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Groundtruthing Academy Award Nominee 'Gasland'

By MIKE SORAGHAN of

The documentary "Gasland" brought the term "hydraulic fracturing" into the nation's living rooms. With its sharp and sustained criticism of gas drilling, it highlighted the growing debate that has come with a boom in the country's domestic energy production.

And it's been nominated for an Oscar.

The HBO film follows Josh Fox, a New York filmmaker whose family owns property in northeast Pennsylvania. After a gas company offers to lease the land for drilling, he takes off in a beat-up Toyota to interview people harmed by gas drilling.

The oil and gas industry has not been as supportive as the Academy of Motion Picture Arts and Sciences. Industry groups, such as the Independent Petroleum Association of America, have accused Fox of confusing hydraulic fracturing with drilling in general. They allege many other errors, large and small. IPAA's "Energy In Depth" campaign issued a seven-page rebuttal to the film, called "**Debunking Gasland**".

EID even mailed it to the Academy of Motion Picture Arts and Sciences, along with a letter arguing that the film doesn't live up to the academy's standards.

But Fox responded with his own detailed defense of the movie "**Affirming Gasland** (pdf)."

The result is a dust storm of charges and counterclaims. The filmmaker and industry have each made errors and have spun some facts to their outer limits. In an attempt to clear the air before the envelope is opened Sunday night, *Greenwire* sifted through the claims.

We read the documents, the ones Fox and EID refer to, and many more. We called the experts and people involved and succeeded in "running to ground" many of the major points of contention.

In the movie's opening segments, Fox often refers to the 19.5 acres in Milanville,

Pa., as "my land." He also talks about "my \$100,000" in reference to money offered by a gas company that wanted to drill on the land. Fox says that he was offered a "signing bonus" of \$4,750 an acre, for a total of \$92,625. He rounded that figure up to \$100,000.

As one might sense from the history Fox relates about the place, it is owned by his family, specifically his father. Many supporters of drilling in the area have questioned any implication that Fox is a local, saying he is a New Yorker whose family has a weekend property in the area.

Neither of his parents or his siblings live on the property. Fox says it is his primary residence.

According to the Wayne County Bureau of Elections, Fox registered to vote in Milanville in December 2002. Fox is founder and artistic director of International WOW Co., which lists its address on its website as Grand Avenue, Brooklyn.

In conversations and e-mail exchanges, Fox said he considers himself to have grown up in both Pennsylvania and New York.

He says "Milanville is the only consistent home I've had my whole life" and calls the property "the centering point of my life." He adds that he did not hide his New York roots, wearing a Yankees cap for most of the film.

Nearby landowners who have leased their land have frequently questioned Fox's assertion that he stood to make \$100,000 to allow drilling on the land. Fox forwarded to *Greenwire* a proposed lease agreement that would have added up to as much as \$90,000, assuming 5 acres of land disturbance beyond the basic, 5-acre well pad. He said he no longer has documents of earlier offerings, which were slightly more generous.

(6:05 into the documentary) "What I didn't know was that the 2005 energy bill pushed through Congress by Dick Cheney exempts the oil and natural gas industries from the Safe Drinking Water Act. They were also exempt from Clean Air Act, the Clean Water Act, the Superfund law and about a dozen other environmental and Democratic regulations. And when the 2005 energy bill cleared away all the restrictions, companies like EnCana, Williams, Cabot Oil & Gas and Chesapeake began to use the Halliburton technology ..."

The oil and gas industry enjoys exemptions from portions of those environmental laws. But it is not completely exempt from any of them.

A one-paragraph section of the 550-page energy bill exempted hydraulic fracturing from the Safe Drinking Water Act (SDWA) but only the underground injection control (UIC) provisions. Oil and gas companies can be sanctioned under other provisions of the law. And one has been recently in Texas (*Greenwire*, Dec. 8, 2010).

Industry has contended that the bill does not "exempt" hydraulic fracturing from the law, because EPA had not previously regulated fracturing under SDWA. But the 2005 **bill** specifically excluded fracturing stating that the regulation "excludes ... underground injection of fluids ... pursuant to hydraulic fracturing operations."

