

## FRACKING PRESENTATION

By Mainstreet Moms, West Marin, California

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I am from Mainstreet Moms in West Marin. We are a citizen advocacy group currently focused on telling people about the potential damage to the human and natural environment caused by hydraulic fracturing in California, a critical energy issue of concern to all of us.

I have a bumper sticker on the back of my car which says “Moms against fracking.” Recently at a gas station a young woman asked me “what is fracking?” Some of you may have the same question.

Fracking is a process used to enhance the extraction of oil or natural gas from the earth. Large amounts of water mixed with sand and chemicals are injected under very high pressure deep into the earth to fracture the bedrock and release oil or gas (and in California, it is usually oil and not natural gas).

The process of fracking for oil presents many possible dangers for our human and natural environment. I want to focus on only a few. Fracking

- Consumes large amounts of water,
- Has the potential to contaminate our groundwater, and
- Has proven to trigger earthquakes.

Fracking has made it easier and more profitable to extract formerly unrecoverable oil and gas. As a result U.S. oil production is at a 21-year high.<sup>1</sup> It’s potentially the new gold rush in California, which is the third largest oil-producing state in the country.<sup>2</sup> But now in the 21<sup>st</sup> century in the era of climate change and global warming, we have to ask the question that gold miners in the 19<sup>th</sup> century didn’t ask:

“Does the long term damage to the environment outweigh the short term economic gain?”

The oil and gas industry is implementing this technology much faster than the government is regulating it. We have to slow down the gold rush mentality and ask some very important questions:

- In California where we are constantly worrying about having enough water for agriculture and wildlife habitat, not to mention thirsty people and lawns, do we have enough water to also satisfy the demands of fracking?

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<sup>1</sup> “Review of Emerging Resources: U.S. Shale Gas and shale Oil Plays” U.S. Energy Information Administration (EIA), July 8, 2011. [www.eia.gov/analysis/studies/usshalegas/](http://www.eia.gov/analysis/studies/usshalegas/)

<sup>2</sup> U.S. EIA, Rankings: Crude Oil Production, April 2013. [www.eia.gov/state/rankings/?sid=US#/series/46](http://www.eia.gov/state/rankings/?sid=US#/series/46)

- Will the waste water produced by fracking contaminate our groundwater thereby reducing even further the amount of fresh water available to us?
- In California where there are so many seismic faults, will disposing of fracking waste water in injection wells trigger earthquakes?

Until these questions are answered one way or the other with scientific evidence, there should be a moratorium on fracking in California. That's the position of Main Street Moms.

I want to tell you a shocking story. It takes place in Kern County in southern California where oil and gas production has been going on since the late 1800's. Kern County is also a center of California's major agricultural production. Fred Starrh and his family are long-time Kern County farmers. They grow cotton, pistachios, almonds and alfalfa. Next to his 6,000 acres is Aera Energy which drills for oil. In 1999 Mr. Starrh dug several wells on his land to supplement his irrigation water supply. He used the ground water on his cotton fields, and the cotton plants wilted. He used it on his almond trees, and they all died. He tested his well water and found high concentrations of chloride and boron along with detectable radiation—all common ingredients of waste water that is produced by fracking in oil fields.<sup>3</sup>

Are we poised to destroy California agriculture?

What is fracking, or hydraulic fracturing? It is a process which is used to break up the rock formation containing oil and/or natural gas. Once the rock formation is broken up, the oil or gas flows more easily to the surface. The process consists of high-pressure injection of fluids into the rock. Some of the waste water from this process then returns to the surface. How to dispose of it is very troublesome. Sometimes it is dumped into open air pits. Sometimes it is sent back into the earth into what are called injection wells.<sup>4</sup>

Oil companies in California have been using this process for a number of years. Fracking technology now includes the use of high pressure water with a combination of sand and chemicals. This technology is particularly effective in oil production in shale formations where the oil industry has known of large oil reserves, but found production to be so costly that it wasn't economically viable. That brings us to the Monterey Shale formation.

The Monterey Shale formation is located in central and southern California. The area that is now targeted for oil exploration is about 1,750 square miles, including the counties of Kern, Orange, Ventura, Monterey, and Santa Barbara, some of California's most productive agricultural lands. According to U.S.

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<sup>3</sup> Miller "Oil and Water Don't Mix with California Agriculture" *High County News*, December 6, 2010, [www.hcn.org](http://www.hcn.org); Aiello, "Brown Announces New Oil Industry Regulations Ahead of 'Promised Land' Release," December 20, 2012 [www.californiaprogressreport.com](http://www.californiaprogressreport.com) ; Aiello, "California Farmer Warns: "Don't Trust Oil Industry, State or Courts" to Protect Water," May 21, 2013 [www.californiaprogressreport.com](http://www.californiaprogressreport.com).

