



## Implementation of the Produced Water Act Frequently Asked Questions (FAQs)

This document provides responses to questions frequently asked during the first phase of implementing HB 546, the Produced Water Act, which was enacted in 2019. The FAQs are arranged in four sections. The first section addresses general questions about produced water and HB 546, and the following three sections present questions and responses from the New Mexico Environment Department (NMED), the Office of the State Engineer (OSE) and the Energy, Minerals, and Natural Resources Department (EMNRD), respectively. These FAQs are intended solely for guidance and are subject to change. As a “living document,” questions and answers may be periodically added, revised and/or updated. Accordingly, the agencies recommend that users check back from time to time for the most up-to-date responses, or, to be notified of updated FAQs, sign-up for NMED’s produced water listserv at <https://public.govdelivery.com/accounts/NMED/subscriber/new>.

To learn more about Produced Water Act implementation, and to submit questions or feedback, visit NMED’s Produced Water website at <https://www.env.nm.gov/new-mexico-produced-water/> or email [pw.environment@state.nm.us](mailto:pw.environment@state.nm.us).

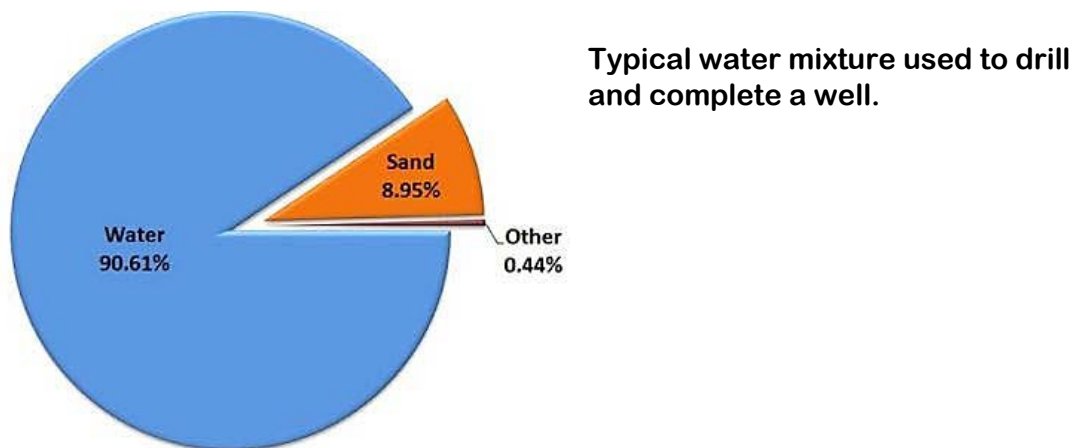
## General FAQs

### 1. What is produced water?

**Answer:** Legally, produced water is defined in New Mexico’s Produced Water Act (NMSA 1978, Section 70-13-2), Oil and Gas Act (NMSA 1978, Section 70-2-33) and Water Quality Act (NMSA 1978, Section 74-6-2) as a “fluid that is an incidental byproduct from drilling for or the production of oil and gas” and has been traditionally described as an oilfield waste. Technically, produced water is a combination of flowback water (i.e., water used to drill and complete the well) and formation water (i.e., naturally-occurring ancient water recovered along with the oil and gas). Flowback water is typically a small component of the total amount of produced water generated over the life of a well.

### 2. What is in produced water?

**Answer:** Common constituents in produced water include salts, oil residues, sand/mud, metals, naturally occurring radioactive materials (NORM), bacteria, carbon-based compounds such as solvents, surfactants, acids and waxes, and biocides (e.g., bactericides). According to the U.S. Geological Survey (USGS), other ingredients or constituents depend on the geology, and possibly the age of a well. Formation water is generally highly saline, often much saltier than sea water. Flowback water will include some of the water mixture used in well drilling and completion (see graph below).



Source: <http://www.oil-gasportal.com/water-treatment-in-unconventional-gas-production-2/>.

