HYDRAULIC FRACTURING

Myths and Facts

Myth: Hydraulic fracturing fluids and products pose no real risk to our water supplies or public health.

FACT: Hydraulic fracturing fluids contain toxic chemicals and are being injected into and near drinking water supplies. According to the EPA, toxic chemicals in fracturing fluids include substances such as polycyclic aromatic hydrocarbons; methanol; formaldehyde; ethylene glycol; glycol ethers; hydrochloric acid; sodium hydroxide; and diesel fuel, which contains benzene, ethylbenzene, toluene, xylene, naphthalene and other chemicals[1]. These chemicals have known negative health effects such as respiratory, neurological and reproductive impacts, impacts on the central nervous system, and cancer.

The Endocrine Disruption Exchange, Inc., (TEDX) has also recently documented health effects of chemicals used in 435 fracturing products. According to TEDX, the top four health effects for chemicals in these products include: skin, eye and sensory organ effects, respiratory effects, gastrointestinal effects, and brain and nervous system effects[2]. In addition to being injected into and near water resources, these chemicals are also being trucked through our communities and can spill and leak from trucks, pits, disposal wells, and flowlines. Aside from water contamination, communities are faced with public health threats from chemicals evaporating off drilling sites and residual chemicals that can spill or leak onto our soils.

Myth: There are no documented cases of fracturing fluids migrating into drinking water wells.

FACT: The oil and gas industry is splitting hairs with this claim. Complaints have been documented in Alabama, Colorado, New Mexico, Ohio, Texas, Virginia, West Virginia and Wyoming in which residents have reported changes in water quality or quantity following fracturing operations of gas wells near their homes. In mitigating and documenting these instances, industry and state regulators have cited casing failures, impacts from other mining operations, methane migration and other explanations for water contamination. Regulators and the public have had to accept these explanations, in part, because industry refuses to disclose the make-up of fracturing chemicals, and regulators do not know what specific chemicals they are looking for following fracturing complaints. The fact remains that landowners and communities are experiencing changes in water quality and quantity that occur during and after fracturing.

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HYDRAULIC FRACTURING – MYTHS AND FACTS

Myth: In 2004 the EPA released a scientific study that demonstrated that hydraulic fracturing is safe and should not be regulated.

FACT: The conclusion of the 2004 EPA report that hydraulic fracturing poses little or no risk to drinking water supplies and thus no further action was necessary was a political conclusion, rather than a scientific one. The 2004 EPA report's conclusion was reviewed and found to be "scientifically unsound" by EPA employee, Weston Wilson, as well as "unsupportable" based upon the available science and literature[3]. Mr. Wilson and public interest organizations who reviewed EPA's report found that the substance of the report actually established that:

1) hydraulic fracturing occurs within underground sources of drinking water;
2) hydraulic fracturing fluids contain toxic components that are not entirely removed from the drinking water formations; and
3) hydraulic fracturing can create pathways which allow methane to migrate to ground water.

Further, EPA had originally planned to undertake actual scientific field investigations near wells that were hydraulically fractured in a second phase of their investigation. However, the 2001 special energy task force, chaired by former Halliburton CEO Dick Cheney, recommended that Congress exempt hydraulic fracturing from the Safe Drinking Water Act. Subsequently, information regarding the potential health impacts of hydraulic fracturing was removed from EPA's 2002 draft of the report, and the final report contained its 'scientifically unsound' and unsupportable conclusion. The political nature of this conclusion was indicated by the 2005 EPA Inspector General investigation that found enough evidence of potential mishandling of the 2004 EPA report to justify a review of complaints brought forth by Mr. Wilson and others. Unfortunately this investigation was tabled when the 2005 Energy Policy Act exempted hydraulic fracturing from the Safe Drinking Water Act.

Myth: Our drinking water is not at risk from hydraulic fracturing because industry is fracturing at depths below the aquifers from which our communities are locating water wells.

FACT: There are a number of ways in which hydraulic fracturing threatens our drinking water. Where drilling companies are developing fairly shallow oil or gas resources, such as some coalbed methane formations, drilling may take place directly in the aquifers from which we draw our drinking water. In that case, contamination may result from the fracturing fluids that are stranded underground, as the few studies that are available have shown that at least 20-30% of fracturing fluids may remain trapped underground.

