Questions and answers about hydraulic fracturing in Michigan

What is fracking?
Fracking is a slang term for hydraulic fracturing, a process that maximizes the output of natural gas and oil wells to make them productive. “Hydraulic Fracturing” is just part of the new fracking process. The major difference between old fracking and new fracking is the addition of horizontal drilling, higher pressures, greatly increased water removal, and the use of many more chemicals. HVHF stands for High Volume Hydraulic Fracturing and should not be confused with conventional fracking.

How does hydraulic fracturing work?
When a well is fractured, an operator pumps a mixture of water, sand and a small amount of chemicals into an oil or gas formation deep underground and applies pressure. The pressure fractures rock layers, releasing oil or gas reserves. The sand holds the fractures open to continue allowing the oil or gas to flow into the well. The amount of chemicals utilized in the new fracking process is not “small”. The Encana State Excelsior 3-25 HD1 in Kalkaska County, Michigan used over 150,000 gallons of chemicals, and over 21 million gallons of water in 2012.¹ This may “only” be about .714% of the total fluid, but these chemicals will need to be transported, stored and mixed on site. A very small amount of some of them can be extremely hazardous.

As gas or oil comes to the well head under pressure, it brings with it the fracturing water that was pumped, along with natural brines that are present in the deeper layers. That “flowback” water is separated from the gas and oil at the surface, contained in steel tanks, and sent to deep injection wells for disposal. The “flowback” from the new fracking process can contain releases from the shale, including radioactive materials and heavy metals, as well as the chemicals originally introduced. 30% to 70% of the waste water is returned to the surface.² In Michigan, fracking flowback must be contained in stainless steel tanks and disposed of in an injection well.³

Unless the Michigan DEQ issues a permit for spraying it on roads, as it did in May of 2012. Over 40,000 gallons of flowback waste from the State Excelsior wells was spread as “dust control” on Northern Michigan roads in Kalkaska and Cheboygan counties over a period of 94 days.⁴ One of the ingredients of the flowback fluid was this acid inhibitor:
This compound includes undisclosed proprietary ingredients and comes with these hazard warnings:

### III. Hazardous identification

**Emergency Overview:** Harmful if absorbed through skin or swallowed. Flammable liquid and vapor. May cause flash fire or explosion.

**Eye Contact:** Severely irritating. If not removed promptly, product will injure eye tissue, which may result in permanent damage.

**Skin Contact:** May cause skin irritation. Allergic reaction is possible. May cause skin sensitization. An allergic reaction, which becomes evident on re-exposure to this material.

**Inhalation:** POISON! May be fatal if inhaled. May be irritating to mucous membranes and lung tissue.

**Ingestion:** POISON! Fatal if swallowed. May be irritating to mouth, throat, and stomach.

**Chronic Harads:** Overexposure may cause kidney damage. May cause liver disorder (e.g., edema, proteinuria) and damage.

The difference between produced water and flowback is only just beginning to be understood in the Collingwood shale. The usual target formation for old fracking is the Antrim Shale. The target formation for the new kind of fracking is the Utica Collingwood, located far below the Antrim shale layer. It’s questionable whether there is any “produced water” with Collingwood wells; it may only be flowback. To demonstrate this, you could complete an Antrim frack with no water at all, and it would “produce” water because there’s water in the formation. With a Collingwood frack, there may be no water in the formation, so it will never “produce” its own water. It’s possible that only flowback will come from a Collingwood well. This is a brand new process, so feel free to ask area geologists their thoughts on this subject. It’s important to reiterate the main point here: an Antrim frack has nothing to do with a Collingwood frack. It’s possible the DEQ permitted the “flowback” to go on roads because they too were new to understanding this process and made a
They may have been using Antrim logic with Collingwood wells because they didn’t know either. It goes to show that basing regulations for today’s fracking on yester year’s fracking is unacceptable.

Is hydraulic fracturing new?
No. Gas and oil operators have been using hydraulic fracturing around the country since the late 1940s. **Hydraulic fracturing** is not new: i.e. using liquid to fracture formations or stimulate production. The process has existed for many decades, using relatively small volumes of water, to stimulate gas and oil wells to increase production. What **IS** new is the combination of high-precision, directional drilling with high volume hydraulic fracturing in deep shale formations. The process uses many times more water and chemical additives for the fracturing. While short leg horizontal fracturing (a few hundred feet) from vertical wells into the Antrim formation (typically 1500 feet deep) have been in the testing phases since the 1980’s, the process of deep shale horizontal hydraulic fracturing did not occur until 2010 in the Utica Collingwood formation in Michigan. (See also response to first question).