### 3. What is the Produced Water Act?

**Answer:** House Bill 546, effective July 1, 2019, amends the New Mexico Oil and Gas Act, NMSA 1978, Sections 70-2-1 to -39, and the New Mexico Water Quality Act, NMSA 1978, Sections 74-6-1 to -17, and creates the Produced Water Act, NMSA 1978, Sections 70-13-1 to -5. HB 546 is available at

<https://www.nmlegis.gov/Legislation/Legislation?chamber=H&legType=B&legNo=546&year=19>. Since HB 546 went into effect, the State can address significant gaps in liability and penalty authority to increase industry accountability and decrease industry reliance on fresh water. The Produced Water Act:

- Defines "treated water" or "treated produced water" as produced water that is reconditioned by mechanical or chemical processes into a reusable form.
- Clearly defines jurisdictional authority between NMED and EMNRD by explicitly requiring that any use of produced water outside the oil and gas industry be regulated by NMED;
- Affirmatively requires state permitting;
- Clarifies responsibility for proper handling of produced water, including liability for spills;
- Removes legal obstacles to recycling produced water in the oil field;
- Restores EMNRD Oil Conservation Division's (OCD) administrative penalty authority, effective January 1, 2020; and
- Requires the New Mexico Water Quality Control Commission (WQCC) to adopt regulations to be implemented by NMED for the "discharge, handling, transport, storage, and recycling or treatment of produced water or byproduct thereof outside the oilfield."

#### **4. How much produced water is generated in oil production?**

**Answer:** As of November 2019, New Mexico data suggests that for every barrel of oil produced, an average of four barrels of produced water are generated. One barrel equals 42 gallons.

#### **5. How much produced water is generated in New Mexico?**

**Answer:** In 2018, the oil and gas industry in New Mexico generated over one billion barrels (42 billion gallons) of produced water. This response will be updated with 2019 data when it is available.

#### **6. What does "outside" vs. "inside" the oil and gas industry mean?**

**Answer:** For the purpose of implementing HB 546, produced water management inside the oil and gas industry, or "in the oilfield," means produced water management associated with the exploration, drilling, production, treatment or refinement of oil or gas, including recycling for oil and gas production and disposal of in underground injection wells. Produced water treatment and use for purposes outside the oil and gas industry, or "off-field," refers to purposes that are unrelated to oil and gas, such as treating water to be used for road construction, restoring rangeland vegetation, crop irrigation and manufacturing (NMSA 1978, Section 74-6-4(P)). As explained in other FAQs, any off-field use of produced water is subject to regulation by NMED.

#### **7. What are the State's main priorities for produced water management?**

**Answer:** As NMED, EMNRD and OSE proceed with implementation of the Produced Water Act, several objectives are guiding their efforts:

- Minimize fresh water usage by increasing and incentivizing recycling of produced water by the oil and gas industry.
- Reduce reliance on injection wells for produced water disposal.
- Ensure proper permitting and regulation of produced water management activities.
- Address and minimize leaks from impoundments, pipeline ruptures, and illegal dumping.
- Protect groundwater and surface water resources.
- Prevent human and wildlife exposure to contaminants.
- Support sound science to fill gaps related to safe treatment and use of treated produced water outside the oilfield.
- Advance renewable energy targets through extraction of materials like lithium – used in batteries and solar panels – from produced water.

**8. How are spills or accidents involving produced water in the oilfield addressed?**

**Answer:** Release (or spill) notification and corrective actions are overseen by the OCD in accordance with the Oil & Gas Act rules (Title 19 Chapter 15, Parts 29 and 30 NMAC), which require responsible parties to report releases within 24 hours, and within 90 days submit a characterization of environmental impacts and a plan to remediate contamination and complete surface restoration. The rules require the cleanup work be completed within certain timelines and meet clean-up standards. In addition, OCD's rules provide additional oversight of produced water to prevent spills and ensure prompt attention to address spills when they do occur. The OCD rules also require produced water transporters and treatment facilities to register with the OCD and provide financial assurance, and place restrictions on the location, construction, operation, and closure associated with produced water treatment facilities.

To report a produced water spill to OCD, call (505) 476-3441.

If you or someone you know is concerned about human exposure to spilled produced water, contact the New Mexico Department of Health at (505) 827-0006.

## New Mexico Environment Department FAQs

### 9. What is NMED's responsibility for produced water management?

**Answer:** The Produced Water Act mandates greater oversight and control of recycled produced water than existed before July 1, 2019, and requires a person obtain a permit from NMED before using produced water outside the oilfield. The Act requires NMED to draft regulations to present before the WQCC that address the discharge, handling, transport, storage, and recycling or treatment of produced water or byproduct thereof outside the oilfield. In adopting regulations, the Water Quality Act requires the WQCC to consider:

- Character and degree of injury to or interference with health, welfare, environment and property;
- Public interest, including the social and economic value of the sources of water contaminants;
- Technical practicability and economic reasonableness of reducing or eliminating water contaminants from the sources involved and previous experience with equipment and methods available to control the water contaminants involved;
- Successive uses, including domestic, commercial, industrial, pastoral, agricultural, wildlife and recreational uses;
- Feasibility of a user or a subsequent user treating the water before a subsequent use;
- Property rights and accustomed uses; and
- Federal and state water quality requirements.

