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Water Usage

BY THE NUMBERS

- 140 Billion Gallons Of Water Are Used By Fracking Operations Annually – As Much Water As Is Used By Chicago And Houston Combined
- 4.5 Million Gallons Of Water Used By A Single Fracking Well
- 600,000 Gallons Of Water Needed to Drill Each New Well
- One Drilling Site Can Use as Much As 50 Million Gallons of Clean Water
- 0 Percent of Fracking Water Can be Reused for Anything but Fracking
- 36 States, Including Colorado, Utah and Wyoming Are Projecting Water Shortages Between Now And 2013

FACT SHEET

The United States Environmental Protection Agency estimated that the annual water usage for hydraulic fracking may be as high as 140 billion gallons, equivalent to the annual water usage of 2 cities roughly the size of Chicago. Oil and natural gas company Chesapeake Energy estimated the amount of water needed to frock a single well is 4.5 million gallons. The EPA estimated that as little 10% of water used in fracking operations is reused. In Colorado alone, the amount of water used for fracking is enough to supply 118,400 homes for an entire year.

EPA Estimated That Annual Water Requirement For Horizontal Wells May Be As High As 140 Billion Gallons, Equivalent To The Annual Water Usage Of 40 To 80 Cities Of 50,000 Residents. According to a 2011 report by the United States Environmental Protection Agency, "EPA estimates that approximately 35,000 wells are fractured each year across the United States. Assuming that the majority of these wells are horizontal wells, the annual water requirement may range from 70 to 140 billion gallons. This is equivalent to the total amount of water used each year in roughly 40 to 80 cities with a population of 50,000 or about 1 to 2 cities of 2.5 million people." [United States Environmental Protection Agency, Draft Plan to Study the Potential Impacts of Hydraulic Fracturing on Drinking Water Resources, 2/7/11]

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Chesapeake Energy Estimated That A Single Horizontal Deep Shale Natural Gas Well Required An Average Of 4.5 Million Gallons Of Water. According to Chesapeake Energy, "Water is also used in hydraulic fracturing where a mixture of water and sand is injected into the formation at a high pressure to create small cracks in the rock allowing gas and oil to freely flow to the surface. Hydraulic fracturing of a typical Chesapeake horizontal deep shale natural gas or oil well requires an average of 4.5 million gallons per well." [Chesapeake Energy, Hydraulic Fracturing Facts, Water Usage, accessed 1/24/12]

- **Chesapeake Energy Said The Amount Of Water Used In A Fracking Well Is Equivalent To The Amount Of Water Used In New York City In 6.3 Minutes**. According to Chesapeake Energy, "The 4.5 million gallons of water needed to drill and fracture a typical deep shale gas or oil well is equivalent to the amount of water consumed by: New York City in approximately 6.3 minutes A 1,000 megawatt coal-fired power plant in 10.8 hours A golf course in 22.5 days, 6.75 acres of corn in a season." [Chesapeake Energy, Hydraulic Fracturing Facts, Water Usage, accessed 1/24/12]

Chesapeake Energy Estimated That Drilling A Fracking Well Required Between 65,000 And 600,000 Gallons Of Water To Drill Natural Gas Well. According to Chesapeake Energy, "Water is an essential component of deep shale natural gas and oil development during both the drilling and hydraulic fracturing processes. Chesapeake uses water for drilling, where a mixture of clay and water is used to carry rock cuttings to the surface, as well as to cool and lubricate the drillbit. Drilling a typical Chesapeake deep shale natural gas and oil well requires between 65,000 and 600,000 gallons of water." [Chesapeake Energy, Hydraulic Fracturing Facts, Water Usage, accessed 1/24/12]

One Drilling Site Could Consume 45 Million to 50 Million Gallons of Clean Water. According to an article in the Examiner, "'Fracking a well' according to industry leader Chesapeake Energy requires 4.5 million gallons per well. Fracking may occur more than once on a well depending upon its output. A specific shale gas "pad site" might hold up to 10 horizontal fracking well veins or bores. This means just one site might easily consume 45 million to 50 million gallons of clean water in order to crack open the shale to release the natural gas trapped within it. Given how the shale gas industry operates regarding actual details of its operations, water use per fracked well might be much higher than what is being stated to the public." [Examiner.com, 7/19/12]

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Western Resource Advocates Report: Water Used in Fracking 100% Consumptive. According to an article in SNL Energy Gas Utility Week, "The…era of unconventional oil and gas development requires significant quantities of water that must be supplied through deliberate and thought-out planning that protects nearby communities, according to a…report from a Western conservation organization. Western Resource Advocates' report, 'Fracking Our Future: Measuring Water & Community Impacts from Hydraulic Fracturing,' outlines the group's concern with water demands of development and offers two key recommendations…The report said water use in hydraulic fracturing is 100% consumptive, whereas 90% to 95% of indoor residential water makes its way back into streams…Mike Chiropolos, chief counsel, lands program with Western Resource Advocates, said the report also offered seven safety recommendations that lawmakers should consider, including increased minimum residential setbacks from oil and gas facilities; increased riparian setback; requirements for comprehensive planning; and mandatory baseline water quality testing." [SNL Energy Gas Utility Week, 7/2/12]

