



Drilling & Fracking a well near Grass River: Notes from an informal conversation with O.I.L. Energy

Dean Branson and Gary Knapp, June 26, 2014

Given that Michigan Department of Environmental Quality (DEQ)-Division of Oil, Gas, and Minerals, issued a permit to O.I.L. Energy on February 27, 2014 (Permit Number 60922), to drill a well and hydraulically fractionate (frack) the Antrim Shale formation near the intersection of Brake Road and White Birch Lane, Three Lakes Association (TLA) initiated a request for an informal conversation about this activity with a knowledgeable representative. Ben Croftchik, on behalf of O.I.L. Energy, graciously accepted our invitation, and Dean Branson & Gary Knapp arranged for the conversation. The purpose of the conversation was to obtain some basic information about the permitted well because of its close proximity to Grass River. We wanted to obtain the information in a non-contentious and non-adversarial manner, and then to share a summary of the information with organizations in the area that are currently involved in the stewardship of Grass River.

The conversation took place on Gary & Sue Knapp's pontoon on Grass River as part of a tour of the new large woody debris structures installed in Grass River last fall to determine if the current in Grass River was sufficient and could be slightly re-directed in a manner it would naturally deepen the channel in areas where sediment from the tributaries had accumulated. In 2011, O.I.L. Energy, acting as an agent for a landowner, granted permission to TLA to walk across their property adjacent to these tributaries as part of an early investigation of sources of sediment in Grass River, which set the stage for the installation of these structures in Grass River.

The following are answers to the questions that we asked during this conversation:

1. Is there anything unusual about this well relative to the dozens of other natural gas wells already installed in this region to produce natural gas from the Antrim Shale formation?

\A\ There is nothing unusual about this proposed well or the anticipated drilling & fracking to harvest natural gas from within the Antrim shale formation at this location. This activity will be very similar to a couple dozen wells that have been successfully drilled & fracked in this area in the last few years without incidents or environmental impacts. The map below shows the location of these wells.

2. What is the anticipated duration of time for the drilling & fracking operation, and what will the site look like when finished?

\A\ The drilling rig and related equipment will be on site for about 2 to 3 weeks. Upon completion the only remaining structure will be the upside down "U- shaped piping" that connects the well to the underground pipeline along M-88. These structures are about 4 to 5 feet high. There will be no flare or source of odor associated with this well. Many of these above ground "U" shaped piping structures are visible on producing wells throughout Antrim County; the aesthetic aspects are not detracting to the natural beauty of the area.

3. When do you anticipate installing this well near the intersection of Brake Road and White Birch Lane?

\A\ The permit was issued on February 27, 2014 and is good for two years. Although we do not currently have a target date for the installation of this well, we anticipate sometime yet this year.

4. How many horizontal legs will stem from this well pad?

\A\ The permit application described one leg about 2,600 feet in northern direction after reaching the vertical depth of about 949 feet in the center of the Antrim shale formation, which is about 50 to 75 feet thick in this area. This link http://www.mogpef.org/video_shale/index.html, is an illustration showing how horizontal drilling is accomplished. If O.I.L. Energy desires to drill additional wells in the future, new permit applications would need to be submitted to DEQ.

5. Will baseline samples of groundwater in the area will be collected and analyzed before drilling & fracking begins?

\A\ O.I.L. Energy occasionally collects and analyzes ground water samples before drilling & fracking a well. A decision about this particular well has not been made.

6. In the event of an accident or spill at this site, what emergency response procedures are/will be in place?

\A\ In addition to following the protocols outlined in the MDEQ rules and regulations O.I.L. Energy Corp. meets (annually) with the Antrim County Emergency Coordinator and he/she would get the call so that they could coordinate with the appropriate departments. Also O.I.L. Energy maintains a Site Safety and Emergency Response plan that addresses any potential situations that may arise.

