



10455 N. Central Expressway. #109-256, Dallas, TX 75231 - www.oilfieldwitness.org



December 1, 2023

New Mexico Environment Department
Groundwater Protection Bureau
Attn: Water Reuse Regulation
P.O. Box 5469
Santa Fe, NM, 87502

**** Submitted by electronically ****

Subject: Written Public Comments submitted by Oilfield Witness regarding
NMED proposed rule Ground and Surface Water Protection – Supplemental
Requirements for Water Reuse (20.6.8 NMAC).

Dear NMED Official:

Oilfield Witness appreciates the time and effort that NMED has put forth in this rule-making process and submits the attached written public comments for your review and consideration.

Thank you for the opportunity to participate in this important process and we look forward to the agency's Response to Comments.

Sincerely,

Kathy J. Martin
Technical Research Manager, Oilfield Witness
Email: kathy@oilfieldwitness.org

NM Proposed Rule on Produced Water Reuse

Written Comments submitted by Oilfield Witness

The following written public comments are submitted by Oilfield Witness to the New Mexico Environment Department regarding the proposed regulation *Ground and Surface Water Protection – Supplemental Requirements for Water*.

Oilfield Witness is a non-profit organization that brings over twenty years of oil and gas expertise combined with Optical Gas Imaging (OGI) evidence to counter the fossil fuel industry's false narrative and false solutions. Using earned media, advertising, social media, and oilfield tours, we help energize community organizations, frontline residents, and other environmental partners. Our evidence of ongoing climate harming pollution in oil and gas fields will help drive a rapid and just transition to clean renewable wind, water, and solar energy.

Main Issues with Proposed Rule

1. The proposed rule is silent with respect to how NMED will regulate malodors and toxic air pollution generated by the treatment processes used to remove pollutants from produced water.
2. The proposed rule does not include an obvious public notice process including opportunity for public comment and appeal for demonstration projects nor groundwater discharge permits for treated produced water.
3. The proposed rule does not specify what *methods* will be allowed for discharges of treated produced water to groundwater, such as land application, ditch irrigation, storage impoundments, evaporative lagoons, and other systems typically used for industrial and municipal wastewater storage and disposal.
4. The proposed rule does not emphasize and address adverse impacts to public health from carcinogenic and toxic pollutants known or suspected to be in untreated and possibly treated produced water.
5. The proposed rule does not include sufficient proscriptive language that would ensure that the permittee has *comprehensively identified all potential pollutants*, chemicals, and other contaminants that could be in the untreated and treated produced water.
6. The proposed rule does not identify and address *known contaminants* in produced water from unconventional hydraulic fracking including high concentrations of salts (total dissolved solids, sulfates, and chlorides) plus the presence of PFAs, NORM/TENORM,

residual crude oil (TPH and benzene, toluene, ethyl benzene, and xylenes - BTEX), toxic heavy metals, biocides, sulfate-reducing microorganisms, fermentation by-products, and residual complex organic hydrocarbons used to frack the formation.

7. The proposed rule does not identify *minimum treatment requirements* for a demonstration project Notice of Intent approval or a discharge to groundwater permit to be classified as a 'treated produced water' including pre-treatment (dehydration at the well-head) prior to the approved treatment processes, physical separation/settling, salt reduction, chemically enhanced solids removal, thermal processes, and other primary, secondary, and tertiary treatment processes.

8. The proposed rule does not contain *minimum design standards* (or citations to other regulatory language) *for surface impoundments and related piping* used at produced water treatment facilities to ensure that sufficient measures are taken to prevent pollution of surface and ground water.

9. The proposed rule does not mention prevention of adverse impacts due to salt concentration in treated produced water when defining land application to crops and pasture.

10. The proposed rule includes numerous references to 'domestic water reuse' without explaining how treated municipal wastewater reuse is related to treated produced water from oil and gas in the context of this rulemaking authorized under The Produced Water Act.

Produced Water in Permian Basin

Permian Embraces Produced Water Recycling

<https://www.aogr.com/magazine/frac-facts/permian-embraces-produced-water-recycling>

Filename: 2023 08 news article Permian Embraces Produced Water Recycling graphs 5 pgs

“To understand the scope of the Permian Basin’s water management challenges, consider a few statistics. In general, Permian Basin wells produce significantly more water than oil. **The average is three or four barrels of water for every barrel of oil, but in some areas, the ratio can reach as high as 12 to one.** These numbers put the Permian Basin’s average water cut higher than any other unconventional play.

As advances in hydraulic fracturing revived activity in the Permian, the total water that needed to be managed soared from 6.3 million barrels a day in 2017 to 18.9 MMbbl/d in 2023. For context, water production in Appalachia grew from 0.17 MMbbl/d to 0.33 MMbbl/d during the same period (Figure 1). **This incredible contrast with one of America’s other prolific basins illustrates the extent of the Permian Basin’s water management challenge.**”

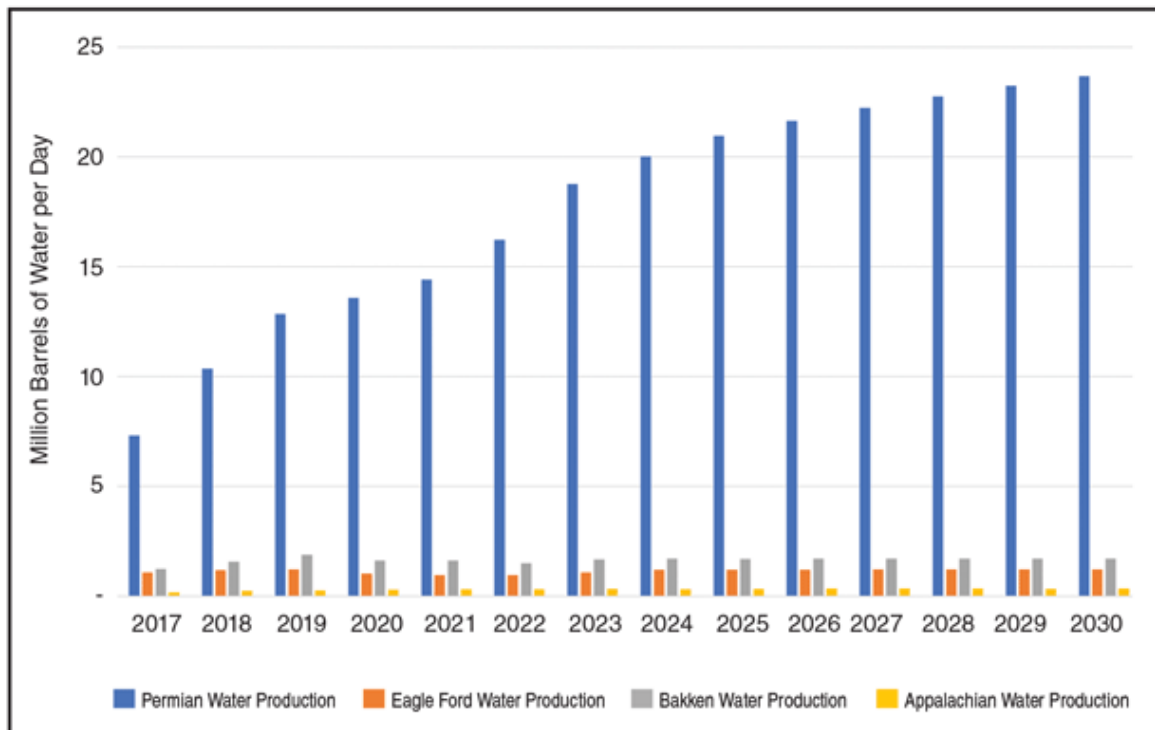


Figure – Snapshot of comparison of produced water from Permian (blue), Eagle Ford (red), Bakkan (grey) and Appalachian formations (yellow).