Is hydraulic fracturing used in Michigan now?
Yes. Companies in Michigan have been using it to facilitate oil and gas production for about 50 years. Approximately 12,000 wells have been fractured in that time, and fracturing has never jeopardized the environment or public health. This is a map of Michigan’s gas and oil fields, not a map of high volume hydraulically fractured
wells. Below is the DEQ's map showing high volume hydraulic fracturing well applications and permits which propose to use more than 100,000 gallons of water to complete (downloaded April 3, 2013).
Some of the permits included on the list that appears in the lower left corner includes vertical permits which have corresponding permits for their accompanying "horizontal drainhole. The two permits together, in essence, make up one well completed with these new technologies. There are some vertical wells listed which do not have corresponding horizontal drainholes, however. The list doesn’t include the additional 8 applications filed by Encana in March 2013. The new well applications filed by Encana propose water withdrawals ranging from 18,900,000 to 31,500,000 gallons of water withdrawal per well, and a cumulative total of 327,180,000 – all from the Manistee watershed in Kalkaska County. Just these well pads will use almost enough water to complete all 12,000 Antrim wells three times over in one basic location: 

\[(12,000 + 12,000 + 12,000) \times 10,000 \text{ gallons per well} = 360,000,000 \text{ gallons.} \]

**Has hydraulic fracturing been responsible for environmental damage in Michigan?**

No. Yes and no. Has the actual and single act of forcing liquid into a formation caused environmental damage? This question cannot be accurately answered, since that act is part of a larger process, and cannot happen without the additional risks inherent to the process also occurring (i.e. drilling, casing, grouting the well, production and disposal of drilling muds, etc). Has environmental damage occurred at sites where gas and oil wells have been hydraulically fractured? Absolutely. 26 orphaned wells are leaking hydrocarbons or have caused groundwater contamination. The Michigan Oil and Gas Regulatory Fund Annual Report (Fiscal Year 2010-2011,) indicates 355 Spill Response Activities, 431 Remediation activities and 141 Remedial Investigations in connection with oil and gas wells and related activities. Specific recent examples of hydrocarbon contamination include the Adams R.1 well in Isabella County, the Price 1 well in Ogemaw County, and the Kobetich et al L-2 well in Gladwin County.

It can also be said that the very act of removing fresh water and adding toxic chemicals to it which cannot be removed effectively results in contamination and environmental damage, because the water has been irreversibly contaminated at that point. **Some are calling for a halt on fracking so it can be studied. What does DEQ think?**

State regulators have been studying hydraulic fracturing in action for five decades. As the lead regulatory agency in Michigan, the DEQ does not support halting an activity that has been regularly used without serious incident. As previously stated, hydraulically fractured high volume horizontal wells in deep shale formations cannot have been studied for decades since they did not get permitted in Michigan until 2010. The State of New York has extended its
moratorium on this type of gas and oil development while it conducts a study on the impacts of these new drilling and completion technologies. Several townships in Michigan have enacted moratoriums to provide themselves the opportunity to assess their options with regard to an ordinance on HVHF also.

**How do Michigan regulations protect the environment?**

Michigan has strict rules about how much water can be used for fracturing, how wells are constructed, how they are tested before they are employed, and how the used ‘flowback’ water is contained and disposed of.

Gas and oil operations are exempt from the “strict rules” imposed for water withdrawal by statute. A Supervisor’s Order from 2011 requires that a Water Withdrawal Assessment Tool (WWAT) computer program be utilized, but even when the tool indicates adverse impact, the Supervisor of Wells can, and has, permitted the water withdrawal anyway (State Excelsior 1-25 HD1).\(^\text{13}\)\(^\text{13}\) 13 recent applications filed by Encana for hydrocarbon development in Kalkaska County cumulatively estimate water withdrawal for those wells to be 327,180,000 gallons of water from the same watershed from which 60,535,564 gallons of water has been already withdrawn for the Excelsior 1-13,1-25, 2-25 and 3-25 wells.\(^\text{14}\)\(^\text{14}\) The WWAT does not take in account the cumulative impact of these actual or proposed water withdrawals. It can be demonstrated that there has been a 3000 fold increase in water withdrawal from the “old” method of fracking (10,000 gallons for Antrim well vs 31 million proposed for the 4-25 HD1). To our knowledge, there has never been a permit denied for gas/oil water withdrawal even after WWAT reports were flagged for site specific review (which despite the name, does not actually involve a visit to the site) due to potential adverse impact.