7. As part of a process of preparing to respond to emergencies and analyzing for possible groundwater contamination, what are the chemicals of greatest concern that will be used to frack this well?

\A\ MSDS sheets are readily available on location. Attached is a general description of some of the chemicals typically used to frack wells in this area.

8. Was Michigan's Water Withdrawal Assessment Tool used to determine if the amount of freshwater to be used to frack this well may have an impact nearby streams?

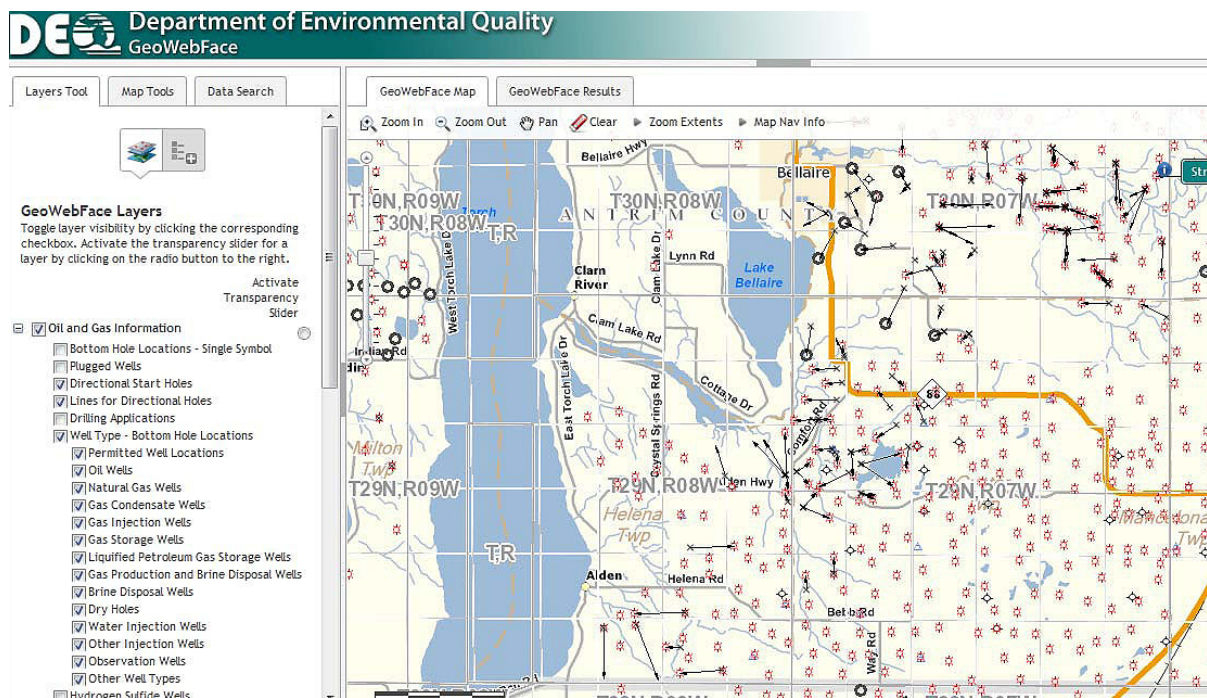
\A\ Yes, the Water Withdrawal Assessment Tool was used and the results were part of the permit application. No impact was forecasted based on the results of this assessment.

9. Will a DEQ compliance officer inspect the drilling and fracking operations during these activities?

\A\ Yes, Ann Stephens from DEQ's Gaylord Office will inspect the site during the drilling and fracking operations. Additional information about the scope of DEQ's compliance inspections can be obtained from Ann Stephens; 989-705-3413.