Review of Proposed Rule Section by Section

20.6.8.7 DEFINITIONS: The following terms as used in this part shall have the following meanings; terms defined in the Water Quality Act, but not defined in this part, will have the meaning given in the act.

A. Terms beginning with numerals or the letter “A,” and abbreviations for units.

(1) **“30-day Average”** For **fecal coliform bacteria**: means the geometric mean of the values for all effluent samples collected during a calendar month. **For other than for fecal coliform bacteria**: means the arithmetic mean of the daily values for all effluent samples collected during a calendar month, calculated as the sum of all daily discharges measured during a calendar month divided by the number of daily discharges measured during that month.

Question: Why include definition for 30-day average (fecal coliform and other pollutants) if the proposed rule prohibits or discharge of any treated or untreated produced water to surface water? Why would there be fecal coliform in produced water – this definition coupled with the domestic reuse classifications is confusing and implies there will be a human sewage component to the rule.

(2) **“Agricultural application”** means the application of **domestic or industrial reuse water for cultivating the soil and growing crops or irrigating pasture for livestock grazing**. Agriculture application includes the use of water in connection with the operation or maintenance of feedlots or agricultural application of water, but not those activities defined as livestock application.

Question: Is the proposed rule implying that treated produced water be considered ‘industrial reuse water’?

Question/Comment: How will NMED protect soil health and prevent crop damage without acknowledging the *serious salt problem* associated with produced water? The definition of agricultural application should include a maximum total dissolved solids concentration to promote adequate crop yields and protect shallow groundwater.

Question: How will NMED regulate land application of treated produced water on pastured land under federal or tribal jurisdiction?

Question: How will NMED prevent livestock from consuming treated produced water?

(3) “Agronomic rate” means the rate of application of nutrients to plants that is necessary to satisfy the plants’ nutritional requirements while strictly minimizing the amount of nutrients that run off to surface waters or that pass below the root zone of the plants.

Comment: NMED should include maximum salt (TDS) concentrations as part of agronomic rate to acknowledge that irrigation water with high electrical conductivity can reduce crop yields substantially depending on the salt tolerance of the crop.

See: ASCE Agricultural Salinity Assessment and Management (ASCE Practice 71)
Ch 13 - Salt Tolerance of Plants

Link: https://www.ars.usda.gov/ARUserFiles/20360500/pdf_pubs/P2246.pdf

Question: What is the concentration of oilfield contaminants that would be allowed to remain in the treated produced water and still be used on human consumptive food crops? Would NMED allow the use of treated produced water to irrigate chilis, onions, jalapenos, pecans, and other human food crops?

(4) “Application” means a final disposition of a treated wastewater as it pertains to water reuse. Different uses may have different effluent criteria dependent on the needs for protection for ground and surface water and human health. Applications may include, but are not limited to industrial, agricultural, direct or indirect potable, recreational turf, rangeland, ecological restoration or other defined fit for purpose applications. Applications have effluent criteria dependent on the needs for protection for ground and surface water and human health and aquatic health.

(5) “Aquifer” means an underground body of sediment or rock that contains or can transmit ground water.

(6) “Aquifer recharge” means a manmade or natural process enhanced by humans to convey water underground and replenish ground water stored in aquifers.

(7) “Aquifer storage” means a manmade or natural process enhanced by humans to convey water underground and replenish ground water stored in aquifers and later recovered for use.

Question: Why include definitions for aquifers and aquifer recharge/storage? Does NMED intend to permit treated produced water to be discharged to drinking water aquifers, such as the Ogallala as a means of recharge and/or storage?

Question: The term ‘aquifer’ appears six times in the proposed rule in the definition section – none occur in the body of the rule. What is the purpose of including these definitions rather than referring to existing definitions elsewhere in NMED regulations?

B. Terms beginning with the letter “B”.

(1) “**Bench-scale project**” means a **small-scale project or study conducted in a laboratory** using small quantities of materials.

(2) “**Brackish water**” means water that has a **dissolved solids concentration** between 1,000 and 10,000 milligrams per liter (mg/L).

Question: Why doesn’t the proposed rule address the range of salt and/or dissolved solids concentrations expected in produced water (treated and untreated) as categories of risk to the environment and waters of the state? Why only identify dissolved solids of 10,000 mg/l when produced water can be much more concentrated and thus an *extreme risk* to water quality, plant and crop yields, and long-term soil health?

C. Terms beginning with the letter “C”.

(1) “**Class 1A reuse**” means **domestic reuse water** that has a water quality more stringent than Class 1B and is appropriate for most applications except direct consumption.

(2) “**Class 1B reuse**” means **domestic reuse water** that has a water quality less stringent than Class 1A and is appropriate for applications where public exposure is likely.

(3) “**Class 2 reuse**” means **domestic reuse water** that has a water quality less stringent than Class 1B, but more stringent than Class 3. Water quality of Class 2 is appropriate for applications in which public access and exposure is restricted or limited temporally and spatially.

(4) “**Class 3 reuse**” means **domestic reuse water** that has a water quality less stringent than Class 2. Class 3 has the least stringent criteria and is only appropriate for applications in which public access and exposure is prohibited.

Question: Why are there *categories for domestic reuse water* in the produced water reuse rule? The terminology is only mentioned in the Definitions section and does not appear elsewhere in the rule as proposed. Why is there is a definition for domestic wastewater, but not a definition of ‘domestic reuse water’.

Question: Does NMED intend to allow treated produced water to be utilized in homes and businesses for toilet flushing and other non-potable uses?

Question: Where are the criteria for each Class (no citation provided) and how does this classification scheme (Class 1, 2, and 3) compared to what is published on the NMED website for treated municipal wastewater?

See NMED webpage on *treated municipal wastewater*:

<https://www.epa.gov/waterreuse/new-mexico-treated-municipal-wastewater-agriculture>

“Class 1A reclaimed wastewater is suitable only for irrigation of food crops when there is no contact between the edible portion of the crop and the wastewater. Spray irrigation of food crops is prohibited. Application of Class 1A reclaimed water does not require restrictions on public access and exposure. It requires a minimum of treatment to remove colloidal organic matter, color, and other substances that interfere with disinfection plus disinfection. Requirements for treatment and disinfection (measurements of fecal coliforms) are more stringent when compared to Class 2 and Class 3.

