug 27, 2013 1:42am EDT

GREENBRIER, Arkansas (Reuters) - Tony Davis, a 54-year-old construction worker in central Arkansas, said he welcomed the boom in natural gas drilling that brought jobs

and new businesses to his hometown starting about a decade ago. But that was before the earth shook.

In 2010 and 2011, the quiet farming town of Greenbrier, Arkansas, was rattled by a swarm of more than 1,000 minor earthquakes. The biggest, with a magnitude of 4.7, had its epicenter less than 1,500 feet from Davis's front porch. "This should not be happening in Greenbrier," Davis recalls thinking. He said the shaking damaged the support beams under an addition to his home.

Then came another surprise: University of Memphis and Arkansas Geological Survey scientists said the quakes were likely triggered by the disposal of wastewater from hydraulic fracturing - commonly known as fracking - into deep, underground wells. That finding prompted regulators from the Arkansas Oil and Gas Commission to order several wells in the area shut down, and the earthquakes soon subsided.

It also prompted Davis and more than a dozen of his neighbors to file five lawsuits in federal court against Chesapeake Operating Inc, as the owner in 2010 of two injection wells near Davis' home, and BHP Billiton, which purchased Chesapeake's shale gas assets in 2011.

Another company, Clarita Operating LLC, owned a third well that was shut down, but the company went bankrupt and was dropped from the litigation in 2011.

Chesapeake and BHP both declined to comment, citing policies not to discuss ongoing litigation. In court documents they denied they were responsible for the quakes and for any damage the quakes may have caused.

The litigation marks the first legal effort to link earthquakes to wastewater injection wells, according to a search of the Westlaw database and interviews with legal experts, and the first attempt to win compensation from drilling companies for quake damage.

If any of the earthquake cases make it to a jury and the plaintiffs prevail, the outcome could spark additional litigation, since wastewater injection wells are used not only in fracking, but in other kinds of oil and gas drilling and geothermal energy production.

"The scientific community is really focusing on this issue so I imagine we will see more cases because of that," said Barclay Nicholson, a Houston lawyer who represents major oil and gas companies and is not involved in the Arkansas cases. "That's one of the new battlegrounds."

LITIGATION WAVE

The first of the suits, filed in U.S. District Court in Eastern Arkansas, is scheduled to go to trial before Judge J. Leon Holmes next March, though the parties have been engaged in settlement talks, according to the court docket.

The Arkansas Independent Producers & Royalty Owners, an oil and gas industry group, acknowledges that scientists found a possible connection between the disposal wells and the spate of minor quakes in and around Greenbrier.

But J. Kelly Robbins, the group's executive vice president, said the companies had no way of knowing of any such link before wastewater injection began, and he said the operators shut the wells down when questions were raised.

"The appropriate state agencies stepped up, collected data, did what they were supposed to do and made a decision," Robbins said in an interview. "Industry abided by that and those wells were closed."

Robbins also said that while Arkansas is a traditional oil and gas producing state, fracking in the Fayetteville shale had brought billions of dollars of investment and boosted the state's natural gas production ninefold in seven years.

The earthquake cases are part of a wave of litigation that has followed the rapid expansion in natural gas production across the United States using fracking, a drilling process that deploys a highly pressurized mix of water and chemicals to break apart shale rock to release oil and gas.

Since 2009, some 40 civil suits related to fracking have been filed in eight states, claiming harm ranging from groundwater contamination to air pollution to excessive noise.

So far none of the lawsuits has made it to trial and about half have been dismissed or settled, with company lawyers mainly arguing that a link between fracking and contaminated groundwater or other environmental problems has not been proven, according to a Reuters analysis of legal filings.

The U.S. Environmental Protection Agency is expected to issue a major report on fracking and drinking water next year that could have an impact on these cases, lawyers closely following the litigation say.

FINDING FAULT

The Arkansas litigation does not target fracking itself, but rather the disposal of the leftover toxic, briny water known as "flowback." Millions of gallons of wastewater are typically trucked from the fracking site to the well site, where they are injected thousands of feet underground into porous rock layers, often for weeks or months at a time.

