Oil & Gas Produced Water in Texas: Considerations & Recommendations

TEXAS LIVING WATERS

Environmental Defense Fund

Texas' population growth and recurring significant droughts coupled with increasingly stressed water supplies have driven state lawmakers to focus on developing and investing in new water supplies, including produced water. ***Produced water is the wastewater byproduct that exits the production well along with oil and gas for the life of the producing well.*** The vast majority of produced water is currently reinjected into disposal wells; however various factors, such as the risk of seismic activity, cost for disposal, and impacts on other water resources, are driving attention to alternate management options. Proposed alternate uses of treated produced water include infield recycling, beneficial reuse, or discharge into surface water resources.

STATUS OF PRODUCED WATER IN TEXAS

Proposed beneficial reuse of produced water (such as crop irrigation) requires robust treatment and risks adverse impacts to human health and the environment. ***Over 20 million gallons of water are required to fracture an oil well and currently 50-60% of produced water is recycled in the Permian Basin.*** As Texas decision-makers look at ways to manage this wastestream and any potential alternate uses, we must recognize there are many knowledge, regulatory, technological and cost gaps to be addressed to ensure healthy communities, protection of water resources and cost effectiveness.

PRODUCED WATER RECYCLING vs. REUSE

Recycling produced water entails using this fluid instead of other water sources (brackish, saline, and fresh) in the hydraulic fracturing process, reducing the demand on these other water resources. Recycling requires little to no treatment of the produced water and the fluid stays within the oil and gas production operation, minimizing the volume requiring disposal.

Treating produced water for reuse outside of oil and gas production requires a higher level of water quality and, thus, a different approach to treatment. Careful treatment of produced water is required to reduce the risk of adverse impacts to human health and the environment. Compared to other lower-quality water resources such as brackish and saline water, produced water is the most challenging and costly to treat because of its complex chemical makeup that goes beyond elevated Total Dissolved Solids (TDS). Produced water contains many other constituents of concern including inorganics, organics, and potentially radionuclides.

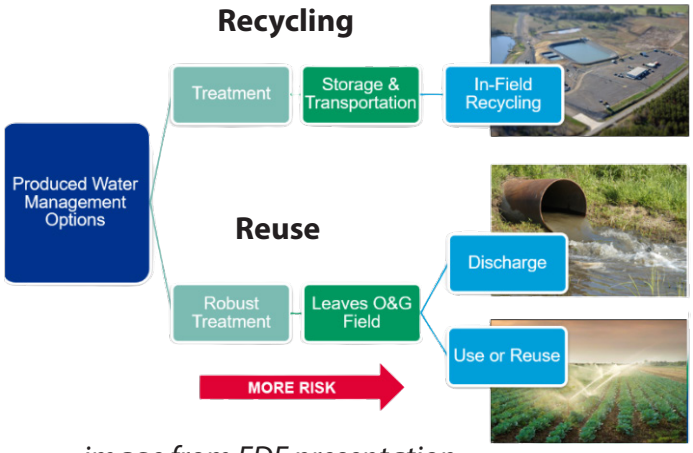
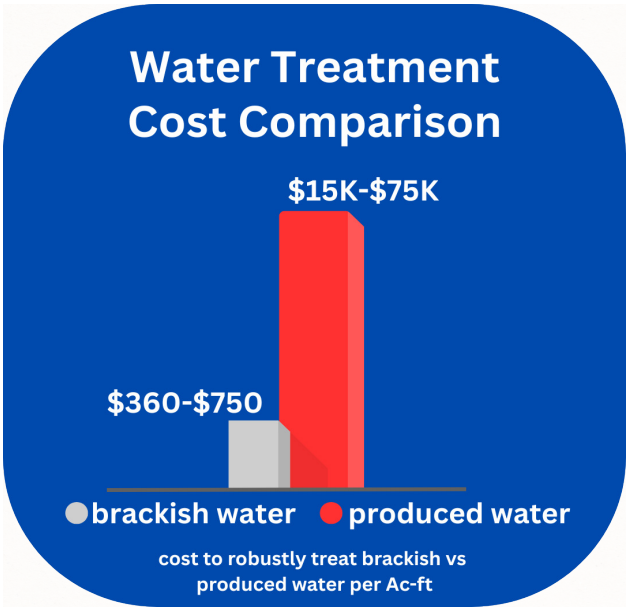


image from EDF presentation

Some of the chemicals present are a result of the fracturing chemicals (of which not all are known due to the proprietary nature of fracturing chemical makeup) but many are present in the formation water that is trapped with the oil and gas reserve, and also present as a result of maintenance chemicals that are added over the life of a production well.

A recent study of produced water from across the U.S. identified the potential presence of more than 1,100 chemical compounds. Of that, only 25% had approved analytical methods (methods available to regulators for establishing treatment standards, and methods routinely run by commercial labs), and only 14% had toxicity values available for developing risk assessments.

Despite increased attention to the potential beneficial reuse of produced water for future water supply, such as crop irrigation or discharge to surface waters , the most cost effective and feasible use of produced water is to recycle it onsite for oil and gas well operations. Maximizing the use of produced water for infield recycling is an obvious path forward to ensuring minimal impacts on other precious water resources and reducing the need for its costly disposal.



RECOMMENDATIONS

1. **Prioritize reuse of produced water in the oil and gas industry.** Although studies on potential beneficial uses of produced water are taking place, the most efficient, economically feasible, safe and logical approach is to offset the oil and gas industry's water demands through expanded infield recycling.
2. **More research and scaled-up pilot projects are needed to fully vet treatment technologies and all-in costs.** Data is sparse on the capabilities and limitations of robustly treating produced water including the all-in costs and Texas should continue to to pursue this important research.
3. **Fill critical knowledge gaps regarding beneficial reuse of produced water to ensure reuse options are protective of human health and the environment.** The Texas Produced Water Consortium must operate collaboratively to provide transparent and scientifically-defensible data and data evaluations to the TCEQ and RRC.
4. **The Legislature should provide the Texas Railroad Commission with needed resources.** The RRC has requested $7.685 million in additional funds and 2 FTEs to create a Produced Water and Injection Data Reporting System - an essential tool needed to move the field forward.
5. **Applicable regulatory programs must ensure that beneficial reuse or intentional release activities utilize the developing science around appropriate analytical methods, risk assessments of constituents of concern, and appropriately vetted treatment technologies.** Before authorizing discharges, agencies and regulatory programs (ex: TCEQ, RRC, NPDES) should ensure they consider and apply the best available information, and TCEQ should be directed to develop improved water quality standards (both narrative and numerical) specific to constituents of concern in produced water (including salinity standards).

SUMMARY

Treatment and use of oil and gas produced water is a relatively new and complex endeavor that requires further data, water quality testing, technological improvements, new regulatory standards and cost analysis to make its use viable beyond the oil and gas fields. Notably, the EPA recently announced that it will initiate the process of developing effluent limit guidelines (national standards for industrial discharges to surface waters) for treated produced water. There are also lessons learned from treatment of produced water in places like Pennsylvania and California.

To learn more about produced water in Texas, download our full paper with references at: bit.ly/producedwatertx

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