Class 2 reclaimed wastewater is suitable for purposes in which public access and exposure is restricted. It requires a minimum of conventional secondary wastewater treatment plus disinfection. Requirements for treatment and disinfection (single sample maximum for total suspended solids and measures of fecal coliforms) are more stringent when compared to Class 3.

Class 3 reclaimed wastewater is suitable for purposes in which public access and exposure is restricted. It requires a minimum of conventional secondary wastewater treatment plus disinfection.”

Note: The NMED webpage has a guidance/table that summarizes criteria for New Mexico's Water Reuse for Agriculture Specifications. This guidance is restricted to *only domestic wastewater reuse* (treated municipal wastewater)

Recycled Water Class/Category	Source Water Type	Water Quality Parameter	Specification	Sampling/Monitoring Requirements (Frequency of monitoring; site/ location of sample; quantification methods)*
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Question: Will NMED create a similar table summarizing the source type, water quality parameter and treatment specification for treated produced water from sources such as coal bed methane, conventional oil and gas, and unconventional oil and gas? If the table is not in the rule, would it be considered ‘guidance’ and thus not enforceable?

Question: Did NMED just copy and paste definitions from the Domestic Water Reuse Guidance without fine tuning the language to be more appropriate for treated oil and gas produced water reuse?

NMED Ground Water Quality Bureau Guidance (January 2007) – Above Ground Use of Reclaimed Domestic Wastewater

Link: <https://cloud.env.nm.gov/water/pages/view.php?ref=5582&k=cdcde6cbdf>

“This document provides guidance for the above ground use of reclaimed domestic wastewater necessary to ensure protection of public health and the

environment. The New Mexico Environment Department (NMED) has developed this guidance document to promote the safe use of reclaimed wastewater to offset the use of limited potable water resources in the State. This guidance document is intended to provide direction for any person seeking to submit an application for a Ground Water Discharge Permit that includes the above ground use of reclaimed wastewater. This document is used by NMED technical staff to ensure consistency in the application review process and in the development of permit requirements.”

Question: Will NMED staff be using this 2007 Guidance document when evaluating ground water discharge permit applications for treated produced water?

(5) “Coal bed methane” means a form of natural gas extracted from coal beds.

Question: Will NMED allow mixing of produced water from coal bed methane extraction with produced water from conventional and/or unconventional oil and gas extraction?

Link to USGS 1991 Report on Coalbed Methane in New Mexico:

<https://geoinfo.nmt.edu/publications/periodicals/nmg/backissues/home.cfm?volume=13&number=4>

“In conventional gas reservoirs, gas occurs in interconnected voids (pores) in the rock. Coal-bed methane is an unconventional gas in that the methane is adsorbed or attached to internal surfaces within the coal. As the reservoir pressure of the coal is decreased by removing water or gas, more gas desorbs from the coal and is available to flow to the well bore.”

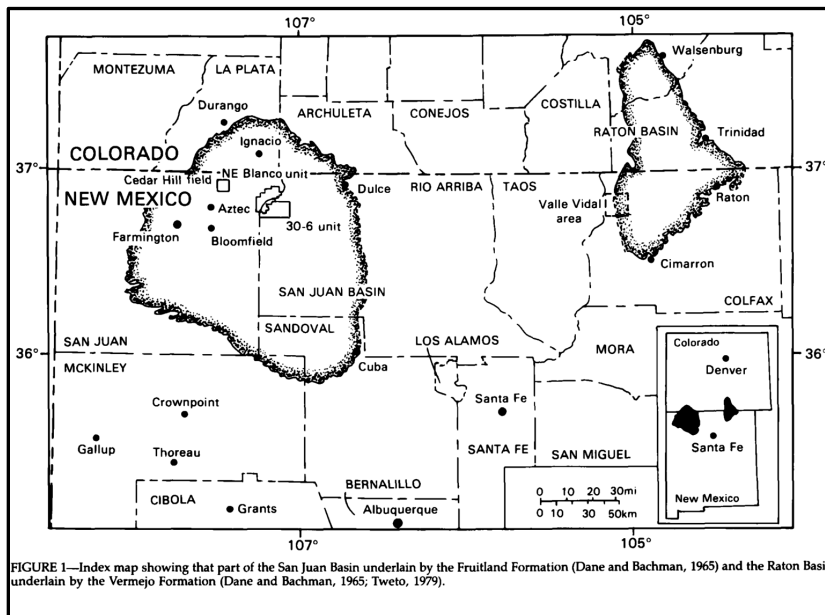


FIGURE 1—Index map showing that part of the San Juan Basin underlain by the Fruitland Formation (Dane and Bachman, 1965) and the Raton Basin underlain by the Vermejo Formation (Dane and Bachman, 1965; Tweto, 1979).

Figure – Snapshot of coalbed methane locations in New Mexico.

NM Oil and Gas production information:

<https://www.eia.gov/state/analysis.php?sid=NM>

“[Natural Gas Production] New Mexico is among the top 10 natural gas producing states in the nation.⁴⁷ As with crude oil, the state's major natural gas deposits are in the northwestern and southeastern parts of the state.⁴⁸ Almost 6% of U.S. proved natural gas reserves are in New Mexico.⁴⁹ In 2022, the state's annual natural gas gross withdrawals exceeded 2.7 trillion cubic feet for the first time, and New Mexico accounted for 6% of the nation's total natural gas production.⁵⁰ Natural gas is produced from low permeability sands, from coalbeds as coalbed methane, and from shale-gas wells in the San Juan Basin in northwestern New Mexico. Conventional oil and gas wells and shale gas wells in the Permian Basin in southeastern New Mexico also produce large amounts of natural gas.^{51,52} In 2021, New Mexico's natural gas production from shale gas wells was more than 20 times greater than it was in 2010 and accounted for about two-thirds of the natural gas produced in the state.^{53,54} New Mexico also is 1 of only 15 states that produce natural gas from coalbeds. In 2021, the state was second only to Colorado in coalbed methane production. Even though New Mexico's coalbed methane production declined to less than one-third of its 2007 peak of more than 616 billion cubic feet, it accounted for one-fourth of the nation's total in 2021.^{55,56}”

(6) “Commercial application” or “industrial application” means the application of domestic or industrial reuse water in connection with any activity that provides, or offers to provide, goods or services for consideration, not including domestic applications, incidental to a commercial or industrial facility where, at a minimum, public access is restricted or limited.

(7) “Composite sample” means an environmental sample collected over time, either by continuous sampling or by mixing discrete samples and represents the average characteristics of the sample media during the compositing period. Unless otherwise approved by the department for specific applications, composite sampling shall be conducted as follows:

(i) 3-hour Composite Sample: means three discrete samples collected no closer together than one hour and no further than 6 hours together and composited in proportion to flow.

