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RAILROAD COMMISSION OF TEXAS HEARINGS DIVISION

OIL AND GAS DOCKET NO. 08-0312799

APPLICATION OF AQUA TERRA PERMIAN, LLC PURSUANT TO STATEWIDE RULE 46 FOR A COMMERCIAL PERMIT TO INJECT FLUID INTO A RESERVOIR PRODUCTIVE OF OIL AND GAS ON THE NORTH PECOS 285 LEASE, WELL NO. 1, PECOS, NORTH (DELAWARE) FIELD, REEVES COUNTY, TEXAS

PROPOSAL FOR DECISION

ISSUED: April 25, 2019

HEARD BY: Karl Caldwell, P.E. – Technical Examiner
Lynn Latombe – Administrative Law Judge

PREPARED BY: John Moore – Technical Examiner
Jennifer Cook – Administrative Law Judge

APPEARANCES:

APPLICANT: Aqua Terra Permian, LLC

Stephan Fenoglio, Attorney
Cory Hall, President & CEO
Kerry Pollard, Expert Witness

PROTESTANT: Finley Resources, Inc.

Paul Tough, Attorney
Katie Ferchill, Attorney
Charles S. Ramsey, Landman
Ryan Millet
John McBeath, P.E., Consulting Petroleum Engineer

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I. PROCEDURAL HISTORY

October 19, 2017	Applicant submitted initial injection application
November 3, 2017	Protest filed by Finley Resources Inc.
December 22, 2017	Application deficiency and notice of protest letter sent to applicant
March 12, 2018	Application deemed administratively complete
March 19, 2018	Applicant's email hearing request received by Oil and Gas Division
April 4, 2018	Docket Services receives Oil and Gas Division's hearing request memorandum
April 9, 2018	Applicant submits completed Hearing Request Form and prehearing conference is set for June 22, 2018, hearing on merits is set for July 13, 2018 under Docket 08-0310507
May 24, 2018	Notice of Pre-hearing Conference issued setting date of June 22, 2018 under Docket 08-0310507
June 15, 2018	Protest filed by P. Champion and S. Champion
June 22, 2018	Pre-hearing conference held
June 25, 2018	Amended injection application filed by applicant
June 27, 2018	ALJ abates docket 21 days to allow administrative review of amended injection application
July 12, 2018	Docket 08-0310507 dismissed without prejudice
July 10, 2018	Docket Services receives Oil and Gas Division's hearing request memorandum regarding the amended injection application
July 11, 2018	Docket Services sends applicant request to submit completed Hearing Request Form
July 13, 2018	New Docket 08-0312799 assigned for amended application
August 6, 2018	No response to Docket Services request for applicant to set hearing
August 28, 2018	Docket 08-0312799 dismissed without prejudice
September 10, 2018	Motion filed by applicant to reinstate hearing request
September 17, 2018	Order of Dismissal vacated
September 19, 2018	Protest filed by NGL Water Solutions Permian, LLC
September 25, 2018	Motion to dismiss NGL protest filed by applicant
September 26, 2018	Applicant submits completed Hearing Request Form; prehearing conference is set for December 11, 2018; hearing on merits is set for January 15-16, 2019 under Docket 08-0312799
October 5, 2018	Response to motion to dismiss filed by NGL
November 13, 2018	Notice of Prehearing Conference issued
December 11, 2018	Prehearing conference held for Docket 08-0312799
January 14, 2019	Order granting motion to dismiss NGL is issued
January 15-16, 2019	Hearing on the merits held for Docket 08-0312799
January 30, 2019	Transcript received

January 31, 2019
February 14, 2019

Opportunity to protest letter sent to Ray Champion
Record closed

II. CASE SUMMARY

Aqua Terra Permian, LLC (Operator No. 028618) ("ATP" or "Applicant") filed an application requesting commercial disposal authority, pursuant to Statewide Rule 46, to inject fluid into a reservoir productive of oil and gas on the North Pecos 285 Lease, Well No. 1 ("proposed SWD well"), in the Pecos, North (Delaware) Field, in Reeves County, Texas. The proposed SWD well would be located on a ten-acre tract about 8.8 miles northwest of Pecos. ATP does not own the mineral interests underlying the ten-acre tract or any adjacent tract potentially impacted by the proposed commercial injection well. ATP failed to demonstrate that the installation and operation of the proposed SWD well was in the public interest, that the injected fluids would not endanger or injure any oil, gas or mineral formation, that the injected fluids would be constrained to the injection interval and that useable groundwater would be protected. The application was protested by Finley Resources, Inc., a mineral interest owner in an offset tract, who intends to develop the recoverable hydrocarbons from the injection formations proposed in ATP's application. Based on the evidence presented in the hearing, the Examiners recommend denial of the application.

III. JURISDICTION

Sections 81.051 and 81.052 of the Texas Natural Resources Code provide the Railroad Commission of Texas ("Commission") with jurisdiction over all persons owning or engaged in drilling or operating oil or gas wells in Texas and the authority to adopt all necessary rules for governing and regulating persons and their operations under the jurisdiction of the Commission.