<sup>4</sup> Hammer & VanBriesen, "In Fracking's Wake: New rules are Needed to Protect our Health and Environment from Contaminated Wastewater," Natural Resources Defense Council Document May 2012. <http://www.nrdc.org/energy/files/Fracking-Wastewater-FullReport.pdf>

Government estimates, the Monterey shale formation holds up to 15.4 billion barrels of oil, or almost 2/3 of the nation's recoverable shale oil resources.<sup>5</sup>

Another technological innovation that may be more important than fracking in tapping the Monterey Shale is a technique called "acidizing." This involves the injection of hydrofluoric acid into an oil well in order to dissolve rock, not just create fissures in it. Acidizing is more effective than fracking in the Monterey Shale because this rock is shattered and folded by geological fault action. Hydrofluoric acid is one of the most dangerous industrial chemicals in use. This technique adds many new dangerous risks in transporting and working with the acid and then disposing of the wastewater that is created.<sup>6</sup>

Fracking technology and acidizing make it much easier to extract oil from the shale. Easier, however, doesn't necessarily mean safer. Fracking and acidizing are not regulated in the state of California.

The Wheeler Institute for Water Law and Policy at UC Berkeley School of Law is sounding an alarm. In a recent study it said:

"It's a watershed moment for the regulation of fracking in California. While oil and gas producers have used hydraulic fracturing, or fracking, in California for many years, new fracturing techniques combined with demand for oil have led to alarming projections of dramatically increased fracking activity in California. Such development may have outstripped the ability of responsible government agencies to effectively oversee fracking activity and its attendant impacts on our land, air and water resources."<sup>7</sup>

So, let's go back to the questions as responsible citizens we should be asking:

1. How much water does fracking consume?

- Fracking is an extremely water-intensive process. In Kern County an average of about 8 barrels of water must be pumped for every one barrel of oil produced.<sup>8</sup> The oil industry's use of water competes with the needs of agriculture. In 2010 the West Kern Water district sold more than 2/3 of its water to oil companies.<sup>9</sup> The high cost of water treatment and recycling means that oil companies opt for purchasing relatively cheap fresh water rather than reusing its waste water.<sup>10</sup>
- All over the country, including California, aquifers which store ground water are being depleted. This is very serious for California farmers who are increasingly dependent on

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<sup>5</sup> Onishi, "Vast Oil Reserve May Now be within Reach, and Battle Heats Up," *NY Times*, February 3, 2013; "California and fracking," [www.sourcewatch.org/index.php/California\\_and\\_fracking](http://www.sourcewatch.org/index.php/California_and_fracking).

<sup>6</sup> Collier, "A New California Oil Boom? Drilling the Monterey Shale" Parts 1 & 2, August 2013 <http://thenextgeneration.org/about/people/robert-collier>.

<sup>7</sup> Kiparsky & Hein, *Regulation of Hydraulic Fracturing in California: A Wastewater and Water Quality Perspective*, April 2013 [www.law.berkeley.edu/clee](http://www.law.berkeley.edu/clee).

<sup>8</sup> Miller.

<sup>9</sup> Saari, "During Record Drought, Frackers Outcompete Farmers for Water Supplies," *EcoWatch* June 21, 2013. [www.ecowatch.com](http://www.ecowatch.com)

<sup>10</sup> Miller.

ground water because of the shortage of surface water due to diminished snow pack as a result of climate change.<sup>11</sup>

- Can we really afford to use our diminishing water resources for short term gains in oil rather than long term investments in agriculture? Less water for farmers will mean less agricultural production which in turn will mean higher prices for food.

2. Will waste water produced by the fracking process contaminate our ground water?

- To appreciate this danger, you have to understand a little more about fracking. Many of the chemicals mixed with the water and sand which are then injected deep into the earth are known to cause cancer. During the fracking process and subsequent pumping of oil, toxic waste water containing these chemicals flows back to the surface at the well head. Additional toxins naturally occurring within the earth, such as lead, arsenic and radioactive compounds, may also come to the surface with the waste water.<sup>12</sup>
- Evidence is mounting throughout the country that the toxic chemicals used in fracking and toxins unintentionally produced as byproducts are making their way into aquifers and drinking water. Water contamination can take several forms: unintentional spills, improper storage, improper treatment, or illegal dumping present risks to surface water and land.<sup>13</sup> The toxic waste water from the Aera oil fields next to Fred Starrh’s farm was dumped into open-air evaporation ponds. That toxic water leached out of the ponds and contaminated the aquifer.<sup>14</sup> That contaminated water killed his almond trees. This happened almost 15 years ago, and is still happening today. Another Kern County farmer named Tom Frantz just last fall videoed a fracking job in which an oily-brown waste spills from a pipe into an unlined pit near another almond grove.<sup>15</sup>
- Drinking water from wells near areas where fracking is occurring in Pennsylvania and other states in the east have been tested and shown to be contaminated.<sup>16</sup>
- Water contamination can also occur as a result of the waste water being re-injected into the earth. These injection wells are typically drilled through aquifers. If the well seal or casing is flawed, there is a risk of contamination of aquifers.<sup>17</sup>
- We actually know relatively little about contamination of groundwater by fracking fluids because the exact chemicals used are protected as trade secrets.<sup>18</sup> Oil and gas companies do not have to disclose the composition of the fluid they inject into the ground. The lack of regulation and reporting requirements should cause us to go slow so that all the impacts—whether negative or neutral—can be understood and regulated.