(ii) 6-hour Composite Sample: means six discrete samples collected no closer together than one hour and no further than 4 hours together and composited in proportion to flow.

(iii) 24-hour Composite Sample: means twenty-four discrete samples collected no closer together than one hour and composited in proportion to flow.

(iv) daily composite sample: as defined in 20.6.2 NMAC.

(8) “**Conventional well**” means oil or gas resources that come from formations that have **good permeability and porosity** that allow for natural gas and oil to flow through the pores and into a **standard wellbore**. Extracting fossil fuels from these geological formations can be done with **standard methods** that can be used to economically remove the fuel from the deposit. Conventional wells are generally vertical wells.

Question: Will NMED consider coalbed methane wells to be conventional wells?

Question: Why does the definition for *conventional well* include a descriptor of ‘good permeability and porosity’? What is considered to be a standard wellbore in this rulemaking? What are the standard methods for extraction?

D. Terms beginning with the letter “D”.

(1) “**Defacto application**” means an application of water that is substantially composed of treated wastewater such as **where communities draw their water supplies from rivers that receive treated wastewater discharges from communities upstream**.

Question: How does this definition apply to the proposed rule that strictly prohibits discharge to surface water of both treated and untreated produced water? Is there an intent to acknowledge that land application of treated produced water could result in contaminated stormwater runoff and the potential to enter surface and ground waters? If so, shouldn’t the rule prohibit contaminated stormwater runoff?

(2) “**Demonstration project**” means a bench-scale or pilot-scale project, as defined in this Part.

Question: Why include bench-scale in this definition when there is already a definition for bench-scale? The definition for *demonstration project* should be used only for those projects that have already been evaluated using bench-scale studies so that it is clear that NMED is not approving never-before-tested processes.

(3) “**Department**” means the New Mexico environment department.

(4) “**Direct potable**” means the application of reclaimed wastewater for drinking water purposes. Direct potable applications convey the reclaimed wastewater to a community drinking water systems without an intermediary environmental buffer.

Question: Why include a definition for *direct potable* water if treated produced water will never be considered as a private or public water supply?

(5) “**Discharge**” means spilling, leaking, pumping, pouring, emitting, or dumping of a water contaminant in a location and manner where there is a reasonable probability that the water contaminant may reach ground or surface water.

(6) “**Discharge permit**” as defined in 20.6.2 NMAC.

(7) “**Discharge plan**” as defined in 20.6.2 NMAC.

(8) “**Discharge site**” as defined in 20.6.2 NMAC.

Note: These are the definitions as they appear in 20.6.2 NMAC:

“(3)“discharge permit” means a discharge plan approved by the department;

(6) “discharge plan” means a description of any operational, monitoring , contingency, and closure requirements and conditions for any discharge of effluent or leachate which may move directly or indirectly into ground water;

(7) “discharge site” means the entire site where the discharge and associated activities will take place;”

(9) “**Disposal**” means to abandon, deposit, inter or otherwise discard a fluid as a final action after its use has been achieved.

Note: no (10)

(11) “**Domestic wastewater**” means untreated wastewater containing human excreta and water-carried waste from typical residential plumbing fixtures and activities, including but not limited to, wastes from toilets, sinks, bath fixtures, clothes or dishwashing machines and floor drains.

(12) “**Dwelling unit**” means a structure that contains bedrooms.

Question: Why does this rule include definition for domestic wastewater? Does NMED intend on *allowing domestic wastewater to be mixed with produced water* in any demonstration project or permitted discharge to groundwater?

Question: Why would the produced water rule need a definition of *dwelling unit*? The proposed language does not include minimum setbacks.

E. Terms beginning with the letter “E”.

“**Effluent**” means the final water component following the treatment of wastewater that may be discharged pursuant to a ground water or surface water discharge permit, a national pollutant discharge elimination system permit (NPDES), or under another state or federal permit, for disposal, transference, or water reuse.

(2) “**Environmental buffer**” means any, ground water, streams, lakes, or impoundments used for reuse water storage or conveyance purposes related to an indirect potable application.

(3) “**Establishment**” means a structure used as a place of business, education, or assembly.

Question: How does an *environmental buffer* apply to permitting a demonstration project under the proposed rule?

Issues in Potable Reuse: The Viability of Augmenting Drinking Water Supplies With Reclaimed Water.

Link: <https://www.ncbi.nlm.nih.gov/books/NBK230187/>

“By definition, indirect potable reuse projects include an “environmental buffer,” that is, a natural water body that physically separates the product water from the wastewater reclamation plant and the intake to the drinking water treatment plant. A reservoir, river, or lake would be the environmental buffer for planned surface water augmentation. With ground water augmentation, the aquifer and/or soil (depending on whether direct injection is used) acts as the environmental buffer between the reclamation plant and the water production well. Surface water always receives subsequent treatment prior to distribution, while ground water may or may not.

The effectiveness of environmental buffers as barriers to various types of contamination is less well understood than that of engineered treatment processes. In different wastewater reuse applications the environmental barriers might include dispersion, dilution, sorption to the sediment and removal by deposition, chemical reaction, biodegradation, and biological transformation processes (photolysis and hydrolysis). Analyzing the effectiveness of environmental buffers for contaminant removal is complex, for a number of reasons. There are different removal processes for different contaminants, and different processes are expected to dominate depending on whether the water infiltrates through surface layers of the ground, is injected into deeper underground layers, or is discharged to a surface water reservoir. Even if all controllable factors are identical, local geology, biology, and climate undoubtedly affect the outcome.”

F. Terms beginning with the letter “F”.

(1) “**Feasibility study**” means a study conducted by a person to determine if a new or modified wastewater treatment technology will be technically, economically, or financially viable for use in an application.

(1) “**Fit for purpose**” means any application of a treated domestic, industrial, or produced wastewater that, with effluent criteria, that serves a function that would otherwise require the use of freshwater and has been determined to be protective of the waters of the state.

Note: two (1)’s

Comment: The definition of *fit for purpose* should include a requirement that the pollutants in the produced water reuse are not harmful to humans and livestock if taken up by the plants/crops/pasture and have the potential to bioaccumulate.

(2) “**Flood irrigation**” means land application of reclaimed wastewater by ditches, furrows, pipelines, low flow emitters, and other non-sprinkler methods.

(3) “**Flowback water**” means the fluid returned after the hydraulic fracturing process is completed, where the internal pressure of the rock formation causes fluid to return to the surface through the wellbore. Flowback water is a component of produced water.

(4) “**Food crop application**” means application of domestic or industrial reuse water to domestic plants which are produced for the purpose of or may be used in whole or in part for, consumption by people or livestock, including, but not limited to nursery, root, seedstock to be used for the production of food crops.

(5) “**Formation water**” means water that occurs naturally within the pores of rock associated with oil and gas extraction.