These are the four top risks from gas and oil development. The DEQ has developed a regulatory structure that has effectively protected Michigan’s environment and public health for decades.
Does the DEQ support hydraulic fracturing?
The Michigan Department of Environmental Quality exists to protect the environment and public health by regulating industrial activity that may impact Michigan’s air, water and soil. Not exactly. The mission of the Office of Oil, Gas, and Minerals (OOGM) is to promote the best use of Michigan’s non-renewable geological resources for their social and economic benefits while protecting associated resource values, property rights, the environment, and public health and safety.\textsuperscript{15}

The DEQ regulates gas and oil production in Michigan. Hydraulic fracturing is a common technique that has been used on more than 12,000 wells in Michigan for more than 50 years without any consequence to the environment or public health. The new fracking wells are vastly different from those 12,000 wells that used small amounts of water to complete in relatively shallow formations and did not employ horizontal drilling or the volume or array of chemicals now used in hydraulically fractured high volume horizontal wells in deep shale formations. As discussed previously, there were many environmental issues with quite a number of those 12,000 “old” type of much smaller fracking wells.

It is important to look again at the numbers on the applications recently filed by Encana for five additional wells on one well pad in Oliver Township, Kalkaska County. This one well pad proposes to use 132,300,000 aggregate gallons of water\textsuperscript{16}: this is more water from a single watershed for a single well pad than all 12,000 Antrim wells cumulatively used in over 60 years of Antrim drilling. Don’t believe it? The average number of gallons used to complete an Antrim well is 10,000 gallons per well.\textsuperscript{17} Multiply 10,000 times 12,000. The result is 120,000,000. That's 12.3 million less than the estimated water withdrawal for the five new wells.

If this process posed a threat to the public or the environment, the DEQ would further regulate it or outlaw it. To the contrary, Michigan’s regulatory structure has been held up as a national model for effective, protective regulation.

Michigan adopted its basic oil and gas conservation statutory scheme in 1929. The well spacing and compulsory pooling provisions were adopted in 1937, amended thereafter and recodified in 1994.\textsuperscript{18} Part 615 of the Michigan Compiled Laws (MCL 324.61501 et seq.) has not been amended since 2004.\textsuperscript{19} The Administrative Rules promulgated by the DEQ to implement Part 615 have not been amended since 2002. There has been no change in any regulation since the permitting of high volume horizontal hydraulic fractured wells began in Michigan in 2010, but for a single Supervisor’s Instruction (not a regulation) regarding use of the WWAT. And, even though the Supervisor of Wells requires a WWAT to be completed for an application for a HVHF well, the well
can be permitted regardless of its potential to cause an adverse resource impact. Those old regulations also fail to address the spacing of the horizontal wells (new applications have horizontals up to 2 miles long with wellheads 50 feet apart), well completion techniques, potential adverse environmental impacts, massive volumes of permanent water withdrawal and greatly increased use of chemicals.

There was, however, one interesting statutory change to Part 327 in 2008 when the exemptions from the large water withdrawal statute (MCL 327.32727) for emergency withdrawals were augmented by an additional exemption for all permits issued for gas/oil development. This occurred, ironically enough, just two years prior to the first deep shale hydraulically fractured horizontal well in Michigan—the Pioneer well in Missaukee County, permitted in 2010.

Is hydraulic fracturing necessary?
Hydraulic fracturing has been used on 78% of all wells drilled in recent years in Michigan for a simple reason: it works. Traditional gas and oil development involved drilling into rock formations that allowed oil and gas to flow freely through the rock and into a well bore.