- **Amount Of Fracking Water Recovered For Reuse In Wells Ranges From 10 To 40%**. According to a 2011 report by the United States Environmental Protection Agency, "One way to offset the large water requirements for hydraulic fracturing is to recycle the flowback produced in the fracturing process. Estimates for the amount of fracturing fluid that is recovered during the first two weeks after a fracture range from 10 to 40 percent of the original fluid injected (Ewing, 2008; Vidic, 2010). This water may be treated and reused by adding additional chemicals as well as fresh water to compose a new fracturing solution. There are, however, challenges associated with reusing flowback due to the high concentrations of total dissolved solids (TDS) and other dissolved constituents found in flowback (Bryant et al., 2010). Acid mine drainage, which has a lower TDS concentration, has also been suggested as possible source water for hydraulic fracturing (Vidic, 2010)." [United States Environmental Protection Agency, Draft Plan to Study the Potential Impacts of Hydraulic Fracturing on Drinking Water Resources, 2/7/11]

2011: Center for American Progress Cited "Huge Quantities of Water" Used for Fracking. According to an article in The Center for American Progress, "The CWA is important for shale gas development because hydraulic fracturing, used in an estimated 90 percent of shale gas wells, uses huge quantities of water that are pumped underground in combination with sand and chemicals to fracture rock formations. A majority of the several million gallons of water used in a typical frack job comes back to the surface. That flow-back water is laced with fracking

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chemicals (which the industry does not have to disclose), as well as underground contaminants including naturally occurring radioactive materials that are brought to the surface—as much as 15,000 gallons in a 3 million gallon frack job, according to the U.S. Geological Survey." [Center for American Progress, 6/3/11]

Ecocentric Blog: "Fracking…Tends to Occur in More Densely Populated Areas Where It Can Come into Conflict with Local Water Uses…" According to an article on the Ecocentric blog, "4.5 Million Gallons of Water. What does that mean to you and your Community? 825 Tanker trucks, traffic in, traffic out to do one frack job. If a well site has inadequate water resources, a fairly common problem, water has to be transported via tanker trucks to fill impoundments over the course of hundreds or thousands of visits… fracking in the United States, especially in the Marcellus Shale region, tends to occur in more densely populated areas where it can come into conflict with local water uses like drinking and irrigation. As fracking spurs the proliferation of natural gas wells around the U.S., water-related issues will continue to impact water quantity and quality for both ground and surface water." [Ecocentric Blog, 4/3/12]

Environmental Engineer Called Water Use "Major National Issue." According to an article in the Lubbock Avalanche-Journal, "Davis L. Ford, an environmental engineer with 40-plus years' experience, has worked with more than 150 industries and 10 foreign governments in the area of water pollution control, solid waste management, hazardous waste remediation and environmental litigation support. He spoke…on horizontal drilling, hydraulic fracking and energy independent at Texas Tech's Department of Petroleum and Engineering lecture program…Ford said in Texas, with the combination of a growing population, the amount of fracking and a severe drought, fresh water is becoming a real commodity. Because GDP is made up of consumption, investments, government spending and exports, minus imports, Ford said, when the US does become energy independent, the DGP will rise accordingly. 'This is a major national issue,' he said." [Lubbock Avalanche Journal, 11/12/11]

36 States, Including Colorado, Utah And Wyoming Are Projecting Water Shortages Between Now And 2013. According to a report by the Government Accounting Office, "State water managers expect freshwater shortages in the near future, and the consequences may be severe. Even under normal conditions, water managers in 36 states anticipate shortages in localities, regions, or statewide in the next 10 years. Drought conditions will exacerbate shortage impacts. When water shortages occur, economic impacts to sectors such as agriculture can be in the billions of dollars. Water shortages also harm the environment. For example, diminished flows reduced the Florida Everglades to

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half its original size. Finally, water shortages cause social discord when users compete for limited supplies." [Government Accounting Office, GAO-02-514, July 2003]

2012: Pacific Institute Report: "Massive Water Requirements" Needed Place in Fracking Debate. According to an article in the Bakersfield Californian, "A…report says public debate over hydraulic fracturing should be broadened to include the amount of water used and disposed of underground as part of the controversial oil field technique also known as 'fracking.' The paper released…by Oakland-based nonprofit Pacific Institute notes that the national discussion of fracking has focused on identifying the sometimes toxic chemicals injected underground as part of the process. 'But while chemical disclosure can be useful for tracking contamination, it may not be the most important issue for water resources,' the authors note. 'Other key issues also deserve major attention and analysis, such as the massive water requirements for hydraulic fracturing and the potential conflicts with other water needs…'Natural gas fracking wells typically use between 2.3 million and 3.8 million gallons of water, according to the study, which also cites a single Texas gas well that used 13 million gallons." [Bakersfield Californian, 6/21/12]