Question: Since the words ‘treated produced water’ do not appear in the definition of *food crop application*, does that mean NMED will not authorize the application of treated produced water to food crops?

G. Terms beginning with the letter “G”.

- (1) **“General NPDES permit”** means a **“NPDES permit”** issued under Section 122.28 of the Clean Water Act authorizing a category of discharges within a geographical area.
- (2) **“Grab sample”** means either a single discrete sample or an individual sample collected over a temporal interval not to exceed 15 minutes.
- (3) **“Ground water”** as defined in 20.6.2 NMAC.

Note: The definition in 20.6.2 NMAC is as follows:

“ground water” means interstitial water which occurs in saturated earth material and which is capable of entering a well in sufficient amounts to be utilized as a water supply.”

H. Terms beginning with the letter “H”.

(1) **“Hydraulic fracturing”** or **“fracking”** means a technique that fractures a rock formation that stimulates the flow of natural gas or oil, increasing the volumes that can be recovered. Fractures are created by pumping large quantities of fluids at high pressure down a wellbore and into the target rock formation. Hydraulic fracturing fluid commonly consists of water, proppant, and chemical additives, that open and enlarge fractures that can extend several hundred feet away from the wellbore. This technique is generally used in unconventional oil and gas production.

Question: Shouldn't the rule acknowledge the difference between traditional hydraulic fracturing in vertical wells versus high volume slickwater fracking in horizontal wells? It would be a good idea to delineate the different chemical frack mixtures that are used in vertical versus horizontal well applications and how that may impact frack flowback and initial produced water composition.

I. Terms beginning with the letter “I”.

(1) **“Impoundment”** means **any structure** designed and used for storage or containment of wastewater.

Question: Why did NMED include a definition for *impoundment* without including design specifications in the body of the rule that informs the public and the permittee what is required to store/treat/dispose of treated and/or untreated produced water?

Question: Will NMED allow *untreated* produced water to be stored in impoundments or treated in impoundments at the demonstration site and thus be a candidate for a discharge permit (leakage from impoundment into subsurface water) and how does that

comport with the prohibition of untreated produced water discharge permits in the beginning of the rule?

Question: Will NMED allow *treated* produced water to be stored in impoundments at the demonstration site and thus be a candidate for a discharge permit (leakage from impoundment into subsurface water) – after the Commission determines water quality criteria?

Question: Will NMED allow the treatment by-products (sludges and solids) to be stored in impoundments at the demonstration site?

(2) “**Indirect potable**” means the application of reclaimed wastewater for drinking water purposes **with an intermediary environmental or constructed buffer**.

Question: Why would NMED include definition of *indirect potable* unless there is an intent to either prohibit or allow the discharge of treated produced water within a drinking water supply? Which is the purpose – prohibit or allow?

(3) “**Industrial application**” see definition for “commercial application”.

(4) “**Influent**” means untreated wastewater that flows into a treatment system.

(5) “**Injection**” as defined in **20.6.2 NMAC**

(6) “**Injection well**” means the well used to place fluid underground into a porous geologic formation. These underground formations may range from deep sandstone or limestone to a shallow soil layer. Injected fluids may include water, wastewater, brine (salt water), or water mixed with chemicals.

(7) “**Irrigation**” means application of water to land areas to supply the water needs of beneficial plants.

Comment: The definition is simplistic by only focusing on water needs of beneficial plants without acknowledging that the plant uptakes pollutants in irrigation water.

J. Terms beginning with the letter “J”. [RESERVED]

K. Terms beginning with the letter “K”. [RESERVED]

L. Terms beginning with the letter “L”.

(1) “**Land application**” means the application of **domestic or industrial reuse** water to the ground surface **in which no fit for purpose use has been assessed** and to which the application or run-off does directly or indirectly enter a surface or ground water of the state.

Note: definition of fit for purpose:

“Fit for purpose” means any application of a treated **domestic, industrial, or produced** wastewater that, with effluent criteria, that serves a function that would otherwise require the use of freshwater and has been determined to be protective of the waters of the state.”

Question: Why is the definition for *fit for purpose* the only definition that includes treated produced water?

(2) “Livestock application” means the application of **domestic reuse water** for the consumption of water for the care and feeding of domestic animals such as cattle or horses. Livestock application does not include the use of water in connection with the operation or maintenance of feedlots or agricultural application of water.

Question: Why include the term ‘domestic reuse water’ in the definition of ‘livestock application’ and *not include reference to treated produced water* when this rule is specific to the *allowable reuse of treated produced water*? Is NMED allowing or prohibiting the reuse of treated produced water for livestock?

M. Terms beginning with the letter “M”.

(1) “Major facility” means any treatment plant with a maximum design capacity of 1,000,000 gallons or more per day.

(2) “Minor facility” means any treatment plant with a maximum design capacity of less than 1,000,000 gallons per day.

(3) “Monthly geometric mean” means the value calculated by taking the sum of the logarithms (sum log x) of each of the data points from the previous calendar month, dividing the sum by the number of data points and then taking the anti-logarithm of the result ($10^y = \text{anti-logarithm of 'y'}$).

Question: Why did NMED choose the minor/major volumetric divide typically used for municipal treatment plants to establish a size criterion for produced water treatment plants? The proposed rule does not identify any design, construction, management, or operation requirements that would apply to either size category.

N. Terms beginning with the letter “N”.

(1) “National Pollutant Discharge Elimination System” or “NPDES” means the federal program for issuing, modifying, revoking, and reissuing, terminating, monitoring, and enforcing permits, and imposing and enforcing pretreatment requirements, under Sections 307, 402, 318, and 405 of the federal Clean Water Act. The NPDES program is

administered by the United States Environmental Protection Agency (EPA) in the State of New Mexico.

(2) “Nephelometric turbidity units” or “NTU” means nephelometric turbidity units, measured by a nephelometer.

(3) “NPDES permit” means an authorization, license, or equivalent control document issued by the authorized permitting entity to implement the requirements of the federal program as identified in 40 C.F.R. Sections 122, 123, and 124. An “NPDES permit” includes an “NPDES general permit” (40 C.F.R. Section 122.28). The term NPDES Permit does not include any permit that has not yet been the subject of final agency action, such as an “NPDES draft permit” or an “NPDES proposed permit.” The surface water quality bureau assists the EPA in implementing the Clean Water Act Section 402 NPDES permit program by reviewing federal permits and preparing federal Clean Water Act Section 401 certifications to certify that the permit also complies with New Mexico law.

Question: Why include the definition of NPDES and NPDES if this rule strictly prohibits discharge to surface water of both treated and untreated produced water?

O. Terms beginning with the letter “O”.

(1) “Occupied establishment” means any establishment that is occupied regularly.

Question: Does NMED intend to establish setbacks from demonstration projects and treatment facilities to property lines, homes, businesses, and churches?