Hydraulic fracturing technology allows for development of “tight” rock formations that contain oil or gas but do not allow it to flow into a well without this technology. Hydraulic fracturing has dramatically increased the production of oil and gas in the United States and reduced the need for imported energy supplies. The truth is, it’s simply unprofitable for private companies to continue to harvest our public oil & gas resources unless they can use our public water resources. By granting large volume water withdrawals to a foreign company like Encana, the public wealth of the many is transferred to private wealth of the few. There is nothing to ensure that the gas and oil extracted by Encana will stay in Michigan or even in the United States. When they are done extracting all of the deep shale gas and oil in Michigan, using hundreds of millions of gallons of our water to do so, and injecting hundreds of millions of gallons of toxic waste under our land, they will be gone, back to their own countries, leaving us to deal with any long term environmental remediation left behind.

Does the DEQ support further regulating or stopping hydraulic fracturing?
The DEQ regularly updates its regulations to reflect changes in the environment, available technology, and industry practices. The hydraulic fracturing regulations were updated in 2011.
The “update” referenced in 2011 is in the form of a Supervisor of Wells Instruction 1-2011.²⁰ This Order specifies only that the Water Withdrawal Assessment Tool be utilized as previously explained. Further, even though the supervisor of wells requires a WWAT to be filed, he has the authority to
approve the water withdrawal regardless of WWAT or a site specific finding. Even though we’re told regulations are updated regularly, the most important ones to protect Michigan’s sovereign wealth don’t seem to be changing. For example, the bond amount for each well remains the same at $250,000 yet the stakes to our aquifers have gone up significantly. The pressures used to frack the wells have gone from 2,000 psi in the Antrim to 10,000 psi in the Collingwood, thus increasing the risk of a contaminated aquifer through extended fractures. The lease price for Michigan land averaged $16.87 at the last auction in October of 2012\textsuperscript{21}, but the water use has gone up by a factor of 3,000. The risks have gone up to Michigan’s sovereign wealth immensely, yet the state still only gets 1/6\textsuperscript{th} of the revenue.

The DEQ monitors gas and oil production in Michigan very carefully. The DEQ is confident in its ability to protect the public and allow the gas and oil industry to continue developing local energy sources. In recent years DEQ departments have been closed or minimally staffed.\textsuperscript{22} Groundwater, contamination and geological survey departments have been disbanded or transferred.\textsuperscript{23} The department as it remains is staffed by 55 people; including 22 area geologists.\textsuperscript{24} With an estimate of 18,000 active wells, area geologists within this department would have to visit over 3 wells per day to observe each active well site one time per year.\textsuperscript{25} The DEQ does not have adequate staff to oversee and regulate established mining activity or contamination events. Recently revised recommendations greatly increase staff responsibilities.\textsuperscript{26} The Michigan Information and Research Service recently reported that $2.7 million of General Fund money was cut out of the House version of the Department of Environmental Quality’s (DEQ) budget for Fiscal Year (FY) 2014.\textsuperscript{27}

How carefully is the DEQ monitoring the sites? So carefully that at the time of this writing, the Schick well in Clare County has a severed well head with open chemical contaminate containers on site. The Shultz well in Sanilac County has uncapped water wells, containers marked “unregulated waste water” and spillage near the wellhead.\textsuperscript{28} The State Richfield in Roscommon County also has open chemical containers with clear hazard warnings left on site.

**What kinds of chemicals are used?**
Many people are surprised to learn that 99.5% of ‘fracking fluid’ is water and sand. The remaining half percent varies, but the chemicals used are determined by the type of rock targeted for production. Below is a breakdown of common fracturing fluid components.
While some of the chemicals used in hydraulic fracturing are common and generally harmless, some are known carcinogens or toxic. The most common chemical used for hydraulic fracturing in the United States in 2005–2009 was methanol, while some other most widely used chemicals were isopropyl alcohol, 2-butoxyethanol, and ethylene glycol. Between 2005 and 2009, 279 products had at least one component listed as "proprietary" or "trade secret" on their Occupational Safety and Health Administration (OSHA) required Material Safety Data Sheet (MSDS). The MSDS is a list of chemical components in the products of chemical manufacturers, and according to OSHA, a manufacturer may withhold information designated as "proprietary" from this sheet. When asked to reveal the proprietary components, most companies participating in the investigation were unable to do so, leading the committee to surmise these "companies are injecting fluids containing unknown chemicals about which they may have limited understanding of the potential risks posed to human health and the environment."  

