

Direct and Rebuttal Testimony Summary



Ken Nichols 9/28/2021

Direct Testimony

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Produced Water

- Produced water is water that is recovered from an oil or gas well. Based on my experience, this includes both water that was injected into the well during hydraulic fracturing operations and water that was originally present in the formation. Rates of recovery and water quality vary by well and over the life of individual wells.

Produced Water Recycling in NM

- There are many treatment technologies and management practices related to produced water recycling.
- Specific activities vary by operator and by well.
- Based on my experience, the most common approach to recycling produced water includes transportation of the water, separation of the water, and storage of the water.
- Initial separation of hydrocarbons and water generally occurs at production facilities.
- Depending on the specific operational needs, water is moved in pipe, layflat hose, or trucks to disposal or recycling facilities.
- Treatment of the water generally occurs to remove residual oil and solids using tanks and filters.

Importance of Recycling

- Recycling reduces the use of scarce fresh water.
- Each barrel recycled saves a barrel of fresh water.
- Recycling produced water is extremely important to New Mexico and the industry.
- Additionally, recycling reduces water disposal volumes into finite disposal zones, prolonging the operational lives of existing salt water disposal zones.

Impact of Proposed Rule

- In my opinion, the rule will reduce water recycling activities.
- Based on my review of research related to the topic, it appears that recycling operations would need to be reduced in size to meet the emissions limit.
- Because the economics of recycling produced water are already challenged, and there are economies of scale and risk reduction associated with larger facilities, this would make some projects infeasible.
- NMED's new proposal addressed this concern.

Permanent Pit Language

- NMOGA proposed revisions to the definition of “Produced Water Management Unit.”
- The modification was proposed to add permanent pond – to align the definition of permanent pond with pit which was not defined.
- The goal is to clarify that “pit” and “pond” mean the same thing (20.2.50.7 DD).
- NMED’s new proposal addressed this concern.

Significance of SWD Well VOC Emissions

- Emissions from SWD are generally low
 - I have reviewed information from studies related to emissions from produced water.
 - Based on my review of the information, emissions quantities are directly related to such variables as water quality, water surface area and wind at the water surface.
 - Operators of Salt Water Disposal wells and facilities (SWDs) attempt to retrieve as much residual oil as possible.
 - SWDs that I am familiar with go through separation equipment (e.g. gun barrel) to retrieve residual oil prior to moving to the storage tanks feeding injection pumps, improving the water quality.
 - The facilities I am familiar with use closed top tanks so the water surfaces within the tanks at SWDs are not exposed to wind.
 - Additionally, the surface area is relatively small, related to the size of the tank.
 - The Fort Worth Natural Gas Air Quality Study evaluated emissions at an SWD site. The emissions for VOCs were less than 0.01 ton/year, consistent with theoretical expectations.
 - NMOGA 53 (Pring, Michael, and John Wilhelmi, 2011. Fort Worth Natural Gas Air Quality Study).

Reducing VOC Emissions from PWMU

- Three phase separation separates the oil, water, and gas after the fluid is produced from the well.
- Separation of oil from the produced water will improve the water quality (reducing concentrations of VOCs) and will reduce emissions.

3 Phase Treatment to meet 2 TPY

- I do not believe VOC emissions from all PWMUs affected by this rule can be reduced to less than 2 tons per year using three-phase separation alone.
- There is uncertainty related to the total emissions from PWMUS because there are many types of systems in use and a wide range of capacities.
- Systems that process large volumes of water likely have emissions larger than 2 TPY
- Reducing to very low rates and reducing the size of the facility would reduce emissions. Unfortunately, this would make recycling uneconomical/infeasible in many cases.

Comments on NMED 9/16 Redlines for Produced Water Management Units

- 20.2.50.126.B.1– “best” management practices may be subjective. Suggest “industry standard practices” or similar
- 20.2.50.126.B.2 - Recommend removing the word “minimize” related to entrained hydrocarbons. Minimize could suggest removing all hydrocarbons. Suggest “using appropriate technology for the purpose of removing entrained hydrocarbons”