P. Terms beginning with the letter “P”.

(1) “Peak hourly flow” means the highest hourly flow rate within a 24-hour period.

(2) “Person” means an individual or any other entity including partnerships, corporations, associations, responsible business or association agents or officers, the state or a political subdivision of the state or any agency, department or instrumentality of the United States and any of its officers, agents or employees.

(3) “Pilot-scale project” or “pilot project” means a representative engineering scale model or prototype system which is beyond the bench-scale and tested in a relevant environment. A pilot project represents a step up in the technology’s demonstrated readiness and tests using larger quantities of materials over longer periods of time.

Question: In the definition of pilot project, what is considered to be a ‘step up’ – is NMED intending to say a ‘step up from bench-scale study’?

(4) “**Planned water reuse**” means an intentional and direct application with the goal of beneficially reusing a recycled water supply to optimize overall water usage.

(5) “**Potable**” means the process of treating water for human consumption (i.e., drinking water).

(6) “**Pretreatment**” means the reduction, elimination, alteration of the nature, of pollutant as in wastewater prior to or in lieu of discharging into a publicly owned treatment works (POTW) or other wastewater treatment facility. The reduction or alteration may be obtained by physical, chemical, or biological processes, process changes, or by other means. Appropriate pretreatment technology includes control equipment, such as equalization tanks or facilities, for protection against surges or slug loadings that might interfere with or otherwise be incompatible with the treatment facility.

Question: Why did NMED choose this definition of *pretreatment*? Is NMED considering the possibility of allowing treated produced water to be discharged to a sanitary sewer and thus to a publicly owned treatment works (POTW) under the federal Pretreatment Permitting program? If not, *a better definition of pretreatment* would be a list of potential treatment methods used at the point of generation of oilfield produced water (well site) such as dehydration, skimming, and other methods used to remove oil and gas from produced water.

(7) “**Produced water**” means a fluid (wastewater) that is an incidental byproduct from drilling for or the production of oil and gas, and includes formation water, flowback water, and any chemicals added downhole during drilling, production, or maintenance processes during the life cycle of an oil or gas well. Produced water includes water pollutants, as defined in the Water Quality Act, NMSA 1978, Section 74-6-2 and in 20.6.2.7(W)(5) NMAC as well as toxic pollutants, as defined in 20.6.2.7(T)(2) or 20.6.4.7(T)(2) NMAC, that, if discharged, may move directly or indirectly into a water of the state.

Question: Where in the proposed rule does NMED address adverse impacts to public health from carcinogenic and toxic pollutants known or suspected to be in untreated and possibly treated produced water?

Q. Terms beginning with the letter “Q”. [RESERVED]

R. Terms beginning with the letter “R”.

(1) “**Reclaimed wastewater**” means **domestic wastewater** that has been treated to the specified levels for the defined applications and complies with other applicable local, state, or federal regulations.

Question: Why is there another definition for *domestic wastewater* in this rule?

(2) “**Recycled produced water**” means wastewater that is reconditioned by a recycling facility permitted or registered with the oil conservation division of the energy, minerals, and natural resources department, and is reused within the oil and gas industry.

Question: What is the term that will be used for reuse *outside* the oil and gas industry?

(3) “**Restoration application**” or “**ecological application**” means the use of domestic water reuse for the implementation of ecological or environmental restoration activities permitted under applicable state and federal regulations.

Question: Again, what does domestic water reuse have to do with produced water?

(4) “**Reuse**” for purposes of this rule, means a treated wastewater originating from domestic, industrial, or produced water sources, that has undergone a level of treatment appropriate for a fit for purpose application such as agriculture, irrigation, potable water supplies, aquifer recharge, industrial processes, or environmental restoration; and conserves the state’s potable, surface, and ground water resources. Reuse water has a water quality, based on application, determined to be protective of the environment and human health. For purposes of this regulation, reuse is categorized by the source of the water (i.e., “domestic reuse” is wastewater originated from domestic sources following appropriate treatment may be used for various applications such as irrigation).

Comment: By combining treated produced water alongside treated domestic and industrial water, *the lines are blurred* on how NMED will implement the limited authority granted by the Produced Water Act to allow reuse of treated produced water.

S. Terms beginning with the letter “S”.

(1) “Safe Drinking Water Act” means the federal act passed by congress in 1974 to protect public health by regulating the nations’ public drinking water supply.

(2) “Spray irrigation” means land application of water through the air utilizing equipment that provides a low trajectory application and minimizes misting of the water.

(3) “State” means the state of New Mexico.

(4) “Surface water” means a, “surface water(s) of the state” as defined in 20.6.4.7 NMAC.

T. Terms beginning with the letter “T”.

(1) “Transference” means the distribution of treated wastewater from a wastewater treatment facility to a third-party authorized for disposal, temporary storage, or reuse of the effluent.

(1) “Treated wastewater” means wastewater that has undergone treatment.

Note: two (1)’s

Question: This cannot be a serious definition (treated wastewater) – why the coyness about what NMED will consider to be the acceptable treatment of produced water that could lead to the ability to warrant beneficial reuse?

(2) **“Treatment”** means a process in which wastewater has been reconditioned by mechanical or chemical processes to remove or eliminate contaminants, creating an effluent that can be returned to the water cycle either through discharge, transference, or reuse.

Note: There is no guarantee that ‘treatment’ would be sufficient to meet this definition without specifying treatment type and efficiency and some method of measuring the effectiveness of the treatment.

Question: How will NMED determine if the treatment is sufficient to warrant reuse?

Question: How can NMED identify ALL contaminants when industry does not disclose?

Question: Why doesn’t the definition of *treatment* include the option to use biological treatment methods?

Definition of Treatment in 19.15.34 NMAC:

Link: <https://www.srca.nm.gov/wp-content/uploads/attachments/19.015.0034.pdf>

C. “Treatment” refers to the reconditioning of produced water to a reusable form and may include mechanical and chemical processes.
[19.15.34.7 NMAC - N, 3/31/15]

U. Terms beginning with the letter “U”.

(1) **“Unconventional well”** means oil or gas resources that are difficult to extract as they are trapped in reservoirs with poor permeability and porosity, and it is extremely difficult or impossible for oil or natural gas to flow through the pores and into a standard well. To be able to produce from these difficult reservoirs, specialized techniques and tools are used. For example, the extraction of shale oil, tight gas, and shale gas must include a hydraulic fracturing step in order to create cracks for the oil or gas to flow through. This method is more costly than those used to produce fossil fuels from a conventional reservoirs, but this stimulation allows for the production of oil and gas from resources that were previously not economic to extract from. These resources become reserves when they can be utilized economically. Unconventional wells are generally horizontal wells.

Note: no (2)

(3) **“Untreated wastewater”** means wastewater that has not undergone treatment.