### 10. What is the timeline for NMED's rulemaking process?

**Answer:** NMED plans to develop rules that prohibit use of untreated produced water outside of the oil and natural gas industry and require companies to analyze and disclose chemical constituents in produced water intended for treatment and use outside oil and gas. NMED anticipates drafting these rules in calendar year 2020.

NMED is collaborating with academic experts to invest in filling science and technology gaps before drafting regulations permitting off-field use of treated produced water. Therefore, NMED does not have a specific timeline for developing these rules.

### 11. How will the NMED be able to ensure off-field use of treated produced water will protect the environment and human health if companies can claim certain constituents as proprietary?

**Answer:** Understanding what is in produced water is essential to the proper regulation of produced water treatment, transport, storage and use. To implement HB 546, NMED is developing science-based rules mandating that companies analyze and disclose chemical constituents in produced water intended for treatment and use outside oil and gas. NMED intends for these rules to include disclosure of proprietary information, which NMED will handle as confidential business information. There are well-established

environmental regulatory frameworks to provide the regulatory agency with necessary information, while also protecting the regulated entity's business interests.

**12. What treatment is needed for use of produced water outside the oil and gas field?**

**Answer:** The level of treatment necessary to protect human health and the environment depends upon the intended end use of the treated water. "Fit for purpose" research to support future regulations will address the range of factors that vary based on the end use. Learn more about "fit for purpose" research in the Ground Water Protection Council's 2019 *Produced Water Report*, available at <http://www.gwpc.org/producedwater>.

**13. What are the processes for removing radioactive particles from water?**

**Answer:** All rocks and soil contain some trace amounts of Naturally Occurring Radioactive Materials (NORM). When a water source, either surface or groundwater, contacts NORM-bearing materials, radioactive materials called radionuclides can accumulate in the water. Water treatment to remove radionuclides is common. For example, in order to comply with state and federal public health standards, drinking water treatment plants use a variety of processes to remove radioactive materials from community drinking water systems, including alum treatment, lime softening, ion-exchange and reverse osmosis. In-home treatment for radionuclides detected in private drinking water wells includes reverse osmosis. However, there may be treatment challenges unique to removing NORM from oil and gas produced water. One task for the NM-PWRC is to identify where technological advances can be achieved and applied to produced water treatment, including to remove NORM.

**14. Does NMED have existing regulations that protect communities near oil and gas operations from unhealthy exposure to radiation?**

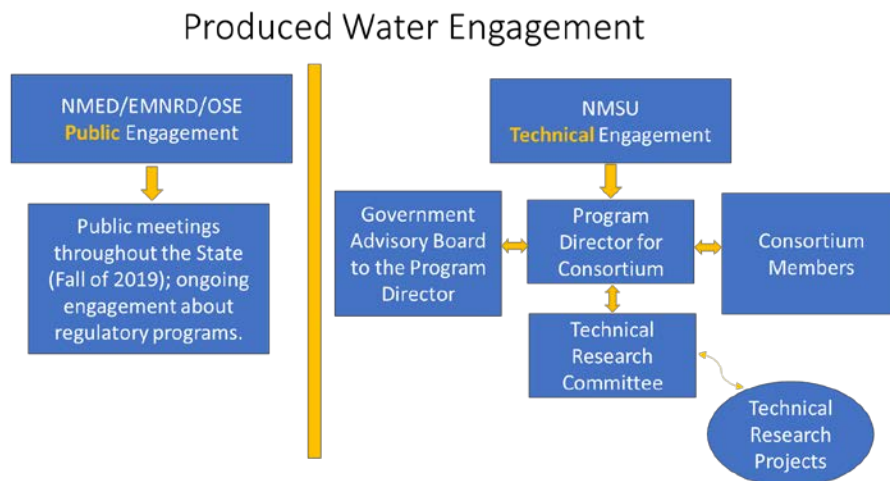
**Answer:** Yes. In accordance with the requirements of the New Mexico Radiation Protection Regulations in 20.3 NMAC, the NMED Radiation Control Bureau (RCB) licenses and regulates radioactive material licensees statewide. For the oil and gas industries, the RCB licenses Industrial Radiographers (20.3.5 NMAC), Well Loggers (20.3.12 NMAC), and naturally occurring radioactive material or NORM (20.3.14 NMAC). NORM is material that is radioactive in its natural state and is not manmade. NORM in most natural substances is low, but an operation that extracts and processes material from the earth has potential to pose a health hazard.