Where drilling companies are developing deeper oil or gas resources, such as shale gas resources, there are a number of issues and concerns. Hydraulic fracturing can leave fluids stranded at these depths, and, through the high pressures used, can open up pathways for fluids or gases from other geologic layers to flow where they are not intended. This may impact deeper ground water resources that may be considered for drinking water supplies in the future. If fracturing wastewater disposal is conducted through underground injection wells, there is an additional risk for groundwater contamination. If wastewater disposal occurs in streams, the chemical make-up or temperature of the wastewater may affect aquatic organisms, and the sheer volume of water being disposed may damage sensitive aquatic ecosystems.

Additionally, fracturing fluid chemicals and wastewater can leak or spill from injection wells, flowlines, trucks, tanks, or pits. This contamination can be moved off-site through stormwater run-off. Finally, faulty casing, weak cementing, human error and geological unknowns can contribute to contamination from fracturing and other drilling practices.

Myth: All, or nearly all, hydraulic fracturing fluids are recovered during the fracturing process.

FACT: Factors affecting fracturing fluid recovery include flowback procedure, job design, specific reservoir conditions and other complexities. With multiple factors affecting fracturing fluid recovery, it is reasonable to assume that there will be a wide range in fluid recovery efficiencies. In fact, literature cited by EPA in their 2002 draft version of the hydraulic fracturing report confirmed this assumption. EPA

cited or discussed four different studies[4]. These studies, conducted in non-coalbed methane basins, found that between 25% and 61% of certain hydraulic fracturing fluids flowed back to the well (that is, between 39% to 75 % was left stranded in some instances). One particularly compelling study showed that only 35-45% of the fracture fluids were recovered. This study was withdrawn from the EPA's final discussion of flowback and was not listed on their master reference list for the final report[4]. Citizens and groups working on this issue have often used the range of 20%-30% of fracturing fluids remaining in the ground without objection by industry. When considering the EPA's literature citations, this is a conservative estimate that generously grants a range of recovery efficiencies to the industry.

Myth: The practice of hydraulic fracturing and creating underground fractures is well-tested, controllable and safe.

FACT: It is critical for communities and decision makers to understand that hydraulic fracturing fluids not only contain toxic chemicals, but this operation utilizes high volumes of fluids and high pressures to intentionally open up underground pathways for gas or oil to flow. Injected fluids have been known to travel as far as 3,000 feet from a well, and fracturing fluids may remain trapped underground[5]. While industry claims that fracturing is a well-tested and controllable technology, computer models have shown that fractures can behave differently than predicted, and diagnostic techniques illustrating fracture history are rarely used. It is important for communities and decision makers to gather more information about fracture behavior, and to ensure that any stranded fluids do not remain in or move into our drinking water resources.[6]

Myth: State regulations addressing casing and other aspects of drilling process such as spills and leaks adequately regulate fracturing products and practices.

FACT: Most states' policies regarding hydraulic fracturing amount to "don't ask and don't tell." At the state level, most oil and gas agencies do not require companies to report the volumes or names of chemicals being injected during hydraulic fracturing, and they have never conducted any sampling to determine the underground or surface fate of hydraulic fracturing chemicals. Without that information, neither states nor the public can begin to eliminate the use of toxic materials, nor adequately evaluate or develop monitoring programs to assess the risks posed by injecting these fluids underground.

Myth: Non-toxic and less toxic fracturing alternatives are in their infancy and not available for industry use.

FACT: Oil and gas operators are routinely using less toxic fracturing fluids in off-shore environments in order to meet federal requirements under the Clean Water Act, and some operators have tested and studied non-toxic fracturing fluids as they problem-solve site specific issues in the Black Warrior and San Juan Basins. Thus, the development of non-toxic or green fracturing fluids is not in its infancy.