V. Terms beginning with the letter “V”. [RESERVED]

W. Terms beginning with the letter “W”.

Note: no (1)

(2) **“Water contaminant”** means any substance that, if discharged or spilled, could alter the physical, chemical, biological or radiological qualities of water. “Water contaminant” does not mean source, special nuclear or by-product material as defined by the Atomic Energy Act of 1954, but may include all other radioactive materials, including but not limited to radium and accelerator-produced isotopes.

(3) **“Water pollutant”** means a water contaminant in such quantity and of such duration as may with reasonable probability injure human health, animal or plant life or property, or to unreasonably interfere with the public welfare or the use of property.

(4) **“Water pollution”** as defined in 20.6.2 NMAC

(5) **“Wastewater”** means water or other liquids associated directly with sewerage systems, industrial processes, or produced water that is disposed of, or undergoes treatment for discharge, transference, or reuse. Wastewater in this Part does not include dairy wastewater, as defined in 20.6.6 NMAC.

Question: What is the definition of the waste removed from produced water (salts, hydrocarbons, heavy metals, NORM/TENORM, toxics, biologics, to name a few) and how will the disposal of those removed wastes be identified, tracked, and disposed of under a permitting regime?

20.6.2 NMAC

<https://www.srca.nm.gov/parts/title20/20.006.0002.html>

“(5) “water pollution” means introducing or permitting the introduction into water, either directly or indirectly, of one or more water contaminants in such quantity and of such duration as may with reasonable probability injure human health, animal or plant life or property, or to unreasonably interfere with the public welfare or the use of property;”

Question: Why is there not at least a citation to the official definition of water and waters of the state?

See 20.6.2 NMAC definitions for words defined in the new produced water rule:

“water” means all water including water situated wholly or partly within or bordering upon the state, whether surface or subsurface, public or private, except private waters that do not combine with other surface or subsurface water;”

“water contaminant” means any substance that could alter if discharged or spilled the physical, chemical, biological or radiological qualities of water; “water contaminant” does not mean source, special nuclear or by-product material as defined by the Atomic Energy Act of 1954;”

“ground water” means interstitial water which occurs in saturated earth material and which is capable of entering a well in sufficient amounts to be utilized as a water supply;”

X. Terms beginning with the letters “X” through “Z”. [RESERVED]

20.6.8.8 – 20.6.8.99 [RESERVED]
[20.6.8.8-20.6.8.99 NMAC – N, mm-dd-yy]

20.6.8.100 GENERAL PROVISIONS: Unless otherwise required by this Part, all persons are subject to the state’s Ground and Surface Water Protection Regulations (20.6.2 NMAC). This includes, but is not limited to, regulations relating to spills, notices of intent, permitting, fees, penalties, compliance orders, and abatement.
[20.6.8.100 NMAC – N, mm-dd-yy]

20.6.8.101 – 20.6.8.199 [RESERVED]
[20.6.8.101-20.6.8.199 NMAC – N, mm-dd-yy]

20.6.8.200 DOMESTIC WASTEWATER REUSE:
[20.6.8.200 NMAC – N, mm-dd-yy]

20.6.8.201 DIRECT AND INDIRECT POTABLE APPLICATIONS:

A. Unauthorized applications. The department shall not approve a discharge plan or a discharge plan modification that includes the discharge of reuse water for direct or indirect applications **except for those authorized applications identified in Subsection B of 20.6.8.201 NMAC.**

B. Authorized applications.

(1) **Feasibility studies:** Persons proposing to conduct a feasibility study for direct or indirect potable water projects shall:

- (a) Comply with all applicable permitting requirements in 20.6.2 and 20.6.4 NMAC.
- (b) Ensure there is no connection between a potable water system and the water being studied and no cross connection between feasibility study-water and the **communities** potable water supply **exist.**
- (c) Ensure that all direct and indirect potable reuse feasibility studies are conducted in a manner that does not interfere with ongoing operations at the wastewater and drinking water facilities
- (d) Ensure that all indirect potable reuse feasibility studies are conducted under either a discharge permit or NPDES permit and complies with all conditions therein.

Note: (grammar) should be community’s or communities’ and ‘exists’

Question: Why does the proposed rule only have separation language for potable water? How will NMED protect public health of the community from produced water treatment projects that will likely generate significant malodors and toxic air pollution?

20.6.8.202-299 [RESERVED]

[20.6.8.201-20.6.8.299 NMAC – N, mm-dd-yy]

20.6.8.300 INDUSTRIAL WASTEWATER REUSE: [RESERVED]

[20.6.8.300 NMAC – N, mm-dd-yy]

20.6.8.301-399 [RESERVED]

[20.6.8.301-20.6.8.399 NMAC – N, mm-dd-yy]

20.6.8.400 PRODUCED WATER REUSE: Except as provided in the Oil and Gas Act NMSA 1978, Sections 70-13-1 through 70-13-5, the following provisions apply to the discharge of produced water for activities unrelated to the exploration, drilling, production, treatment, or refinement of oil or gas.

A. Unauthorized applications.

(1) **Untreated and treated produced water discharges to surface water:** In accordance with this part, a produced water discharge to a surface water of the state, as defined in 20.6.4.7(S)(5) NMAC is prohibited and not considered a fit for purpose. No person shall cause or allow untreated produced water or treated produced water to discharge to a surface water of the state. The department shall deny certification of any federal permit proposing to discharge untreated or treated produced water to a surface water of the state.

(2) **Untreated produced water discharges to ground water:** No person shall cause or allow untreated produced water to discharge so that it may move directly or indirectly into ground water. The department shall not approve a discharge plan or a discharge plan modification that includes the discharge of untreated produced water.

(3) **Treated produced water discharges to ground water:** No person shall cause or allow treated produced water to discharge so that it may move directly or indirectly into ground water, unless the discharger has obtained a discharge permit approved by the department. Until such a time that water quality criteria based on scientifically defensible information about the composition, toxicity, fate and transport of treated produced water is adopted by the commission, the department shall not approve a discharge plan or a discharge plan modification that includes the discharge of treated produced water.

Note:

- Prohibits discharge of treated or untreated produced water to waters of the state; states they will challenge a federal NPDES permit (EPA Region VI has NPDES primacy?).
- Prohibits discharge of untreated produced water to groundwater.
- Prohibits discharge of treated produced water discharge to groundwater unless there is scientifically defensible information.

What are NMED allowing with this rulemaking?

- Discharge of treated produced water to groundwater if 'science'.
- Feasibility studies and demonstration projects.

B. Authorized applications.

(1) **Demonstration projects**, determined by the department to not require a discharge permit because the project will not discharge in a manner that may directly or indirectly affect ground or surface water, given the following provisions:

(a) Persons intending to conduct a demonstration project shall secure all applicable federal, state, and local permits and certifications.

(b) The demonstration **project shall be designed to provide information** specific to untreated produced water quality, treatment technologies, treated produced water quality, treatment volumes, and toxicity studies or potential produced water reuse applications.