A 2011 study identifies 632 chemicals used in natural gas operations. Only 353 of these are well-described in the scientific literature; and of these, more than 75% could affect skin, eyes, respiratory and gastrointestinal systems; roughly 40-50% could affect the brain and nervous, immune and cardiovascular systems and the kidneys; 37% could affect the endocrine system; and 25% are carcinogens and mutagens. The study indicates possible long-term health effects that might not appear immediately. The study recommends full disclosure of all products used, along with extensive air and water monitoring near natural gas operations; it also recommends that HVHF’s exemption from regulation under the US Safe Drinking Water Act be rescinded.

<table>
<thead>
<tr>
<th>Component / Additive Type</th>
<th>Example Compound(s)</th>
<th>Purpose</th>
<th>Percent Composition (by volume)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Water</td>
<td></td>
<td></td>
<td>90</td>
</tr>
<tr>
<td>Proppant</td>
<td>Silica, quartz sand</td>
<td>deliver proppant</td>
<td>9.51</td>
</tr>
<tr>
<td>Acid</td>
<td>Hydrochloric Acid</td>
<td>keep fractures open to allow gas flow out</td>
<td>0.1230</td>
</tr>
<tr>
<td>Friction Reducer</td>
<td>Polyacrylamide, mineral oil</td>
<td>minimize friction between fluid and the pipe</td>
<td>0.0880</td>
</tr>
<tr>
<td>Surfactant</td>
<td>isopropanol</td>
<td>increase the viscosity of the fluid</td>
<td>0.0850</td>
</tr>
<tr>
<td>Potassium chloride</td>
<td></td>
<td>create a brine carrier fluid</td>
<td>0.0600</td>
</tr>
<tr>
<td>Gelling agent</td>
<td>Guar gum, hydroxyethyl cellulose</td>
<td>thicken the fluid to suspend the proppant</td>
<td>0.0560</td>
</tr>
<tr>
<td>Scale inhibitor</td>
<td>Ethylene glycol</td>
<td>prevent scale deposits</td>
<td>0.0430</td>
</tr>
<tr>
<td>pH adjusting agent</td>
<td>Sodium or potassium carbonate</td>
<td>maintain the effectiveness of the other components</td>
<td>0.0110</td>
</tr>
<tr>
<td>Breaker</td>
<td>Ammonium persulfate</td>
<td>allowed delayed breakdown of the gel</td>
<td>0.0100</td>
</tr>
<tr>
<td>Crosslinker</td>
<td>Borate salts</td>
<td>maintain fluid viscosity as temperature increase</td>
<td>0.0070</td>
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<tr>
<td>Iron Control</td>
<td>Citric Acid</td>
<td>prevent precipitation of metal oxides</td>
<td>0.0040</td>
</tr>
<tr>
<td>Corrosion Inhibitor</td>
<td>N,N-dimethylformamide</td>
<td>prevent pipe corrosion</td>
<td>0.0020</td>
</tr>
<tr>
<td>Biocide</td>
<td>Glutaraldehyde</td>
<td>eliminate bacteria</td>
<td>0.0010</td>
</tr>
</tbody>
</table>
I've heard “horizontal” fracturing is different. Is it?
In past years, most natural gas exploration in Michigan targeted reserves ranging up to 2,000 feet below the surface. Energy companies more recently have started to target deposits that are 5,000 or more feet underground. The process for fracturing the wells remains the same. What is different is the amount of oil or gas recovered, the amount of water required for hydraulic fracturing, and the increasing use of horizontal drilling. One typical deep horizontal well can replace 10 to 20 vertical wells, reducing the footprint on the landscape. These deposits are even further from the surface, which further reduces any potential threat to aquifers. However, deep horizontal wells use more water than a shallow, vertical well operation.

The fact that the target formation is lower in the new type of fracking does not make it safer. The pressure is attained in a closed system whether it was 2000 feet or 9000 feet or 20,000 feet. The risk is directly proportional to the amount of pressure used to frack the well. As the amount of pressure is increasing, the risk is increased by more than just by addition and subtraction, but rather exponentially. If there is so much as a pinhole leak in the closed system, the increased pressure will blow more toxic fluid through that pinhole as an exponential function to the amount of the pressure.