Synopsis: Our overall impression is that the drilling and fracking of this particular well will be done in a manner similar to the previous wells that have been drilled and fracked in this area without incident and without impacting the pristine and fragile nature of the environment in this area. We were pleased to learn about the protection of the aesthetic aspects...no hydrogen sulfide odor and only a relatively small piece of piping above ground. We are very aware of the negative news articles and movies about fracking, especially those based on deep wells in states with completely different geology and less stringent rules governing the drilling and fracking of natural gas wells, as compared to Michigan's rules. For additional factual information please visit <http://energyindepth.org/just-the-facts/>.

We were also pleased to learn about the \$12 million from the Michigan Natural Resources Trust Fund that has been received within Antrim County to acquire land for parks and recreation, including some for the purchase of portions of Grass River Natural Area. The source of funds in the Trust Fund are from leases and proceeds received from State of Michigan mineral leases and royalties generated from the production of oil and natural gas.

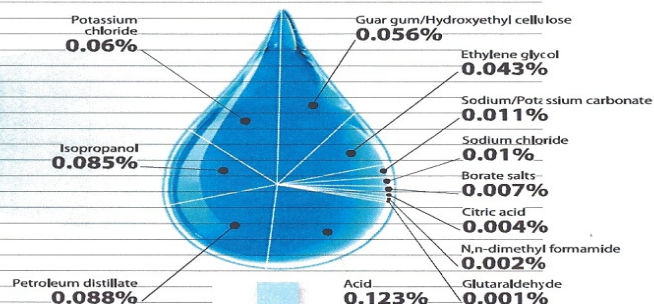


DEQ map showing the location of natural gas wells in this area.

A FLUID SITUATION:

TYPICAL SOLUTION* USED IN HYDRAULIC FRACTURING

0.49%
ADDITIVES*



Compound*	Purpose	Common application
Acids	Helps dissolve minerals and initiate fissure in rock (pre-fracture)	Swimming pool cleaner
Glutaraldehyde	Eliminates bacteria in the water	Disinfectant; Sterilizer for medical and dental equipment
Sodium Chloride	Allows a delayed break down of the gel polymer chains	Table Salt
N, n-Dimethyl formamide	Prevents the corrosion of the pipe	Used in pharmaceuticals, acrylic fibers and plastics
Borate salts	Maintains fluid viscosity as temperature increases	Used in laundry detergents, hand soaps and cosmetics
Polyacrylamide	Minimizes friction between fluid and pipe	Water treatment, soil conditioner
Petroleum distillates	"Slips" the water to minimize friction	Make-up remover, laxatives, and candy
Guar gum	Thickens the water to suspend the sand	Thickener used in cosmetics, baked goods, ice cream, toothpaste, sauces, and salad dressing
Citric Acid	Prevents precipitation of metal oxides	Food additive; food and beverages; lemon juice
Potassium chloride	Creates a brine carrier fluid	Low sodium table salt substitute
Ammonium bisulfite	Removes oxygen from the water to protect the pipe from corrosion	Cosmetics, food and beverage processing, water treatment
Sodium or potassium carbonate	Maintains the effectiveness of other components, such as crosslinkers	Washing soda, detergents, soap, water softener, glass and ceramics
Proppant	Allows the fissures to remain open so the gas can escape	Drinking water filtration, play sand
Ethylene glycol	Prevents scale deposits in the pipe	Automotive antifreeze, household cleansers, deicing, and caulk
Isopropanol	Used to increase the viscosity of the fracture fluid	Glass cleaner, antiperspirant, and hair color

On average, **99.5%** of fracturing fluids are comprised of freshwater and compounds are injected into deep shale gas formations and are typically confined by many thousands of feet or rock layers.

Source: DOE, GWPC: Modern Gas Shale Development In the United States: A Primer (2009)

The specific compounds used in a given fracturing operation will vary depending on source water quality and site, and specific characteristics of the target formation. The compounds listed above are representative of the major material components used in the hydraulic fracturing of natural gas shales. Compositions are approximate.

WWW.ENERGYINDEPTH.ORG



Chemicals used to hydraulically fractionate gas shale formation to enhance the production of natural gas.