TEXAS WATER FOUNDATION

PHOTO CREDIT: COLTON STURGEON ON UNSPLASH

PRODUCED WATER

The 2017 Texas State Water Plan predicts a shortage of 8.9 million acre feet per year by 2070[1]. Meanwhile, the Texas Railroad Commission (RRC) reported 1.3 million acre feet of produced water in 2017[2], and Sourcewater, Inc. projects over 1.9 million acre feet of produced water by 2023[3]. Interest in the large volume of produced water in Texas raises several important questions. What is the most efficient use of produced water? What are the current and proposed uses? What data and regulatory needs should be considered?

UNDERSTANDING PRODUCED WATER

PRODUCED WATER

During oil and gas extraction, a wastewater byproduct made up of i) water from the geologic formation, ii) flowback water from injection and iii) any chemicals added downhole, is also produced. That wastewater byproduct is referred to as produced water. Ratios of produced water to oil in Texas average 5:1, but can range from 1:1 to 8:1 in unconventional development and 3:1 to 22:1 in conventional fields.[4]

TREATMENT

Produced water is variable in quality and must be treated to be used. Various processes are used to treat produced water, depending on the use. Treatment for reuse within oil and gas operations is different compared to treatment for discharge to surface water, which requires higher water quality standards.[6]

REUSE

Treating and using produced water in oil and gas operations, as opposed to disposing or discharging it, is considered reuse. While it is common to see reuse of flowback water, reuse of produced water in oil and gas operations is minimal.

DISPOSAL

Produced water that is not reused or treated and discharged into surface water is injected deep into the ground via injection wells. Injection wells are used to move fluid from the surface into subsurface[5].

DISCHARGE

The release of produced water from a point source into surface water after treatment is considered discharge. Discharge requires a National Pollutant Discharge Elimination System (NPDES) permit issued by the Texas Commission on Environmental Quality (TCEQ).

[1] TWDB 2017 State Water Plan
[2] Veil, 2020. U.S. Produced Water Volumes and Management Practices in 2017.
[3] Lyons, Blythe, et al. Sustainable Produced Water Policy, Regulatory Framework, and Management in The Texas Oil and Natural Gas Industry: 2019 and Beyond. Texas Alliance of Energy Producers, 16 Sept. 2019.
[4] Summary of Input on Oil and Gas Extraction Wastewater Management Practices Under the Clean Water Act. U.S. Environmental Protection Agency, May 2020,
[5] 16 TAC 3.9
[6] "Naturally occurring constituents [of produced water] include, but are not limited to, bromide, calcium, chloride, magnesium, sulfate, and [at times] radioactive materials. Materials added downhole include hydraulic fracturing chemicals, well stimulation chemicals and well maintenance chemicals. Over time, the characteristics and volume of produced water generated for a well can change." -EPA, May 2020

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CURRENT AND PROPOSED USES OF PRODUCED WATER

Disposal in Injection Wells

In 2017, 54% of produced water was disposed of in injection wells[7]. As of October 2020, the RRC reported 13,000 class II injection wells permitted.

Reuse in Oil & Gas

Currently, the most efficient use of produced water is reuse in oil and gas operations because it requires the least treatment. **Reuse of produced water by oil and gas operations reduces demand on freshwater supplies, but also requires treatment facilities and transport**. In 2017, nearly 47% of produced water was reused in enhanced oil recovery[8].

Drinking, Irrigation & Discharge

With existing technology, **it is currently uneconomical to treat produced water to drinking water quality.** Some treatment technologies suggest it may be possible to treat produced water to irrigation and discharge standards at costs competitive to the cost of disposal.

GOOD TO KNOW

- In its **December 2020 Interim Report,** the Texas Senate Committee on Water and Rural Affairs published several recommendations in regards to produced water.
- **86(R) HB 3246:** gave title of produced water, as part of fluid oil and gas waste, to whoever takes possession of it to put it to a beneficial use. This is currently being discussed in courts as a potential legislative taking.
- **86(R) HB 2771**: transferred jurisdiction over the discharge of produced water into surface waters from the RRC to the TCEQ and instructed TCEQ to obtain delegation from EPA for authorization to issue NPDES permit for those discharges. On January 15, 2021 EPA approved that delegation and TCEQ now has authority to issue NPDES permits to cover these discharges.
- **87(R) SB 601 / HB 3096**: proposes the creation of the Texas Produced Water Consortium
- **87(R) HB 4524**: proposes requiring TCEQ to adopt standards for discharges of produced waters.

POLICY CONSIDERATIONS

Reuse & Transportation

Moving excess produced water to the oil and gas plays that need it would require extensive infrastructure, such as treatment facilities, pipelines and eminent domain authority. With no current minimum standards in place for produced water infrastructure, new regulations governing best practices and accidental spills during transport may need to be considered.

Disposal & Treatment

Produced water volumes exceed the water needs in parts of oil and gas industry. Disposal of produced water in injection wells will remain necessary until technology makes treatment an economically viable option[9].

Environment

As TCEQ considers discharge permits, some hunting, angling, and conservation organizations have expressed concerns about whether discharges of produced waters into surface water streams will be of good enough quality to protect fish and wildlife resources.

Data Gaps

Produced water volumes and spills are not currently reported to the state. Instead, estimates are made based on indirect methods, such as well tests and reported volume of injections. Similarly, constituents of produced water vary depending upon production operations and are not always disclosed.

Reliability of Supply

With data gaps on produced water volumes and oil and gas production variability, how produced water can/should be factored into state water planning is an ongoing debate.

Health Impacts

As Texas considers reuse and beneficial use of produced water, water quality and potential health impacts must be considered. In states where produced water is already being treated and discharged into surface water, an ongoing discussion about potential health impacts exists[10].

[7] Veil, 2020
[8] Interim Report p. 7
[9] Scanlon et al.
[10] EPA, p.1

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