Seismologists say fracking can cause tiny "micro earthquakes" that are rarely felt on the surface. The process of disposing of the wastewater, though, can trigger slightly larger quakes when water is pumped near an already stressed fault, even one that hasn't moved in millions of years, according to the U.S. Geological Survey.

Only a handful of the 30,000 injection wells across the country have been suspected of causing earthquakes, the U.S. Geological Survey has said.

That rare event likely happened in central Arkansas, said Scott Ausbrooks, a geologist at the Arkansas Geological Survey in Little Rock who lives in Greenbrier and said he received calls from panicked neighbors when the quakes were rattling the town more than a dozen times a day.

Ausbrooks said he became interested in studying wastewater injection in the area because it had previously experienced some earthquakes, including a notable swarm in the 1980s.

He worked with Steve Horton from the University of Memphis Center for Earthquake Research and Information to set up seismic monitors around eight disposal wells. They found that 98 percent of the 2010-11 swarm of small quakes occurred within 3.7 miles of two of the wells.

"Given the strong spatial and temporal correlation between the two wells and seismic activity on the fault," Horton wrote in a study published in "Seismological Research Letters" in the March/April 2012 issue, "it would be an extraordinary coincidence if the recent earthquakes were not triggered by the fluid injection. For these reasons, I conclude that fluid injection triggered the recent seismicity."

It was only after the wastewater injection wells went online that scientists discovered a previously unknown fault, now called the Guy-Greenbrier fault, Ausbrooks and Horton said.

The Arkansas Oil and Gas Commission declared a permanent moratorium on new injection wells in almost 1,200 square miles (3,100 sq km) around the newly discovered fault. The commission now requires new wells to be between 1 mile and 5 miles from known faults, and it more closely monitors the amount and pressure of injected wastewater.

The EPA currently has no regulations relating to earthquakes and disposal wells - known as Class II wells - but the agency began working on a report addressing the issue in the wake of a spike in quakes in the central and eastern United States.

In a November 2012 draft report, the EPA said it was studying "injection-induced seismicity" in central Arkansas; north Texas; Braxton County, West Virginia; and Youngstown, Ohio.

In Texas, operators in 2009 voluntarily plugged two disposal sites after regulators started investigating whether the wells touched off several quakes around the Dallas Forth-Fort Worth International Airport. Virginia's Department of Environmental Protection in 2010 reduced the rate of wastewater injection allowed after a series of small tremors. And in Ohio, officials shut down five injection wells in Youngstown

following a 4.0 earthquake on New Year's Eve 2011 in an area that had never experienced seismic activity before, the EPA report said.

The EPA said the draft, obtained by the specialized news service EnergyWire through a Freedom of Information Act request, was a "technical report" as opposed to a policy blueprint and "is still under development."

SEEKING PLAINTIFFS

While the federal regulatory process plays out, the relationship between injection wells and earthquakes could first be thrashed out in court. Defense lawyers say proving negligence could be a difficult hurdle.

"You have to prove that the conduct was unreasonable," said Thomas Daily, an Arkansas lawyer who represents energy firms and is not involved in the earthquake cases. "You are not liable for a bolt out of the blue."

The plaintiffs' attorneys, from the Little Rock firm Emerson Poynter, claim the companies should have known the risks of drilling in a historically seismic area.

"The scientific proof is absolutely there," said plaintiffs' lawyer Scott Poynter.

Emerson Poynter lawyers said they currently represent 35 homeowners, about half of whom have yet to file lawsuits but plan to do so in state court. Along U.S. highway Route 65, which cuts through Greenbrier, the firm sprung for a billboard that features an illustration of a cracked brick wall next to the caption, "Earthquake damage?" written in a shaky looking font. The firm's phone number is at the top.

No matter how many people sign on, state regulators said the lawsuits will not deter oil and gas drilling.

"It's something that happened, we addressed it and developed some rules to keep it from happening again and everyone has moved on," said Lawrence Bengal, director of the Arkansas Oil and Gas Commission. "Whether the past will result in some award of money to someone I really don't know. But I don't know what more could have been done."