Also, EPA complied with a 1997 appeals court order instructing it to require that Alabama regulate fracturing under SDWA. The 2005 legislation ended that requirement for EPA and prevented the precedent from being used elsewhere. However, outside Alabama, EPA had imposed no restrictions on fracturing under SDWA before the exemption in the 2005 bill.

The energy bill, called the Energy Policy Act of 2005, originated from a 2001 White House energy plan, developed by a task force led by Vice President Dick Cheney, who headed Halliburton at the time of the Alabama ruling. The *Los Angeles Times* reported in 2004 that Cheney's office was involved in discussions about how fracturing should be portrayed in the 2001 report and that it resisted EPA's attempts to include concerns about its effects on the environment (*Greenwire*, Oct. 15, 2010).

Passage of the bill was a policy achievement for the George W. Bush administration. Barack Obama, a senator at the time, voted for the bill.

The 2005 energy bill also exempted oil and gas drilling from the stormwater provisions of the Clean Water Act. Drilling was already exempt from CWA's stormwater discharge permit program, so long as it is not contaminated with sediment or chemicals. The bill expanded the exemption to cover new roads and pipelines associated with oil and gas production.

The 2005 act also made it easier for oil and gas projects on federal lands to bypass the most exhaustive federal reviews under the National Environmental Policy Act (NEPA). If a broader environmental analysis, such as an environmental impact statement, has already been done for the gas field, the law allowed a "categorical exclusion" for drill pads less than 5 acres, and most drill pads are less than 5 acres.

Hazardous waste created by drilling is exempt from the federal hazardous waste regulations of the Resource Conservation and Recovery Act (RCRA), but this exemption was granted long before 2005. Under federal law, it is treated as regular waste headed to a landfill. States can have stricter standards.

Clean Air Act provisions implemented long before 2005, according to the environmental group Earthworks, prevent oil and gas wells from being lumped together when measuring air pollution to determine what kind of protections are needed.

(6:24) "But when the 2005 energy bill cleared away all the restrictions, companies ... began to lease Halliburton technology and to begin the largest and most extensive domestic gas drilling campaign in history -- now occupying 34 states."

Whether the shale gas rush is the "largest and most extensive domestic gas drilling campaign in history" could depend on how one measures it. The Energy Information Administration chart cited by both industry and Fox shows a clear surge in drilling activity in the past decade. But the upward trend started before passage of the 2005 bill.

According to the [chart](#), more wells were drilled in 2008 than any other year recorded. There has been a decline since 2008, however. The years 2009 and 2010 rank behind a drilling ramp-up in the early 1980s.

The method of gas drilling they use is called "hydraulic fracturing."

The method of drilling is not called "hydraulic fracturing." Fracturing, or "fracking" is a process that is one part of drilling a well and producing oil or gas. Fracturing has been used by drillers for around 60 years. But in recent years, the process has been ramped up with higher-volume "frack jobs" that involve more pressure to break apart concrete-like shales. These advances in technology have made it possible to retrieve gas from shale formations like the Marcellus under Pennsylvania. Previously, it was considered uneconomical to do so.

(32:34) "The energy task force and a \$100 million lobbying effort on behalf of the industry were significant in the passage of the 'Halliburton Loophole' to the Safe Drinking Water Act, which authorizes oil and gas drillers exclusively to inject known hazardous materials, unchecked, directly into or adjacent to underground drinking water supplies. It passed as part of the Bush administration's Energy Policy Act of 2005."

The \$100 million refers to political contributions from energy companies of all kinds. According to [Opensecrets.org](#), from the 2002 campaign cycle to the end of the 2006 cycle, oil and gas companies contributed about \$72 million to congressional and presidential campaigns.

The industry put more money into lobbying. From 2001, the year the Cheney energy plan was released, to the end of 2005 when the energy bill passed, Opensecrets.org says the oil and gas industry spent \$287 million on lobbying, or an average of \$57 million a year.

As for whether the law allows drillers to "inject known hazardous materials ... into ... drinking water supplies," the gas-rich Marcellus Shale formations that underlie Fox's family property and much of Pennsylvania are thousands of feet underground. That is also thousands of feet below the groundwater. Fox himself says in the film that fracturing injects water "8,000 feet into the ground."

