Beneficial Reuse of Treated Produced Water: Assessing Feasibility and Sustainability

A November 2026 white paper, titled *Beneficial Reuse of Treated Produced Water: Assessing Feasibility and Sustainability*, prepared by Dan Mueller, PE, and commissioned by Amigos Bravos, examines the current economic and technical feasibility of reuse of produced water – an industrial waste product generated by drilling and production of oil and gas.

Bottom line: Beneficial reuse of treated produced water, is technically unproven, economically uncertain, and limited by unresolved sustainability concerns. Significant work is necessary before concluding that reuse and discharge of treated produced water is safe for the environment and human health.

Executive Summary of *Beneficial Reuse of Treated Produced Water: Assessing Feasibility and Sustainability*

New Mexico ranks second only to Texas in U.S. oil and gas production, and that production generates large volumes of produced water. Produced water is an industrial wastewater that is currently managed primarily through underground injection for enhanced oil recovery or disposal or recycled for use in completing (fracturing) recently drilled wells.

Currently, a significant volume of produced water generated in New Mexico is transported to Texas for disposal – estimated at around 35%. Although there are permit applications for discharge of treated produced water under review by Texas Commission on Environmental Quality, there are currently no draft permits issued for public review nor is there beneficial reuse of treated produced water occurring in the Permian Basin area of Texas. All produced water transported from New Mexico to Texas is disposed in the same manner and at the same cost as produced water generated in Texas.

Because much of New Mexico's oil production occurs in water-stressed areas, treating produced water for discharge, aquifer storage, irrigation, industrial use, or other beneficial uses warrants careful consideration. Beneficial reuse could provide a supplemental water source while reducing reliance on underground disposal. However, it must not be advanced as a water-supply or waste-management solution until its technical feasibility, economic viability, and long-term sustainability have been demonstrated.

Assessing feasibility requires more than determining whether treatment is technically possible. A feasible approach must consistently protect human health and the environment, operate reliably under variable conditions, be financially viable when all costs are considered, and provide water of sufficient quality and quantity for the intended use. The white paper evaluates the state of the science through a review of recently published peer-reviewed research, much of it available through the NMPWRC website, with focus on technical, economic, and sustainability considerations.

Technical feasibility remains promising but unproven. Produced water is a highly variable waste stream, and important knowledge gaps remain regarding its constituents and the performance of treatment technologies across different sources and operating conditions. Demonstrating reductions in total dissolved solids or other bulk water-quality measurements is not equivalent to demonstrating that treated produced water can be consistently and safely released into the environment.

Published studies identify constituents that persist through treatment, increase in concentration, or appear in

treated effluent even when they were not detected in untreated water. These findings underscore the need to evaluate the complete treatment process—including pretreatment, desalination, and polishing—and to assess known and yet to be fully identified (unknown) constituents of concern and potential treatment byproducts. Longer-duration, larger-volume pilot testing is needed to establish treatment effectiveness and reliability before commercial-scale feasibility can be determined.

Economic feasibility is similarly uncertain. Published cost estimates rely on models and simulations rather than comprehensive operating data from commercial-scale facilities. A meaningful economic evaluation must account for the full cost of collecting and transporting produced water; constructing, operating, and maintaining treatment facilities; securing the required energy; managing concentrated residual wastes; monitoring treatment performance and water quality; and delivering treated water to its intended use. These costs must be evaluated under realistic operating conditions and across the expected range of produced-water quality and volume.

Energy demand is substantial, particularly for desalination of the complex and highly variable produced water, and management of the resulting concentrate remains a significant disposal challenge. These factors affect both treatment costs and the overall environmental footprint of beneficial reuse. Without reliable, all-in cost information, it is not possible to determine whether beneficial reuse can be financially viable or competitive with existing produced-water management practices.

The consequences of inadequate economic planning extend beyond the profitability of an individual facility. Produced-water treatment facilities have closed or ceased operations in ways that left legacy waste-management problems and environmental contamination. These experiences demonstrate the need for financial assurance, enforceable closure and post-closure requirements, and clear long-term responsibility for residual wastes, facility decommissioning, and environmental impacts. Any permitting framework for beneficial reuse must fully address these obligations before facilities begin operating.

Sustainability also remains uncertain. Produced water is not an independent or renewable water supply; its generation depends on oil and gas production, which varies with market conditions, drilling activity, reservoir performance and depletion, and other factors. This variability creates supply risk for agriculture, industry, or other users that require a dependable long-term water source. Beneficial reuse may help address short-term or regional needs, but available information does not yet support treating produced water as a reliable long-term water-planning solution.

Overall, beneficial reuse of treated produced water, while promising, is technically unproven, economically uncertain, and limited by unresolved sustainability concerns. The appropriate path forward is a deliberate, transparent, and independently evaluated process that establishes treatment performance, protects human health and the environment, demonstrates full-cost economic viability, and addresses long-term water-supply reliability and waste-management responsibility.

Decisionmakers must rely on scientifically defensible, reproducible data—not assumptions—to avoid creating new environmental, public-health, or financial liabilities while attempting to address the oil and gas industry's produced-water management challenges.

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