

# How is Water Used in Oil and Gas Exploration in Kansas?

## Hydraulic fracturing and horizontal drilling frequently asked questions

Water and energy are interdependent. Energy resources are needed for producing, processing, distributing and using water resources. Conversely, water is an essential component of deep shale gas development. It is used 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. Water is also used in *hydraulic fracturing* where a mixture of water and sand is injected into the deep shale at high pressure to create small cracks in the rock that allow natural gas and oil to freely flow to the surface.

**The actual quantity of water depends on the well depth, formation and pressure needed in the fracing process.**

- It is found that Kansas formations are much different than other areas and *require less water to complete the process.*

## Horizontal Well vs Vertical Well

- One horizontal well replaces 4 to 10 vertical wells
- One horizontal well pad for multiple wells compared to 1 vertical well per site

## How much water is used to drill a horizontal well in Kansas?

- It has been reported to take as little as **420,000 gallons up to 1 million gallons** of water to drill a horizontal well in the Mississippian Lime Play.

## How much water is used to hydraulic fracture a horizontal well in KS?

- The hydraulic fracturing process may take anywhere between **42,000 up to 2.49 million gallons of water** for well simulation.

## How much water is that?

1 million gallons = 3.07 acre feet

1 million gallons = 20,000 baths

1 million gallons=average use for 9.3 residences for one year

1 million gallons irrigates 3.2 acres if 18 inches are applied to the crop

1 million gallons supply the town of Harper (as of the 2010 census, the city population was 1,473) for 5.5 days

## For the counties of Sumner, Harper and Comanche in KS.....

Their total water use (2005 USGS) is 21,861 Acre-Feet/Year

- 70% of the 2005 water use was for Irrigation
- 8% of the 2005 water use was for Public Water Supply

- Example: Assume an oil company will drill 48 wells per year with an average of 2.5 million gallons per well (7.7 Acre-feet per well) = 368 Acre-Feet/Year, then the oil company's water use would represent about 1.6% of total water use in this region

## **Where will the water supply come from?**

Water for the fracturing process can come from surface supplies, groundwater sources or recovered water. Water recovered from oilfield activities can be used if quality is acceptable or it is treated to acceptable levels (recycle or reuse).

Options to supplement any usable recovered water include:

- Purchase from public water suppliers
- New Term, Basin Term or Temporary Permits from cities, other private lakes, streams or a ground water source
- Purchase from irrigator
- Surplus water contract from federal reservoir

*All depend on availability under an existing water permit or source conditions.* No matter the source it can be either purchased from an existing water supplier (such as a city, RWD or irrigator) who has an amount legally available but not being used, or through a permit obtained from the Kansas Department of Agriculture's Division of Water Resources (DWR). If purchased, the owner of the water right must apply to DWR for appropriate changes such as type of use and place of use.

## **Is horizontal drilling going to be a threat to our State's water supply?**

### **Quantity**

There are no signs it will be.

- The quantities needed are for short term use
- Approved permits are based on availability calculated at the diversion location
- Localized impacts possible if water well is pumped at a rate or longer than the local aquifer will support that use, however the required quantities of water are relatively small

### **Quality**

No documented cases that fracing activity has contaminated fresh waters in Kansas.

*(Hydraulic Fracturing has been performed in Kansas since 1947)*

- Handling and disposal of fluids have potential to affect water quality if not properly performed, but these activities are regulated to protect fresh water
- Fluid storage and disposal regulated by KCC with goal to avoid any freshwater contamination

## **Who regulates the use of water in the Hydraulic Fracturing process in Kansas and how?**

These water permits are issued by DWR for a specific time period and can use water already appropriated under an existing right or can be obtained through a new appropriation, if available.

- To establish if water is available, DWR conducts an analysis of the local source of supply to determine if the water can be appropriated without impairing other water users.

## **What type and how much water can landowners and cities sell to oil companies?**

Landowners, cities, municipalities, irrigation holders and industrial rights with adequate water rights can sell part of their water right if they choose to. However, DWR must still issue a permit for the authority to pump water for fracing.

- Landowners with ponds that are under 15 acre feet (4,887,771.43 gallons) can sell water without an additional permit from DWR
- Municipalities with adequate water rights can sell to oil companies as a customer from their water supply without an additional permit from DWR

## **If water is sold, can the price per gallon be regulated by the State?**

No. However, the state does have water it sells from state-owned storage in certain federal reservoirs. The state sets the price for those purchases.

## **If an oil company buys land, can they abuse the use of water or are they regulated?**

- Owning the land does not entitle a company to the water under Kansas law. Energy companies must abide by the same water laws governing everyone else.

## **If a landowner digs a pond, can he sell water collected from runoff?**

Yes, if it is less than 15 acre feet (4,887,771.43 gallons) annually, which is an amount considered allowed under domestic use.

- If the pond stores more than 15 acre feet during a calendar year, they must have an appropriation right from DWR
- Other permits are also required from the state and federal government once a pond or reservoir exceeds a certain size

## **Is there currently any type of frac water recycling being done?**

YES, many companies are reusing produced water. This depends on quality and proximity to the “new” well.

- Chesapeake Energy reports reusing in Texas, West Virginia, Pennsylvania and Arkansas
- SandRidge Energy has used produced water in their fracs instead of fresh water as the application warrants.
- Shell has indicated plans to use reuse water in its process and has done so in the past
- There is a report that Devon Energy Corp. has begun recycling a small percentage of the water it uses for fracing (Texas)
- There are reports that a Canadian company plans to recycle water in Arkansas