The industry says it is impossible for fracturing chemicals to leak upward through millions of tons of impermeable rock. But some environmentalists say they could, given the relatively ancient "fractured" rock formations under Pennsylvania.

Still, even though the concept has been mocked by industry, the law does allow for injecting fracturing fluid, with or without "hazardous materials," into sources of drinking water. EPA studied the use of hydraulic fracturing fluids in "underground sources of drinking water" to produce coalbed methane and determined in 2004 that it posed "little or no threat." That finding formed the basis of the SDWA exemption for fracturing in the 2005 law.

But not all underground sources of drinking water are aquifers that produce potable water. Some are reservoirs and considered potential sources of water in the future, but they are far too salty to be used for potable water now.

If a driller injects hazardous materials into a reservoir that people use for drinking water, EPA and state regulators still have the authority to step in, stop the drilling and sanction the company.

In another wrinkle in the complex law, EPA is allowed to require a company to get a permit before fracturing with diesel fuel.

(1:32:34) "Diana DeGette and Maurice Hinchey's FRAC Act [is] a piece of legislation that's one paragraph long that simply takes out the exemption for hydraulic fracturing to the Safe Drinking Water Act."

When Reps. Diana DeGette (D-Colo.), Maurice Hinchey (D-N.Y.) and John Salazar (D-Colo.) introduced their bill in 2008, it was not called the "FRAC Act." It did a little more than simply "take out" the exemption for fracturing. The 49-word, one sentence [bill](#) (pdf) reversed it to say the definition of underground injection control "includes" fracturing. Before 2005, the statute

had been silent on whether fracturing was covered by SDWA.

In 2009, DeGette's [bill](#) (pdf) was renamed the "Fracturing Responsibility and Awareness of Chemicals Act." It was expanded to require public disclosure of the chemicals used in fracturing fluid.

(1:00:56) "Because of the exemptions, fracking chemicals are considered proprietary. ... The only reason we know anything about the fracking chemicals is because of the work of Theo Colborn ... by chasing down trucks, combing through material safety data sheets and collecting samples."

There are easier ways to find the chemical ingredients of fracturing fluid than tracking down trucks. For example, the Pennsylvania Department of Environmental Protection has a [list](#) (pdf) of some of the chemicals used on its website.

But the information wasn't as readily available in 2003 when Theo Colborn started researching the [chemicals](#) (pdf) being injected into wells in western Colorado where she lives. As for chasing down trucks, the website for her group, the Endocrine Disruptor Exchange, states that to research the ingredients used in gas drilling, the group has sifted through numerous sources of information, including accident and spill reports.

In 2002, EPA had published a draft of its fracturing study that listed fracturing fluid ingredients gathered from material safety data sheets and the Bureau of Land Management. Little-known at the time, it listed ingredients such as benzene, 2-butoxyethanol ("2-Be") and diesel fuel. It also noted that early fracturing technology involved injection of napalm.

Pennsylvania's DEP released its list of chemicals in March 2009. It was updated and posted to the agency's website in June 2010. New York's Department of Environmental Conservation published a more detailed list in a 2009 [study](#) (pdf) (page 130). Energy In Depth cites its source as information gathered in 2009.

Some state government lists lack important information or give vague names for potentially hazardous chemicals ([Greenwire](#), June 21, 2010).

The most complete public disclosure is in Wyoming, where the state's Oil and Gas Conservation Commission began last year to demand that drillers disclose each chemical that they are putting in each well ([Greenwire](#), Dec. 20, 2010). Even there, though, the state allows companies to withhold the name of some chemicals, if they can prove that the information constitutes a "trade secret."

(6:50) "[Hydraulic fracturing] blasts a mix of water and chemicals 8,000 feet into the ground. The fracking itself is like a mini-earthquake. ... In order to frack, you need some fracking fluid -- a mix of over 596 chemicals."

There are not "over 596" chemicals in fracturing fluid. That might be the size of the smorgasbord that drillers can choose from. But in any given "frack job," the figure is more like a dozen.