Annual Water Requirements For Fracking In Colorado Would Provide Enough Water For As Much As 118,400 Homes. According to a report by the Western Resource Advocates annual water requirements for Fracking in Colorado would provide enough water for 66,400 to 118,400 homes, serving 166,000 to 296,000 people per year. [Western Resource Advocates, Fact Sheet: Fracking Our Future: Measuring Water & Community Impacts from Hydraulic Fracturing, 2012]

IMPACT ON DRINKING WATER

The large amount of water used for fracking can impact drinking water. The EPA reports that the removal of large amounts of water can lower water tables, exposing the aquifer to naturally occurring minerals that change the odor and taste of ground water. Removal of large amounts of water that results in the lowering of the aquifer can destabilize local geology and will inexorably contaminate surface water. While the withdrawal of water used for fracking may be minimal in some areas, the environmental impact cannot be overlooked.

EPA: Removal Of Large Amounts Of Water Can Impact Drinking Water Supplies, Lead To Lowering Of Water Tables. According to a 2011 report by the United States Environmental Protection Agency, "Large volume water

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withdrawals for hydraulic fracturing are unique in that much of the water used for the fracturing process may not be recovered after injection. The impact from large volume water withdrawals varies not only with geographic area, but also with the quantity, quality, and sources of the water used. The removal of large volumes of water could stress drinking water supplies, especially in drier regions where aquifer or surface water recharge is limited. This could lead to lowering of water tables or dewatering of drinking water aquifers, decreased stream flows, and reduced volumes of water in surface water reservoirs. These activities could impact the availability of water for drinking and other uses in areas where hydraulic fracturing is occurring. The lowering of water levels in aquifers can necessitate the lowering of pumps or the deepening or replacement of wells, as has been reported near Shreveport, Louisiana, in the area of the Haynesville Shale (personal communication from Gary M. Hanson, Director, Red River Watershed Management Institute, Louisiana State University in Shreveport, to EPA's Robert Puls)." [United States Environmental Protection Agency, Draft Plan to Study the Potential Impacts of Hydraulic Fracturing on Drinking Water Resources, 2/7/11]

The Lowering Of Water Tables May Affect Water Quality By Exposing Naturally Occurring Minerals, Causing Salination, Odor, And Taste Problems. According to a 2011 report by the United States Environmental Protection Agency, "The lowering of water levels in aquifers may also affect water quality by exposing naturally occurring minerals to an oxygen-rich environment. This may cause chemical changes to the minerals that can affect solubility and mobility and may cause salination of the water and other chemical contaminations. Bacterial growth may be stimulated by lowered water tables, causing taste and odor problems." [United States Environmental Protection Agency, Draft Plan to Study the Potential Impacts of Hydraulic Fracturing on Drinking Water Resources, 2/7/11]

Large Volume Water Withdrawals From Ground Water Can Lead To Destabilization Of The Geology. According to a 2011 report by the United States Environmental Protection Agency, "Depletion of aquifers may also cause an upwelling of lower quality water from deeper within an aquifer. In some cases, changes in water levels may interact with well construction in such a way as to cause an increase in siltation or cloudiness of the produced water. Large volume water withdrawals from ground water can also lead to subsidence and/or destabilization of the geology." [United States Environmental Protection Agency, Draft Plan to Study the Potential Impacts of Hydraulic Fracturing on Drinking Water Resources, 2/7/11]

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Removal Of Large Amounts Of Ground Water May Increase Number Of Contaminants In Surface Water. Additionally, removal of significant volumes of water may reduce the dilution effect and increase the concentration of contaminants in surface water resources (Pennsylvania State University, 2010). Furthermore, it is important to recognize that ground water and surface water are hydraulically connected (Winter et al., 1998); any changes in the quantity and quality of the surface water will affect ground water and vice versa." [United States Environmental Protection Agency, Draft Plan to Study the Potential Impacts of Hydraulic Fracturing on Drinking Water Resources, 2/7/11]

Impact Of The Withdrawal Of Water For Fracking Varies From Region To Region, But Sparks Concern Everywhere. According to a 2011 report by the United States Environmental Protection Agency, "Whether the withdrawal of this much water from local surface or ground water sources has a significant impact may vary from one part of the country to another and from one time of the year to another. In arid North Dakota, the projected need of 5.5 billion gallons of water per year to release oil and gas from the Bakken Shale has prompted serious concerns by stakeholders (Kellman and Schneider, 2010). On the other hand, in less arid parts of the country (e.g., the Barnett Shale area), the impact of water withdrawals may be less significant. In the Marcellus Shale area, stakeholder concerns have focused on large volume, high rate water withdrawals from small streams in the headwaters of watersheds supplying drinking water (Maclin et al., 2009; Myers, 2009) rather than on overall water use." [United States Environmental Protection Agency, Draft Plan to Study the Potential Impacts of Hydraulic Fracturing on Drinking Water Resources, 2/7/11]