Simply put, casings can be bad from the get go, or they can fail over time. While an operator can monitor pressures to know when a casing is bad and decide not to frack, as was the case with Lucas 1-13 HD well in Kalksaka County, an operator has no recourse if the casing fails during the frack or after the frack. If an operator feels pressure to “carry on” for fear of upsetting his boss, this risk goes up even more. If the DEQ is not notified and an operator chooses to act unethically and hide reports of these leaks it can have serious consequences for our environment. If there is a leak in the casing, the pressure in the well bore will continue to seek that hole in the closed system until the hydraulic pressure is equalized. That means, as long as there is more pressure in the well bore (highly likely) the toxins will continue to spew out the leak until pressure is equalized. If that hole happens to be near the aquifer or has a migration path to the aquifer, the aquifer is contaminated.

This is common sense and does not take a degree in geology to understand. To mislead and abate concern by once again comparing old fracks to new fracks is wrong at best and intentionally misleading at worst.

One deep shale horizontal well will not replace 10 to 20 Antrim shale wells in production of natural gas. An Antrim well generally produces between .5 to .8
Bcf (Billion Cubic Feet) over its twenty year plus lifetime. Thus far, Excelsior 1-13 and 1-25 have not surpassed 750Mcf since December of 2011. Granted, it’s early in the game, but it’s important to note the Excelsior production is far, far below those of other deep shale plays in the U.S., such as the Marcellus. Any claim made about the EUR (Estimated Ultimate Recovery) on Collingwood wells is speculative; there is no data to support such claims.

Spacing for Antrim wells is 40 acres. That would be 800 acres for 20 Antrim wells. A new drilling unit proposed by Encana in Kalkaska County is 2240 acres for three wells.

**Does hydraulic fracturing cause earthquakes?**

There is one instance in British Columbia where hydraulic fracturing is believed to have caused very low-level earthquakes; only one was felt by humans, and none caused any damage or safety risks. There have been instances of similar earthquakes in other states associated with deep wells used for disposal of waste fluids from oil and gas development under specific conditions. Michigan does not have the conditions necessary for this to occur.

Significant earthquakes are increasing occurring within the continental interior of the United State, including five of moment magnitude in 2011 alone. Concurrently, the volume of fluid injected into the subsurface related to the production of unconventional resources continues to rise. A recent study published by the Geological Society of America on in March of 2013 identifies the largest earthquake potentially related to injection: a Mw 5.7 earthquake in November of 2011 in Oklahoma. The earthquake was felt in at least 17 states.
The study shows that the tip of the initial rupture plane is within 200 m of active injection wells.  

I saw a video where someone lit their tapwater on fire. Is that from hydraulic fracturing?  
No. There have been a few rare cases where gas from drilling operations has escaped into fresh water aquifers; however, that was caused by improper well construction, not hydraulic fracturing. Where gas occurs in water wells, it is almost always from natural pockets of methane gas. Over time, gas seeps into the water well and is transmitted into the home. It has been documented in Michigan public health advisories dating back to the 1960s. It has never been associated with hydraulic fracturing.

A Michigan DNR Report released in 1990 chronicles 53 incidents of oil/gas leakage as a result of hydrocarbon development; 5 of them are specifically for methane. Hydraulically fractured wells are just as susceptible to methane migration as unfractured wells, arguably more so as a result of extended length of casing which means extended length of grout/cement subject to improper seal, and due to increased pressure in the wells.

As presented by the National Academy of Sciences of the United States in study results released in May of 2011, it has been documented that water wells within a kilometer of HVHF wells targeting the Marcellus and Utica shale in Pennsylvania and New York were 17 times more likely to have methane present than water wells with outside that distance or where no HVHF development had occurred. You can’t segment one part of the process from another part, and then blame methane migration on only one of them. All of the components to complete a HVHF well need to be taken as a whole because you can’t have an HVHF well without casing, grout, water, or chemicals. It is a process that needs to be considered as a whole.

We can find no report of anyone lighting their tap water on fire in Michigan. Yet.