A quick review of the detailed disclosures being filed in Wyoming shows a range of between eight and 14 different chemicals mixed with water and sand for each "frack job."

According to industry, those chemicals amount between 2 percent and half a percent of the mixture. Fracturing companies spend a lot of time and money on that small fraction. Halliburton once estimated that public disclosure of its proprietary formulas could cost it \$375 million.

The chemicals involved can be as mundane as ice cream thickener and as toxic as benzene. Many of those toxins are harmful in tiny quantities.

As for whether fracturing creates a "mini-earthquake," Anne Sheehan, a professor of geological sciences at the University of Colorado, said, "I don't think that's really exaggerating." But, she added, "In fracking, it would be too small to be felt by people."

And she noted that "clean" renewable energy can cause the same "mini-earthquakes." Geothermal energy production can cause the same seismic activity, she said. In 2009, a geothermal project in Switzerland was shut down when a study found earthquakes generated by the project would likely cause millions of dollars in damage each year.

The deep underground injection of drilling waste causes more seismic activity, Sheehan said. Some are looking at underground injection as they search for the cause of an earthquake "swarm" in Arkansas, which has unnerved residents but caused little damage.

In the documentary, Fox graphically depicts the fracturing process as one that results in the obliteration of the shale formation. In reality, the fractures created by the procedure and kept open by the introduction of proppants such as sand are typically less than a millimeter thick.

Fox's animation of fracturing differs from this industry-sponsored [video](#). This [depiction](#) on the "Gasland" website is more dramatic than the graphic in the film. It shows fractures reaching up

to the water table, though the text below says that they are separated by about 7,000 feet. It also states that water problems typically stem from poor cement well casings, which is different from fracturing.

(50:05) "Each well completion, that is, the initial drilling phase plus the first frack job, requires 1,150 truck trips."

According to Fox's rebuttal, he used information from an 800-page "**supplemental generic environmental impact statement** (pdf)" produced by the New York Department of Conservation. It is difficult to replicate his exact figure from the information, but it is squarely within the range.

That study estimated that the number of truckloads to construct a well pad and fracture one well is between 890 and 1,340 truckloads. The average of those figures is 1,115.

The Energy In Depth critique mocked the idea that every "frack job" would take the same number of trips. Fox says that he averaged the figures.

For one well pad with eight wells drilled on it, the New York study estimated between 5,850 and 8,905 truckloads, for an average of 7,377.

The Marcellus Shale Coalition's website, says each frack job involves "an average of 400 trucks coming and going" to the site. It does not list a specific number of truck trips.

Fox cites these truck-trip figures in the midst of his segment on drilling in western Wyoming, not Pennsylvania or New York. The Bureau of Land Management's environmental studies for that area estimated that building a multi-well well pad, drilling the first well and "fracking" it would require 2,020 truck trips. That assumed it would take 45 or more days to drill a well. Companies are now getting them done in fewer than 20 days.

(51:12) "Before the water can be hauled away and disposed of somewhere, it has to be emptied into a pit -- an earthen pit, or a clay pit, sometimes a lined pit, but a pit -- where a lot of it can seep right back down into the ground."

Most states, including Pennsylvania, have rules requiring drillers to keep waste water from seeping into the ground and groundwater, which means drillers should be sanctioned if their liners leak. But not all states have such rules.

ProPublica, a news organization that has run a series of articles sharply critical of drilling, analyzed a **report** (pdf) on pit liners that is frequently cited by industry. It found that while 23 states require pits to be lined with natural or artificial liners to keep fluids from seeping directly into the ground, at least four states do not.

ProPublica also noted that 17 states do not require that pits be kept at a distance from streams and rivers and that 17 states do not explicitly forbid pits from intersecting the underground water table. And fewer than half of the states surveyed have a specific cleanup standard when waste fluids or pits do spill.

(53:36) "The Pinedale Anticline and the Jonah gas fields [of Wyoming] are directly in the path of the thousand-year-old migration corridor of pronghorn antelope, mule deer and sage grouse. And yeah, each of these species is endangered and has suffered a significant decline of their populations since 2005."