(Reporting by Mica Rosenberg; Additional reporting by Elizabeth Dilts; Editing by Eric Effron and Tim Dobbyn)

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Planning Commission

September 10, 2013

EPA Regions III
Ground Water & Enforcement Branch (3WP22)
Office of Drinking Water & Source Water Protection
Attn: Mr. Steve Platt
1650 Arch Street
Philadelphia, PA 19103

Dear Mr. Platt:

This letter is in response to EPA's request for comment concerning injection control permit PAS2D02CLE applied for by Windfall Gas and Oil in Brady Twp. Clearfield County, PA.

The EPA Supplement to the Statement of Basis states that seismic events from 1938 to 2012 are extremely rare in Clearfield County. Are they rare because there currently are no wells for waste water disposal located in Clearfield County? If there are waste water disposal wells, are they located in developed residential neighborhoods serviced by private and municipal wells and reservoirs in Clearfield County or elsewhere. We know of none and we are not interested in testing the water so to speak. In the case of the proposed windfall well "extremely rare" referencing seismic events is simply not good enough.

The EPA Supplement of Basis reasons that since the maximum pressure proposed to operate the Windfall well is less than the initial pressure in fracturing, then the injection zone for future fractures could possibly be limited; however, it would not protect against the reduction in friction resulting from the injection fluids in the fracture zone. The removal of friction increases the possibility of a sympathetic reaction to a large earthquake event. The suggestion in the EPA supplement of Basis that constant monitoring will protect against the effects of a failure at a well site is questionable. The time between when a monitor warns of a system failure at an injection well operation until operation shutdown is enough time for damage to the environment which includes aquifers and ground water.

Also, there is a big difference between studies in open areas and studies in areas like ours. This area was heavily mined a century ago leaving catacombs beneath the ground on which this entire area built their towns, schools, churches and roads. A fault line runs from Luthersburg to the DuBois reservoir area and beyond.

We understand that the EPA preliminary draft report distributed in Dec. 2012 to technical experts who had contributed to the report could have some answers or guidelines on the issue. It seems this report is for internal use only. Is this the case?

See Science 12 July 2013 Vol 341 No. 6142 DO1:1126/Science 1225942.
See Geological Survey (recent)
See EPA Draft report Dec2012

At the public hearing in Brady Township I and others asked if the EPA decision makers who heard our testimony would accept our invitation to view the site so you could see for yourself what we are concerned with. The answer was yes. The invitation is still there.

We recognize the economic impacts of this industry. Our primary concern is with the threat of developing waste water injection wells and like industry facilities in this inappropriate area. We do not want to find out, and we think neither do you, that the people in this area were right, when it is too late.

Your attention to our concerns will be appreciated.

Sincerely,

Nancy E. Moore

Nancy Moore
City of DuBois Planning Commission Chairman

Subject:	comment letter on seismic activity near DuBois
From:	Sherry Green (jimsherrygr@yahoo.com)
To:	platt.steve@epa.gov;
Date:	Tuesday, September 10, 2013 9:34 AM

Dear Sir:
Attached is a scanned letter for our comments. The signature did not scan right but the original letter is in the mail to you.
Thank you.
Sherry and James Green

James & Sherry Green
815 Reynoldsville Sykesville Road
Reynoldsville, PA 15851

September 9, 2013

EPA Region III
Ground Water & Enforcement Branch (3WP22)
Office of Drinking Water & Source Water Protection
1650 Arch Street
Philadelphia, PA 19103

Dear EPA:

RE: PAS2D020BCLE - Brady Township, Clearfield County, PA

This is a letter to provide public comments on the seismic issues of concern to area residents for the proposed permit for Brady Township Underground Injection Control Permit PAS2D020BCLE. This letter is to request denying the permit based on recent seismic concerns in various states including Texas, West Virginia, Arkansas, Ohio and Oklahoma. It was mentioned in prior public comments that it has long been known by scientists that injection wells cause earthquakes and an example was used from Colorado.

A recent article "Tremors in Timpson" by Adam Duvernay on September 4, 2013 gives examples of what injection wells are doing to a stable area. The article states, "Timpson, Texas is located in the middle of a North American tectonic plate and should be geologically stable.". The area around Timpson is home to at least 20 commercial disposal injection wells, which seems to be the reason for the earthquakes that have happened since 2011. Robert Williams was quoted in the article since he is a geophysicist for the U. S. Geological Survey and the article mentions geologists are pointing to injection wells as the cause of earthquakes across our nation. Williams was quoted in the article, "we don't know where all the faults are, and we don't know which are susceptible to being reactivated."