The offshore oil and gas industry, for example, has had to develop fluids that are non-toxic to marine organisms in order to be allowed to discharge the fluids into the ocean. According to the Schlumberger web site: "Meeting stringent environmental guidelines in both the U.K. North Sea and the Gulf of Mexico (GOM), the new Schlumberger GreenSlurry system delivers consistent, earth-friendly performance. This slurry system, developed for use in all types of fracturing and gravel-packing operations in environmentally sensitive regions, features a unique carrier fluid. The new carrier fluid can be easily metered using all existing equipment.[7]" The public and decision makers must assume that Schlumberger and many other companies formulate these types of fluids because standard fracturing fluids are toxic to marine organisms and will not meet off-shore regulations. Because we don't have full disclosure of fracturing fluids, it remains vague as to how toxic or less toxic products designed for an offshore environment are to humans. However, industry studies and demonstrations have shown that water without any additives is an effective fracturing fluid that is more economic in certain environments, and can solve production problems such as chemical gels (cross-linker gels) damaging coal permeability[8].

HYDRAULIC FRACTURING – MYTHS AND FACTS

Myth: Lifting the exemption for hydraulic fracturing under the Safe Drinking Water Act would be unduly burdensome for States.

FACT: Congressional Representatives DeGette (CO), Salazar (CO) and Hinchey (NY) introduced a bill in 2008 that would reverse special treatment of Halliburton and other hydraulic fracturing companies by requiring regulation of hydraulic fracturing under the Safe Drinking Water Act (HR 7231). This effort establishes a minimum federal floor for protecting drinking water from hydraulic fracturing. According to the EPA, the regulation of underground injection does not require a new permitting process. A state could begin the specific regulation of hydraulic fracturing by issuing a general rule for hydraulic fracturing with safety standards. States already have permit processes for oil and gas wells and they could simply include hydraulic fracturing.

Protect Our Drinking Water: Close the Halliburton Loophole in the Safe Drinking Water Act

- Repeal the Safe Drinking Water Act exemption for hydraulic fracturing.
- Require full chemical disclosure and monitoring of hydraulic fracturing products.
- Require non-toxic hydraulic fracturing and drilling products.

Visit www.ogap.org for more information.

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CITATIONS

[1] U.S. Environmental Protection Agency. August, 2002. DRAFT Evaluation of Impacts to Underground Sources of Drinking Water by Hydraulic Fracturing of Coalbed Methane Reservoirs. EPA 816-D-02-006.

[2] The Endocrine Disruption Exchange, Inc. February 2009. Products and Chemicals Used in Fracturing. http://www.endocrinedisruption.com/chemicals.fracturing.php

[3] Wilson, W. October 8, 2004. Letter to Senators Allard, Campbell and Representative DeGette. Available on the Oil & Gas Accountability website: http://www.earthworks-action.org/publications.cfm?pubID=372

[4] U.S. Environmental Protection Agency. August, 2002. DRAFT Evaluation of Impacts to Underground Sources of Drinking Water by Hydraulic Fracturing of Coalbed Methane Reservoirs. EPA 816-D-02-006. This draft cites or discusses: Mukhergee, et al (1995), Palmer and others (1991a), Samuel et al. (1997), Willberg et al (1997).

[5] Mukhergee, HI, Paoli, B.F., McDonald, T. and Cartaya H. 1995 'Successful control of fracture height growth by placement of an artificial barrier.' SPE Production and Facilities, 10(2); 89-95. (cited on page A-18 of the draft EPA Report)

[6] IN THE SUPREME COURT OF TEXAS, No. 05-0466, Coastal Oil & Gas Corp. and Coastal Oil & Gas USA, L.P., Petitioners, v. Garza Energy Trust et al., Respondents, On Petition for Review from the Court of Appeals for the Thirteenth District of Texas, Argued September 28, 2006.

[7] (Schlumberger. Green Chemistry: Earth-friendly GreenSlurry system for uniform marine performance.) http://www.slb.com/content/services/stimulation/execution/greenslurry.asp

[8] See L. Sumi's discussion in Our Drinking Water at Risk (2005). Two relevant industry studies on non-toxic fracturing fluids include: (i) T.L. Logan. 1994. "Preliminary results of cooperative research efforts with Phillips Petroleum Company and Amax Oil and Gas Inc., San Juan Basin." Quarterly Review of Methane from Coal Seams Technology. April 1994 11(3&4):39-49. (ii) Puri, R., King, G.E., Palmer, I.D. Amoco Production Co. 1991. 'Damage to Coal Permeability During Hydraulic Fracturing.' Paper presented at the Rocky Mountain Regional Meeting and Low-Permeability Reservoirs Symposium, Denver, CO, April 15-17, 1991.