Section 27.031 of the Texas Water Code states that no person may continue using a disposal well or begin drilling a disposal well or converting an existing well into a disposal well to dispose of oil and gas waste without first obtaining a permit from the Commission.

IV. APPLICABLE LAW

The Railroad Commission may grant an application for a disposal well permit under Texas Water Code § 27.051(b) and may issue a permit if it finds:

1. The use or installation of the injection well will not endanger or injure any oil, gas, or other mineral formation;
2. With proper safeguards, both ground and surface fresh water can be adequately protected from pollution;
3. The use or installation of the injection well is in the public interest;

4. The applicant has made a satisfactory showing of financial responsibility as required by section 27.073.

Additionally, the applicant must comply with the Commission's Statewide Rules. For example, Statewide Rule 46 states:

(a) Permit required. Any person who engages in fluid injection operations in reservoirs productive of oil, gas, or geothermal resources must obtain a permit from the Commission. Permits may be issued when the injection will not endanger oil, gas, or geothermal resources or cause the pollution of freshwater strata unproductive of oil, gas, or geothermal resources.

V. DISCUSSION OF THE EVIDENCE

A. The Application

1. Notice¹

Notice of the application was published in the in the *Pecos Enterprise*, a newspaper having general circulation in Reeves County, on June 21, 2018. On June 18, 2018, a copy of Forms H-1, H-1A, were mailed to the surface owner (Ward County Irrigation District), surface owners of adjacent tracts, operators of wells within one-half mile (Carrizo Permian LLC, Finley Resources, Inc. ("Finley" or "Protestant") and RBJ & Associates, LP ("RBJ")), and the Reeves County Clerk. The application is protested by Finley.

On November 13, 2018, the Hearings Division of the Commission sent a Notice of Pre-Hearing Conference ("Notice") via first-class mail to Applicant and all affected parties setting a pre-hearing conference date of December 11, 2018.² The Notice contains (1) a statement of the time, place, and nature of the pre-hearing conference; (2) a statement of the legal authority and jurisdiction under which the hearing is to be held; (3) a reference to the particular sections of the statutes and rules involved; and (4) a short and plain statement of the matters asserted.³ The pre-hearing conference was held on December 11, 2018. Both Applicant and Protestant appeared and participated. At the pre-hearing conference, the parties agreed to commence the hearing on the merits on January 15, 2019. The hearing on the merits was held on January 15 and 16, 2019. Applicant and Protestant attended and participated in the hearing on the merits. Consequently, all parties received more than 10 days' notice of the hearings and an opportunity for hearing.

¹ Applicant's Exhibits 13, 14.

² See Notice of Pre-Hearing Conference issued November 13, 2018.

³ See Tex. Gov't Code §§ 2001.051, .052; 16 Tex. Admin. Code §§ 1.41, 1.42, 1.45, 3.46.

2. Seismic Information⁴

A review of U.S. Geological Survey seismic data shows no earthquakes have been reported within 100 square miles (a 9.08 km radius circle) of the proposed SWD well location.

3. Form H-1 and Form H-1A⁵

The following information is taken from ATP's revised Form H-1, *Application To Inject Fluid Into A Reservoir Productive Of Oil Or Gas* ("H-1") and Form H-1A *Injection Well Data* ("H-1A") submitted to the Commission on July 2, 2019. ATP revised the original H-1 and H-1A by deepening the proposed injection zone, amending the casing and cement program for the proposed commercial injection well and the well's API number.

a. Field and Lease Name (H-1)

The field name identified on line 6 is the Pecos, North (Delaware) Field (70095500). The lease name identified on line 8 is the North Pecos 285.

b. Reservoir Data (H-1)

The name of the formations identified on line 11 are Bell Canyon, Cherry Canyon, and Brushy Canyon. The formation lithology is stated on line 12 to be sand. The type of trap is structural with water as the type of drive during primary production. The formation pay thickness is 300+ feet with a current bottom hole pressure of 2,400 pounds per square inch. Average horizontal permeability is stated to be 75 millidarcies and porosity averages are between 12% and 22%.

c. Injection Project Data (H-1A)

The proposed injection is identified as a commercial disposal well on line 24. The types of injection fluids are stated to be salt water and Resource Conservation and Recovery Act (RCRA) exempt wastes.

d. General Well Data (H-1A)

The proposed injection well is to be drilled and completed for the purpose of injecting fluids. The proposed SWD well's API number is 42-389-37268 and is proposed to be drilled to a total depth of 7,000 feet.

⁴ Applicant's Exhibit 46.