Local residents in the surrounding area haven't built homes to withstand earthquakes or budgeted for earthquake insurance. The news article that residents have seen since last year talk about all the earthquakes being experienced near injection wells, injection wells being shut down due to earthquakes and the USGS has done studies that demonstrate cause for concern.

All these seismic concerns should be more than enough to deny this permit. Other reasons include: specific studies on injection wells need to be done before injection wells are located in a residential areas; injections wells shouldn't be located closely to private water wells, municipal water sources, water towers or water reservoirs; specific studies to area should be completed before it is assumed that "seismic events are extremely rare"; monitoring pressure isn't enough to protect residents from an injection well failure since damage to a water source will have happened before shutdown procedures are taken; area has experienced seismicity concerns due to an earthquake; man induced seismic

concerns have already affected homes (coal mining, Marcellus drilling, and a natural gas explosion); public hearing testimony gave concerns of fault lines in the review area; a syncline is located in the area; fault lines that exist cause concern that fluids may travel along the fault to flow towards abandoned deep gas wells and abandoned coal mines and old casings for gas wells may allow contamination of USDWs; underground pressure changes may cause seismic activities; fluids may lubricate the faults causing seismic activity; a USGS study presents concerns about injection wells and seismic activities; other recent happenings in various states cause present concerns; and we refuse to accept the risk of it "might happen" when already mistakes have happened in our area with the Irvin Injection Well that was over pressurized for three months with no one knowing and stopping the injection well operations. The EPA is unable to predict the future so no chances should be taken with our water, USDWs and homes. Injection wells should be deemed an unsafe risk near any faults, so no chances are taken.

Sincerely,

James L Green

Sherry D Green

James & Sherry Green

September 9, 2013

EPA Region III
Ground Water & Enforcement Branch (3WP22)
Office of Drinking Water & Source Water Protection
1650 Arch Street
Philadelphia, PA 19103

Dear EPA:

RE: PAS2D020BCLE - Brady Township, Clearfield County, PA

This letter is to provide comment on the EPA Public Comment period for seismicity concerns for the Brady Township Underground Injection Control Permit PAS2D020BCLE. The EPA received extensive comments during 2012 that requested this permit be denied and seismicity was one of the listed concerns since area water sources could be contaminated.

1) Studies specific to injection wells need to be done before this proposed injection well is located in a residential area that is near so many private wells, multiple municipal water sources and our local municipal water reservoir.

2) Stating that seismic events are extremely rare in Clearfield County is an incorrect assumption that needs further study. Studies need to be specific to our area before it is assumed that "seismic events are extremely rare."

3) Monitoring pressure is insufficient to protect residents from an injection well failure since damage to water sources will have happened before shutdown procedures could be taken.

4) Man induced seismic concerns have already affected homes when a natural gas line blew up a home in the past. Blasting for coal in our township has cracked foundations of homes in the past and coal mining continues to operate in Brady township

5) Prior public hearing testimony presented demonstrated residents' concerns of fault lines present in the review area that deeply concern residents of the chances being taken to cause seismic activities. The fault lines that exist cause concern and fluids traveling along the fault to flow towards abandoned deep gas wells and abandoned coal mines through old casings or a syncline is just a way to cause trouble in the future for residents.

6) The changes in underground pressures have the potential to affect the faults and cause seismicity concerns. Fluids may lubricate the faults causing seismic activity and possible earthquakes.

7) One study shed enough doubt on injection wells and seismic activities to stop this permit (Science Magazine on July 12, 2013 citied William Ellsworth from the Earthquake Science Center, U. S. Geological Survey, Menlo Park, California. Article is here http://www.usgs.gov/blogs/features/usgs_top_story/man-made-earthquakes/). Other studies and recent happenings in four states cause grave concerns that back up denying this permit.