Has hydraulic fracturing in other states polluted rivers?  
The actual process of hydraulic fracturing has not polluted rivers. However, in other states flowback water had been trucked to local wastewater plants for treatment and then discharged to surface waters. The wastewater plants were not equipped to remove naturally occurring salts from the water. Once again, an attempt to isolate the fracturing process from the entire development process is used. The Pennsylvania Department of Environmental Protection issued a fine of $75,000 to one treatment plant, and ordered it to stop accepting drilling waste after it discharged fecal coliform and suspended solids, not “naturally occurring salts” into a river. Flowback contains chemicals that kill the microbes utilized in waste water treatment plants. Radioactivity in wastewater is also a major concern. There will be 300,000 to
700,000 gallons of flowback to dispose of for every 1,000,000 gallons of water used to fracture and complete each well. It cannot safely be reused or recycled for any purpose so, if regulations are followed, it must be re-injected into a waste disposal well. Disposal wells present another possible avenue for contamination through migration as a result of casing breakdown, improper seal, or encounter with existing fractures or faults.

This has never happened in Michigan because Michigan regulations require flowback water to be contained in steel tanks and sent to deep injection wells for disposal. Operators are not allowed to use any other containment or disposal method. In the case of the Anglers of the AuSable vs. Michigan Department of Environmental Quality, Merit Energy sought to discharge 800 gallons per minute into Kolke Creek, which forms the headwaters of the AuSable River. It took a lawsuit to stop it. 38

Does use of water for horizontal fracking threaten water supplies?
No. Oil and gas companies are subject to the same requirements as other users of large volumes of water—they must first evaluate the potential effects of the withdrawal using a computer program Michigan regulators designed to track and measure water use and protect local aquifers. The Water Withdrawal Assessment Tool (WWAT) is a computer program which purportedly predicts whether a proposed withdrawal will change the flow or temperature rate of a river or stream enough to kill an “unacceptable” amount of fish that live there. The data it uses to make this determination was extrapolated for 7000 river and stream segments in Michigan from just 147 actual flow data sets. It was proven to have overstated the flow rate for Kolke Creek to be 100 times than it actually is. 39

To say Oil and gas companies are subject to the same requirements as other large users of water has been demonstrated as false in previous responses above. To reiterate: the only significant change was in 2008 to exempt the oil and gas industry from rules governing large volume water use prior to the very first one of these types of wells being drilled.

If it appears that proposed local uses put dangerous stress on local water supplies, the proposed withdrawal request is denied. The Office of Oil, Gas and Minerals has never denied a permit because of proposed water withdrawal. The current Supervisor of Wells has stated that he has never denied a permit for any reason during his tenure in that position. 40. Again, in 2008, just before the very first well of this type was drilled, the Supervisor of Wells was specifically given explicit authority to approve an oil or gas well even if they potentially caused an adverse resource impact as indicated on the WWAT.

Michigan’s water withdrawal assessment tool is a nationally lauded environmental
The WWAT was not designed to calculate adverse impact as a result of proposed water withdrawal in the context of water for gas/oil development, and such withdrawals are specifically exempted from the water withdrawal statute.41

1 fracfocusdata.org

2 http://www.endocrinedisruption.com/home.php

3 http://www.endocrinedisruption.com/chemicals.introduction.php

4 http://www.northernexpress.com/michigan/article-5927-fracked-roads.html; documents received through Freedom of Information Act request by BanMichiganFracking.org

5 Michigan DEQ MSDS for State Excelsior 3-25 HD1

6 Statement of Robert W. Howath, PhD, Cornell University, before the Sub-Committee on Technology, Information Policy, InterGovernmental Relations, and Procurement Reform, Committee on Oversight and Government Reform, U. S. Congress May 31, 2012

7 www.michigan.gov/.../deq/utica_-_collingwood_activity_map3_3548...


9 http://ww2.deq.state.mi.us/GeoWebface/GeoWebface/DL/151/59112_DL.pdf

10 Applications received pursuant to Freedom of Information Act requests March 14, 2013 by Friends of the AuGres-Rifle Watershed


13 WellFile at http://ww2.deq.state.mi.us/GeoWebface/GeoWebface/WF/079/60389_WF.pdf


15 http://www.michigan.gov/deq/0,4561,7-135-3306_57064---,00.html

16 Applications A130043, A130044, A130044, A130045, and A130047 received pursuant to Freedom of Information Act requests March 14, 2013 by Friends of the AuGres-Rifle Watershed from Michigan DEQ

17 See TheAntrimShaleProject, respectmyplanet.org.

18 MCL 324.61513 (1994)
41 Michigan Compiled Laws 324.32727