(c) In accordance with 20.6.2.1201 NMAC, persons intending to conduct a demonstration project using untreated or treated produced water shall **submit a notice of intent to the ground water quality bureau** of the department and include the information enumerated in Subsection C of 20.6.8.400 NMAC of this part.

(d) Demonstration projects shall not commence until a **determination on the notice of intent has been made by the department.**

(e) Persons transporting, storing, treating, or utilizing untreated or treated produced water shall have **written procedures at the location(s)** where the demonstration project is physically located to prevent releases onto the ground, directly or indirectly into ground water, or to surface water of the state.”

(f) All untreated and treated produced water shall be handled, transported, and stored in accordance with all other applicable local, state and federal regulations.

Question: Will those ‘written procedures’ required in item (e) be posted on a facility sign that is easily read from a public road so concerned community members know what is permitted to occur on the property and include a contact name and phone number?

Question: Does NMED/WQCC know what those regulations are referred to in item (f) and would those regulations be different than permits in item (a)?

Question: Where is the public participation process triggered by a Notice of Intent in this rulemaking? Does NMED intend on approving demonstration projects without input from the surrounding community and other stakeholders? Would NMED issue a groundwater discharge permit for a produced water treatment facility without a public participation process that includes public notice, public comment, and right to appeal?

For example, a demonstration project submitted to the State Engineer **has a process for public notice as follows:**

Link: <https://www.srca.nm.gov/parts/title19/19.025.0008.html>

“19.25.8.18 NOTICE--PUBLICATION: Within thirty (30) days after receipt of a letter from the state engineer informing the applicant that their application has

been accepted for filing, the applicant shall submit a notice for publication to the state engineer for review.

A. The notice shall set forth the contents of the application in a form containing the following information:

- (1) The name and address of the applicant;
- (2) The legal and common descriptions (per NMSA 1978, Section 14-11-10.1) of the location of the proposed project facilities and the area of hydrologic effect;
- (3) A brief description of the pilot/demonstration project.
- (4) A brief description of the proposed full-scale project, as appropriate, including the capacities;
- (5) The requirements for a protest, as set forth in Section 20 hereafter;
- (6) Disclosure that protests to the application shall be filed within ten (10) days after the date of the last publication of the notice; and
- (7) The day of the last publication (to be on the notice when published);
- (8) All other relevant information required by the state engineer.

(g) Any release of untreated or treated produced water is subject to the notifications and corrective actions in 20.6.2.1203 NMAC.

(h) Persons disposing of untreated or treated produced water, as part of the final disposition following a demonstration project, shall use one of the following methods: discharge to a produced water disposal well permitted pursuant to the oil conservation commission's regulations for oil and gas injection (19.15.26 NMAC), delivery to a surface waste management facility permitted pursuant to the oil conservation commission's regulations for oil and gas surface waste management facilities (19.15.36 NMAC), or disposal in a permanent pit permitted pursuant to the oil conservation commission's regulations for oil and gas pits, closed-loop systems, below-grade tanks and sumps (19.15.17 NMAC).

(i) Persons disposing of the components of a demonstration project using untreated or treated produced water, as part of the final disposition must adhere to all local, state and federal regulations, as applicable.

Note: discharges allowed after the demonstration project:
to disposal well;
surface waste management facility (OCC);
permanent pit (OCC); closed-loop systems,
below-grade tanks and sumps.

Title 19 = Natural Resources and Wildlife
Chapter 15 = Oil and Gas

19.15.17 NMAC – Pits, Closed-Loop Systems, Below-Grade Tanks and Sumps
<https://www.srca.nm.gov/parts/title19/19.015.0017.html>

19.15.26 NMAC - Injection
<https://www.srca.nm.gov/parts/title19/19.015.0026.html>

19.15.36 NMAC – Surface Waste Management Facilities
<https://www.srca.nm.gov/parts/title19/19.015.0036.html>

Question: According to the proposed rule, would the entity submitting Notice of Intent to do a demonstration project have to show proof of OCC permits for the disposal injection well? Permit for permanent pit? Permit for waste management facilities? How will OCC regulate the treated produced water under these permitting scenarios? Would existing permits need to be amended/modified and would there be public participation processes?

C. Notice of intent.

(1) In accordance with 20.6.8.400(B) NMAC, any person intending to use produced water for approved purposes, unrelated to the development or production of oil or gas, shall submit to the ground water quality bureau of the department a produced water notice of intent prior to use.

(a) Notices shall be on a form provided by the department and shall include the following information:

- (i) the name and address of the person intending to conduct the discharge;
- (ii) the location of the intended discharge;
- (iii) the demonstration project research plan and objectives;
- (iv) documentation that the demonstration project design is consistent with the approved applications in Subsection 20.6.8.400(B) NMAC;
- (v) the storage, secondary containment and spill prevention methods that will be used to prevent accidental discharges;
- (vi) plans to transport in and transport out any untreated produced water or treated produced water in a safe manner, in accordance with state and federal regulations;
- (vii) plans for safe handling and proper disposal of produced water and any materials that come into contact with produced water or treated produced water, including soils, plant material, treatment equipment, and containment area materials; and
- (viii) health and safety considerations that minimize the risk of human exposure to produced water via any exposure pathway.

Question: What about demonstration projects that do not intend to discharge?

Question: Again, what state and federal regulations does NMED/WQCC imagine would apply to these demonstration projects?

Question: What level of detail will be required in these 'plans' to garner approval?

(b) The department may request additional information if needed.

(c) Based on the information provided in the notice of intent, the department shall make a determination if the demonstration project is consistent with the requirements in this Section and whether a discharge permit is required. If the demonstration project does not meet the requirements in this or if a discharge permit is required, the person shall not implement the demonstration project as proposed.

Question: This is confusing (blue highlighted sentence) – it is understandable that a project would be rejected if the project does not meet the requirements of the rule – but what do they mean 'or if a discharge is required'? The rule allows discharge to groundwater.

(2) Persons implementing demonstration projects shall submit to the department all research results, including lab analyses of all water contaminants in the untreated produced water and treated produced water, to assist the commission in developing standards and regulations that may allow for the broader use of treated produced water in a manner that prevents water pollution and protects human health and the environment.

Question: Will this information be available to the public?

D. Effluent Quality

(1) Until such a time that water quality criteria based on scientifically-defensible information about the composition, toxicity, fate, and transport of treated produced water demonstrates fit for purpose and authorized applications are adopted by the commission, discharges of untreated or treated produced water to surface and ground waters of the state are prohibited and the department shall not approve a discharge plan or a discharge plan modification for the discharge of treated produced water.
[20.6.8.400 NMAC – N, mm-dd-yy]

Question: Does 'adopted by the commission' guarantee full public participation including public notice, public comment, public hearing, and right to appeal?

20.6.8.401-20.6.8.899 [RESERVED]
[20.6.8.401-20.6.8.899 NMAC – N, mm-dd-yy]
20.6.8.900 REFERENCES: [RESERVED]
[20.6.8.900 NMAC – N, mm-dd-yy]