Those gas fields are in the path of a longstanding migration corridor, but mule deer and antelope are not endangered. And the sage grouse in that area do not migrate.

The sage grouse, hard hit by oil and gas development, is on the decline. Subdivisions and wind power turbines are also a problem. Last year, federal officials determined sage grouse met the qualifications for protection under the Endangered Species Act. But they said there were too many other species that were in more dire straits and too few resources to protect them. The Fish and Wildlife Service deemed sage grouse "warranted but precluded" rather than threatened or endangered.

The number of deer in the Sublette County mule deer herd has declined 7 percent since 2005, according to BLM. But on the Mesa where drilling rigs mingle with prime wintering habitat for deer, the number of deer rebounded 25 percent since 2005 after several years of decline. BLM officials note that there are other factors affecting deer in the area, including drought and residential development.

The pronghorn population has increased, according to BLM.

(31:32) "In 2004, the EPA was investigating water contamination incidents due to hydraulic fracturing across the country. But a panel rejected the inquiry, stating that although hazardous materials were being injected underground, EPA did not

need to investigate."

In 2004, EPA was completing a multiyear study of fracturing. Researchers (not enforcement personnel) were looking into whether drillers contaminate groundwater when they inject hydraulic fracturing fluid into underground sources of drinking water. The study did not cover all types of drilling, only production of methane gas from coal beds.

EPA's Office of Water, not a panel, determined not to pursue further study. The office was headed by then-acting Assistant Administrator Benjamin Grumbles, a George W. Bush appointee. The EPA study determined that fracturing may release potentially hazardous chemicals into sources of drinking water but said there was no reason to study it further. The study determined that fracturing posed "little or no threat" because the water is sucked back up out of the ground and the hazardous chemicals would likely be diluted or biodegrade on their own.

(1:28:06) "Just a few short months after this interview, the Pennsylvania Department of Environmental Protection suffered the worst budget cuts in history, amounting to over 700 staff either being fired or having reduced hours and 25 percent of its total budget cut."

The oil and gas program in Pennsylvania didn't lose staff in the significant cuts to the state budget. It gained inspectors and permit staff after increasing fees for the processing of Marcellus drilling permits. The cut was to the state-funded portion of the DEP budget, said Jan Jarrett, president and CEO of PennFuture, a state-focused environmental group, but the agency gets money from other places such as federal grants and user fees.

The "700 staff" figure seems to correlate to the number of statewide positions lost. The agency hired 37 new employees in 2009 and announced in January 2010 that it would begin hiring 68 new people.

Fox has noted that the film was completed shortly before the 68 new positions were announced.

(1:23:15) Dunkard Creek: Fox includes images of dead fish along a 35-mile stretch of Dunkard Creek in Washington County, Pa.; attributes that event to natural gas development.

EPA and state regulators have pointed the blame for the September 2009 at coal mine

drainage, not wastewater from drill sites.

EPA's preliminary report in December 2009 said a bloom of toxic algae wiped out almost all fish, mussels, salamanders and aquatic life along 43 miles of the creek that snakes back and forth along the Pennsylvania-West Virginia border. The salty conditions that allowed the algae, EPA reported, were tied to mine treatment discharges high in "total dissolved solids."

Fox has questioned that finding, noting that mines have been draining into local creeks for decades, and posed, "So, what has changed?" But in September 2009, West Virginia Public Broadcasting [reported](#) a state official's contention, "One possible culprit is a new borehole on the Pennsylvania side that's injecting polluted water into the mine void."

State officials did not say what the borehole was. But in the weeks before the fish kill, EPA had fined the mine owner more than \$150,000 for failing to properly staff a coalbed methane injection well in the vicinity.

EPA said it was working to develop standards to protect aquatic life from mine wastes. It said officials hoped the standard could be expanded to cover Marcellus Shale drilling wastes and coalbed methane wastes.

"That's the best I've done. I smell hair." -- Mike Markham of Fort Lupton, Colo. He had just cupped a lighter to his kitchen faucet. As water started to dribble out flames shot out of the faucet and filled his sink with flame. It's one of the most dramatic moments in "Gasland." The film also shows news footage from a Denver television station of his neighbor Jesse Ellsworth lighting water from his faucet on fire.