The first step in protecting the public and workers occurs with the licensing application process. NMED requires applicants for all radioactive materials licenses to meet all regulatory requirements before a license is issued. For the oil and gas industry, regulatory requirements include, but are not limited to: worker training and certifications, records management, monitoring workers for radiation dose, radiation survey plans, storage, radiography equipment specifications, emergency procedures, and protection of the general population. The RCB regularly inspects licensees on a prioritized schedule to ensure radiation exposures and material releases comply with applicable regulatory limits that are safe

for communities and workers. In addition to meeting the regulatory requirements regarding radiation exposure in the normal course of business, NMED also requires facilities to strive to meet occupational dose levels that are as low as reasonably achievable (ALARA), because technology safeguards can maintain radiation exposure to far below regulatory safe levels. During inspections, NMED examines dose records and dosimetry badge summaries, and takes surveys of areas where radioactive material is used and or stored.

**15. How is NMED involved with the New Mexico Produced Water Research Consortium?**

**Answer:** New Mexico State University is managing the New Mexico Produced Water Research Consortium (NM-PWRC). NMED is involved as a member of the Government Advisory Board (see diagram below) and in other administrative activities related to implementation of the [NMED-NMSU Memorandum of Understanding](#). The NM-PWRC is leading the research, while NMED is responsible for policy-making and regulations.



**16. Where does the funding come from to support the scientific research that will be conducted through the NM-PWRC?**

**Answer:** There are three primary revenue sources for the NM-PWRC. First, non-profit organizations, academic institutions and businesses can participate in the NM-PWRC by joining as a member, which involves signing a membership agreement and paying an annual fee (visit <https://nmpwrc.nmsu.edu/membership/> for more information). Second, individuals, non-profit organizations, academic institutions and businesses can choose to become a Consortium sponsor (visit <https://nmpwrc.nmsu.edu/sponsorship/> for more information). There are different levels of sponsorship based on the amount on an individual or entity’s contribution. Sponsors will not make decisions about NM-PWRD research priorities, nor will they influence research outcomes. Third, the NM-PWRC may apply for grants from governmental agencies and private organizations to carry out the work. To promote scientific integrity and ensure independent and objective research, the NM-PWRC applies guidelines used by the National Academies of Sciences, Engineering, and Medicine (NASEM).

## Office of the State Engineer FAQs

### 17. What is the role of the OSE in produced water management?

**Answer:** HB 546 and existing regulations confirm that produced water is not under the jurisdiction of the OSE, and an OSE permit or authority is not necessary to use produced water. The use of produced water is considered “disposition by use,” and is not a “beneficial use” for establishing and maintaining a water right. As the science and technology gaps are filled such that NMED drafts regulations addressing the discharge, handling, transport, storage, and recycling or treatment of produced water outside of oil and gas industry uses, the OSE will work with NMED to evaluate implications for OSE-administered programs. As the NMED develops rules, the OSE will examine which of its statutes and regulations might need to be changed to facilitate those NMED-permitted uses in the future. The OSE will work with other state agencies to reduce the use of freshwater resources for oil and gas production and reduce the amount of produced water being injected in disposal wells.

### 18. When oil and gas companies get a lease to drill a production well, do water rights come with the lease? Or does that require a separate lease?

**Answer:** No, a lease to drill a production well on private land does not include any water rights. The details of a lease for oil and gas production is a private contract, and the OSE does not have details or requirements for each individual lease. There are likely some instances where water is included in the lease and others where water will have to be acquired through some other means. The use of leased water is governed by NMSA 1978, Sections 72-6-1 to-7, and whether the water is part of an oil and gas lease, or is being leased from another source, an application must be made with OSE and the public is properly noticed according to NMSA 1978, Section 72-2-20. Water needed for the project may be purchased from a mid-stream supplier or leased from the holder of an existing, valid water right in New Mexico. The land owner may have a valid water right and include lease provisions attempting to force the production company to buy water only from the lessor. HB 546 attempts to limit this practice by making existing lease provisions void that require an oil and gas producer to buy water from the land owner.