8) Residents aren't willing to accept the risk of it "might not happen" when they have already seen mistakes happen first hand in our area at another injection well that is located in Bell Township, Clearfield County. **EXCO OPERATED THE IRVIN INJECTION WELL AT A PRESSURE EXCEEDING ITS PERMITTED MAXIMUM INJECTION PRESSURE FOR A THREE MONTH PERIOD IN 2010. EXCO VIOLATED THE TERMS OF ITS UIC PERMIT BY FAILING TO IMMEDIATELY CEASE INJECTION OF BRINE INTO THE IRVIN A-19 BRINE DISPOSAL WELL ("IRVIN WELL") UPON DISCOVERING THAT THE WELL HAD FAILED MECHANICAL INTEGRITY.**

This permit for a proposed disposal injection well in Brady Township should be denied due to the increased risk of earthquake due to known faults within the Area of Review.

Sincerely,

Cliff & Jeanette Stump
814-772 5461
Ridgway, Pa. 15853

September 5, 2013

EPA Region III
Ground Water & Enforcement Branch (3WP22)
Office of Drinking Water & Source Water Protection
1650 Arch Street
Philadelphia, PA 19103

Dear EPA:

RE: PAS2D020BCLE - Brady Township, Clearfield County, PA

This letter is our response to the EPA Public Comment period for seismicity concerns dealing with the Brady Township Underground Injection Control Permit PAS2D020BCLE. The EPA received extensive comments during 2012 that would directly relate to our request to deny this permit and seismicity is our biggest concern to contaminate area water supplies and local, abandoned coal mines.

Our neighbor an engineer trained to understand the construction and pressure of this proposed equipment presented in-depth information on the dangers our area faces due to the proposed construction and how the fault lines in the 1/4 mile change the affects of the review area. His presentation showed fluids would migrate along a fault line towards the old abandoned coal mines and two old deep gas wells. His testimony and other neighbors stressed that allowing harmful fluids to flow up around old deteriorated casings towards our old coal mines and private water wells would impact USDW's. Other neighbors presented how they have water wells affected by other deep gas wells in our area already. The neighbors showed fracturing occurred for deep gas well drilling in the review area. All these factors combined would be dangerous mixed with any thing that shakes our ground.

Permitting a disposal injection well and taking any chance with our water resources or contamination of USDWs along with abandoned coal mines is not an option that should be allowed with our homes sitting over these coal mines & also abandoned deep gas wells. Another public hearing should be held since some residents left before the residents gave public comment due to the length of the previous EPA hearing since it started over an hour late.

Studies (US Geological Survey) are finding disposal injection wells have been tied to seismicity concerns. Any pressure could cause sesimicity as we experienced already around a year ago after affects here from an earthquake. The risk is not acceptable especially since specific studies aren't complete on injection wells located in residential areas. Especially when seismic events have been experienced in Clearfield County that include regular and man made actives. Protecting residents against USDW contamination through monitoring pressure that would tell us of failure after the fact isn't acceptable when we rely on our water sources daily.

Man made blasting has been happening in our township and will continue to happen, since we learned a local coal company (Black Cat) just received permission to work for years into the future in Brady Township. Residents of
Brady Township have experienced homes affected from the blasting with negative results even though studies are done before blasting occurs. Man made blasting will continue for coal and is also happening for the gas industry. Other neighbors have experienced loss of water wells due to changes from the gas industry. Major seismicity concerns come from man made blasting that potentially would affect the man made casing around the proposed injection well. Anything man made has the potential to fail and man made blasting in the area has the potential to contaminate USDWs if the proposed disposal injection well is permitted. These are definite risks of induced seismicity by man. Another man made case of seismicity concerns happened in our area from a house explosion due to a natural gas leak. No one knows when or if the group could shake in our area with the increase in earthquakes.

Please deny this permit. We have been trying to sell our home recently and the concerns of a proposed disposal injection well have harmed the local housing market. As a local home owner, I feel strongly that this has detrimental affects to our environment that make it hard to sign the documentation for selling our house to others. And also may prevent banks from lending money, to home buyers.

Thank you for taking time to reopen the public comments and consider seismicity issues further. The rising incidents in other states has raised local concerns that further demonstrate the need for more studies and research on injection wells.

Sincerely,

Randall and Valerie Powers