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<sup>11</sup> Perlman, “Aquifer depletion detected from on high” SF Chronicle June 21, 2013.

<sup>12</sup> Kiparsky & Hein.

<sup>13</sup> Kiparsky & Hein.

<sup>14</sup> Miller, “California Drought is No Problem for Kern County Oil Producers,” August 24, 2010, [www.circleofblue.org](http://www.circleofblue.org).

<sup>15</sup> Knudson, “Fracking Near Shafter Raises Questions about Drilling Practices,” *Sacramento Bee* June 30, 2013.

<sup>16</sup> Begos, “Pennsylvania Drinking Water Study shows Methane Might Contaminate Some Wells Near Fracking Sites,” June 24, 2013 [www.huffingtonpost.com](http://www.huffingtonpost.com).

<sup>17</sup> Hammer & VanBriesen; Kiparsky & Hein.

<sup>18</sup> Kiparsky & Hein.

### 3. Will fracking trigger earthquakes?

- Wastewater is typically disposed of by re-injecting it back into the earth into what is called an injection or disposal well.
- According to a recently published report by the [U.S Geological Survey](#) (USGS), there has been a significant increase in seismic activity in the central and eastern United States that coincides with the injection of wastewater in deep disposal wells.<sup>19</sup>
- There is convincing evidence that in 2011 a magnitude 5.7 earthquake in Oklahoma was triggered by an active wastewater-injection well. This earthquake destroyed 14 homes and injured two people. It was felt as far away as Chicago.<sup>20</sup>
- Earthquakes in Ohio, Arkansas, Texas and Colorado have also been attributed to the injection of wastewater into injection wells.<sup>21</sup>
- We don't know how this will play out in California. What we do know is that we have active faults, and the state will have to monitor this very closely.

Fracking and fracking wastewater are big issues in many states across the country.<sup>22</sup> And in each of those states, citizens are demanding appropriate regulation of the oil and gas industry to protect the environment and public health. That is what needs to happen in California.

We need proper regulation of the fracking process itself. There currently is none. The state of California doesn't even know where fracking is taking place, or how it is being done.

Until we know enough about the risks and until we have comprehensive regulation based on scientific evidence, there should be moratorium on fracking. This is what is being done in New York State, and is what should be done here.

What can we do?

1. Educate yourself
2. Talk to others – recent (June 7, 2013) poll by LA Times: 58% want to ban fracking near groundwater sources; 52% favor tax incentives for good safety record; 84% want property owners nearby to be informed of fracking<sup>23</sup>

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<sup>19</sup> More than 300 earthquakes above a magnitude 3.0 occurred in the three years from 2010-2012, compared with an average rate of 21 events per year observed from 1967-2000. Ellsworth, Robertson, Hook, "Man-Made Earthquakes," [www.usgs.gov/blogs/features/usgs\\_top\\_story/man-made-earthquakes](http://www.usgs.gov/blogs/features/usgs_top_story/man-made-earthquakes) (July 12, 2013).

<sup>20</sup> W.L. Ellsworth, "Injection-Induced Earthquakes," *Science* **341**, 1225942 (2013); Keranen, Savage, Abers & Cochran, "Potentially induced earthquakes in Oklahoma, USA: Links between wastewater injection and the 2011 Mw5.7 earthquake sequence," [www.geology.gsapubs.org/content/early/2013/03/26/G34045.1abstract](http://www.geology.gsapubs.org/content/early/2013/03/26/G34045.1abstract); Choi, "Confirmed: Fracking practices to blame for Ohio earthquakes," <http://www.nbcnews.com/science/fracking-practices-blame-ohio-earthquakes-8C11073601>.

<sup>21</sup> Ellsworth, "Injection-Induced Earthquakes;" Charles Q. Choi, "Confirmed: Fracking practices to blame for Ohio earthquakes" Sep. 4, 2013, <http://www.nbcnews.com/science/fracking-practices-blame-ohio-earthquakes-8C11073601>.

<sup>22</sup> Massachusetts, Vermont, New Jersey, Connecticut, Pennsylvania, Ohio, Texas, Colorado, Wyoming. Maryland, Oklahoma, Michigan.

3. Communicate with Governor Brown and ask him to place a moratorium on fracking until there are adequate regulations
4. Citizen advocacy can make a difference. Please do your part.

The California gold rush brought great wealth to a few and a legacy of significant environmental degradation still evident today - such as contaminated drinking water and fish from mercury, arsenic, and asbestos, and sediment filling up San Francisco Bay to name only a few.<sup>24</sup> Let's act together as responsible citizens to decide whether the long term damage to the human and natural environment caused by fracking outweighs the short term economic gain.

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<sup>23</sup> [www.Dornsife.usc.edu/usc-dornsife-la-times-poll-fracking-june-2013](http://www.Dornsife.usc.edu/usc-dornsife-la-times-poll-fracking-june-2013).

<sup>24</sup> The Sierra Fund, *Mining's Toxic Legacy* (2008)  
<http://www.conservation.ca.gov/dlrp/watershedportal/ReportsEvents/Documents/Miningstoxiclegacy.pdf>