### 19. Do oil companies pay for drill water? How much is the cost per gallon or well?

**Answer:** Yes, oil companies pay for the use of any water outside of the recycled produced water. The OSE does not collect information on the monetary value of private water transactions for water purchases in the State, including for the oil and gas industry.

### 20. What is the OSE doing to change the trend of water use for oil and gas production activities?

**Answer:** In 2018, the OSE stopped issuing multiple underground public water use permits related to prospecting and drilling for mineral exploration (NMSA 1978, Section 72-12-1.3), resulting in an approximate 70% reduction in the issuance of these permits.



The OSE is currently taking the following actions to further reduce the use of freshwater resources for oil and gas activities:

- Considering other water source availability and reasonable timeframes when reviewing water-use lease applications.
- Requiring oil and gas applicants to demonstrate need for fresh water in lieu of saline/other water sources.

**21. Where do oil and gas companies get fresh water?**

**Answer:** Oil and gas companies buy or lease water needed for their operations. Fresh water comes from either surface waters or groundwater, e.g., the Pecos River and Chinle Aquifer.

**22. Are NM aquifers suffering a strain due to oil and gas productions?**

**Answer:** Yes, and the State is examining ways to encourage producers to use other sources, such as brackish or produced water, before fresh water, including through implementing HB 546, the Produced Water Act.

**23. Regarding HB 546, what is meant by a “possessory right”?**

**Answer:** The Produced Water Act states that a possessory interest in produced water includes “the right to take possession of the produced water and to use, handle, dispose of, transfer, sell, convey, transport, recycle, reuse or treat the produced water and to obtain proceeds from any such uses.” NMSA 1978, Section 70-13-4(A)(1) (2019).

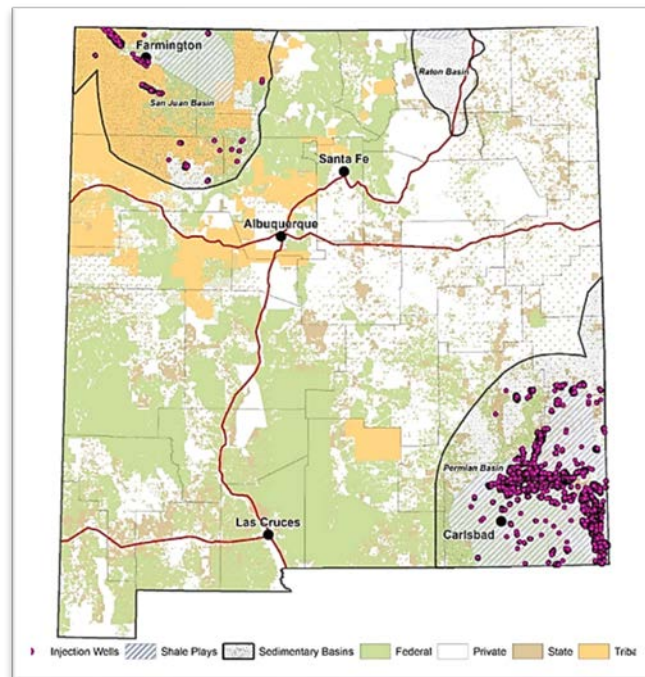
## Energy, Minerals, and Natural Resources Department FAQs

### 24. What is the role of the EMNRD in produced water management?

**Answer:** Under the Oil and Gas Act, the EMNRD's Oil Conservation Division (OCD) regulates the handling and disposal of produced water within the oil and gas industry in New Mexico. This includes underground injection control (UIC) wells for produced water disposal, reuse through enhanced recovery operations, and recycling and reuse in oil and gas drilling operations. EMNRD anticipates minor changes to existing rules to comply with HB 546.

### 25. Where is produced water generated?

**Answer:** In New Mexico, oil and gas production activity is in the Permian Basin in the southeast corner of the State (see map below), and the San Juan Basin in the northwest corner.



Source: EMNRD 2019.