The Colorado Oil and Gas Conservation Commission [told](#) (pdf) Markham, "There are no indications of oil and gas related impacts to your water well."

Markham's partner, Marsha Mendenhall, acknowledges the state's conclusion in the film. But she doesn't accept it. She tells Fox that state officials told her, "There's nothing wrong with the water that can be affected by oil and gas production in your area." She adds, "I was a little disappointed in the state. I mean, obviously, we have a problem here."

The same agency [found](#) (pdf) that methane in the Ellsworths' well water did originate from oil and gas development. The Ellsworths settled with a gas company and Colorado officials replugged a 60-year-old well located near their well that the agency [considered](#) (pdf) to be a possible source of or conduit for migration of gas from drilling.

Fox has said that because of the settlement with the gas company the Ellsworths are now prohibited from discussing the situation.

Dissatisfaction with state-level regulation is common among critics of drilling, who want to see more U.S. EPA regulation.

Methane is not harmful in drinking water. But in a confined space it can accumulate and explode. In higher concentrations, it can become an asphyxiant.

The problem of gas migration has little to do with the specific process of hydraulic fracturing but with poor cement well casings.

In a [presentation](#) (starts at 33:32) last year at the Heritage Foundation, Mark Boling, executive vice president and general counsel for Southwestern Energy Co., explained that while hydraulic fracturing itself doesn't cause gas migration, poor well construction can cause it.

"We have analyzed every case that has been reported with respect to gas migration; we have found that absolutely none of that has to do with the actual hydraulic fracturing," Boling said. "It has to do, usually, with problems from shallower formations that haven't been properly cemented. ... The gas is allowed to migrate out and that is a problem."

Lisa Bracken: Fox blames methane occurrence in West Divide Creek, Colo., on natural gas development.

State oil and gas regulators have determined that drilling did not cause a gas seep in West Divide Creek in Garfield County, Colo. But county officials are standing behind a study they commissioned by University of Wyoming geologist Geoff Thyne that methane seems to be increasing in groundwater and it seems to be coming from natural gas (*Land Letter*, March 26, 2009). Thyne is part of the university's Enhanced Oil Recovery Institute. The county asked the state to reconsider Thyne's concerns, and the state has agreed to take another look.

The Colorado Oil and Gas Conservation Commission also criticized Fox for indicating that hydraulic fracturing caused an earlier seep nearby in the same creek. In 2004, the commission said, it determined that seep was caused by a drilling error, specifically "an improperly cemented borehole." The operator was hit with a "substantial fine."

Calvin Tillman: Fox interviews mayor of Dish, Texas; blames natural gas development, transport for toxins in the air, benzene in blood.

State health officials determined that there were not abnormal levels of benzene in the blood of people of Dish. The study found that, "For the majority of the participants, the levels of [volatile organic compounds] measured in blood were similar to those measured in the general U.S. population, suggesting that their exposures to these contaminants were not different than those received by people living in other areas of the U.S."

Their study was released in May 2010, after the film was completed and released. Health officials recommended that the tests should be repeated during the summer months when the temperatures are higher and when people indicate that the odors are greatest. No repeat test was done.

Town officials and industry critics point to different studies that have found unhealthy levels of benzene in the air. The Texas Commission on Environmental Quality's monitoring in 2009 found short-term benzene levels exceeding the department's long-term health-based comparison value in two locations. Short-term levels of benzene can contribute to long-term cumulative exposure levels. The department recommended additional long-term air monitoring.

Energy In Depth also questioned the credibility of EPA whistleblower Weston Wilson, who criticized the 2004 study, and was interviewed in the film. The EID rebuttal stated, "Mr. Wilson has invoked 'whistleblower' status to fight dam construction in Colorado, oil and gas development in Montana, and the mining of gold in Wyoming."

Wilson, who retired in 2010, invoked whistleblower status only once during his tenure at EPA. That was when he criticized the 2004 study. He was not part of the team that did the study.

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