### 26. How many gallons of water does it take to frack one well?

**Answer:** The amount of water used in completing a fractured well depends on a number of factors, including the length of the lateral. As lateral lengths have increased, so has the amount of water used. Based on FracFocus data, the average amount of water for each well drilled in New Mexico in 2018 was approximately 9 million gallons. This response will be updated with 2019 data when it is available.

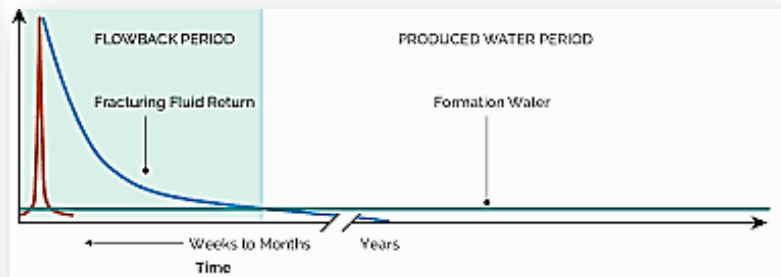
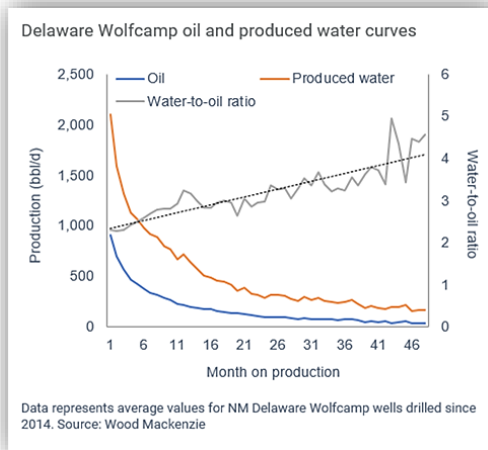
**27. Is all of the water used for fracking a well fresh water?**

**Answer:** No, current practices employed in New Mexico use a combination of brackish (non-potable) water and recycled produced water in addition to or in place of fresh water.

**28. How does the relative percentage of formation water to flowback water in produced water typically change over the life of a well?**

**Answer:** As wells age over time, the produced water becomes predominantly formation water. As an example, the figure below left shows oil barrel production per day (bbl/d) over time and months in production for the New Mexico Delaware Wolfcamp wells drilled since 2014. Production of barrels of oil (blue line) and produced water (orange line) decrease over the months in production. The water to oil ratio (gray dotted line) in the produced water increases, since oil production is going down.

The figure below right shows that over the produced water period (i.e., weeks, months, or years), the amount of fracturing fluid returned (blue line) decreases with the age of the well and is composed of mostly the original formation water (green line).



Source: Wood MacKenzie, 2014.

**29. What percentage of produced water is currently being reused within the oil field?**

**Answer:** OCD’s current estimate is that approximately 40% of the produced water generated is being reused by the oil and gas industry. However, this varies widely among operators and with market conditions.

**30. What oil and gas operations reuse produced water? How much?**

**Answer:** Oil and gas companies reuse approximately 10% of the produced water generated from drilling new oil wells to produce oil from active wells through hydraulic fracturing. About 30% of produced water

is reused in enhanced oil recovery (EOR), which is the process of increasing the amount of oil recovered, usually by injecting a substance into an existing oil well.

**31. Does all produced water require treatment prior to reuse by the oil and gas industry for hydraulic fracturing?**

**Answer:** All produced water does not need treatment but for most current reuse scenarios associated with hydraulic fracturing, some treatment is required. That treatment can often be as simple as filtration to remove suspended materials. Flocculants are also used to remove certain undesirable compounds such as sulfur. These are substances that promote the clumping of fine particles that either float on top of the water or settle to the bottom, making them easier to remove. Biocides can be added to inhibit bacterial growth. The dissolved salt in most produced water does not typically need to be removed before reuse in drilling mud, in casing cement, for well completions (i.e., fracking), well workovers, or enhanced oil recovery operations.

**32. How is the transportation and storage of produced water currently managed within the oil and gas industry?**

**Answer:** Typically, produced water is managed and disposed within the immediate area from which it is generated to control costs. Water is piped from production wells to nearby above ground separation and holding tanks. If reuse or disposal does not occur within the production field, the water is transported either by pipes or trucks to reuse or disposal facilities. Third party water or “midstream” companies provide full water services for supply, treatment, and disposal, and are becoming more prevalent in the industry all across the U.S. and in New Mexico.