⁵ Applicant's Exhibit 12.

e. Well casing and completion program (H-1A)

Line 13 states the base of useable quality water is 2,050 feet. The well is proposed to be completed with 9 5/8-inch surface casing to a depth of 3,050 feet with 1,600 sacks of 40 pound/foot cement circulated to surface. The long string 7-inch casing is proposed to be set from surface to a depth of 4,900 feet and cemented with 520 sacks of 26 pounds/foot cement up to a depth of 2,500 feet. The 4 1/2-inch tubing would be run from surface to a depth of 4,700 feet with the injection tubing packer set at 4,700 feet.

f. Injection interval, volumes and pressures (H-1A)

Line 23 states the proposed injection interval is open hole from 4,800 to 6,987 feet. The proposed maximum injection volume per day is 25,000 barrels and the proposed average is 15,000 barrels per day. The proposed maximum injection pressure is stated to be 2,400 pounds per square inch.

B. Applicant's Case⁶

ATP's President and CEO, Mr. Cory Hall, testified regarding the design, construction, operation and merchantability of the proposed commercial 25,000 barrels per day ("Bbl/day") injection facility. Applicant's proposed facility will have a Federal Spill Protection Countermeasure Control Plan to contain possible contamination from tankage leaks and operations.⁷ The receiving, processing and holding tanks will be set in a poly-lined steel enclosure. The proposed facility design will accommodate piped fluids and trucked fluids. Much of the received fluids will be recycled and resold for oil field operations. Mr. Hall testified that he has had direct conversations with regional operators and truckers and from that has determined the "four and a half million"⁸ dollar investment in the proposed SWD is justified.

Upon cross examination, Mr. Hall confirmed that under the "SWD and Brine Water Agreement," by and between ATP and the Ward County Irrigation District No. 1 (the owner of the surface estate), effective June 13, 2017, ATP does not have any title or rights to the mineral estate underlying the proposed SWD well's ten-acre site.

ATP's expert witness, Mr. Kerry Pollard, testified regarding the site geology, the proposed SWD well's injection wellbore and completion program, the surrounding wells within a one-mile radius, the possible causes of current injected fluid migration to the Finley wells and the probability of fluid migration from the proposed injection interval. The expert witness also testified as to the probability of commercially recoverable hydrocarbons within the proposed injection interval.

⁶ The hearing transcript in this case is referred to as "Page [pages], line [lines]."

⁷ Page 27, line 13.

⁸ Page 22, line 1.

The proposed SWD well, the North Pecos 285 SWD No. 1 (API 42-389-37268) is located in Reeves County, Texas approximately 8.8 miles northwest of the City of Pecos. The stratigraphic geology of the planned injection well site has been established with numerous wells being drilled in the region known as the Delaware Basin. Mr. Pollard expects the regional stratigraphy from shallower to deeper to be the Lamar section, comprised of halite and anhydrite, the Delaware Mountain Group known as the Bell Canyon, Cherry Canyon and Brushy Canyon,⁹ then the Bone Spring, followed by the Wolfcamp.¹⁰

FORMATION SEQUENCE	
Lamar	
Delaware Mountain Group	Bell Canyon
	Cherry Canyon
	Brushy Canyon
Bone Spring	
Wolfcamp	

Upon cross examination by Protestant, Mr. Pollard agreed the bottom of the Bell Canyon, a productive Delaware section, could be between 4,700 and 5,300 feet depending on the expert correlating the strata.¹¹ This is significant given the proposed injection interval in the proposed SWD well is stated to be from 4,800 to 6,987 feet.

From the submitted H-1 and H-1A, Mr. Pollard testified that 9 5/8-inch casing will be set to depth of 3050 feet and cemented to surface (in accordance with a Ground Water Advisory Unit letter issued 13 October 2017), long string 7-inch casing will be set to 4900 feet and cemented to an up-hole depth of 2500 feet, and 4 1/2-inch tubing will be run to a depth of 4,700 feet and a packer set. Mr. Pollard testified from the submitted H-1, Line 11 that the injection interval will be in the Bell Canyon, the Cherry Canyon and the Brushy Canyon.¹² ATP is requesting a commercial permit to inject up to a maximum of 25,000 Bbl/day, averaging an estimated 15,000 Bbl/day, with a Maximum Surface Injection Pressure ("MSIP") of 2,400 psig.

Mr. Pollard stated Protestant's concern is that injected fluids from the proposed injection well would migrate from the Cherry Canyon and Brushy Canyon up through the strata to the Bell Canyon where Protestant's wells are completed and classified in the Mi Vida (Delaware 4400) Field. Although the requested MSIP is within the Commission's standards to prevent fracturing the formation, ATP has agreed to conduct a step rate test to determine the appropriate MSIP that will not fracture the proposed injection formation.¹³ Mr. Pollard also stated that ATP would be willing to set long string casing down to 5,500

⁹ Page 56, line 4-6.

¹⁰ Page 56, line 8-9.

¹¹ Page 162, line, 24-25; Page 163, line 1.

¹² Page 59, lines 14-16.

¹³ Page 61, line 12-15.

feet,¹⁴ thereby increasing the thickness of strata between ATP's injection interval and Protestant's producing interval in the Bell Canyon, and testing individual zones for hydrocarbons.

Mr. Pollard contends, however, that without fracturing the formation, there is no natural conduit for any injected fluids from the injection well, as originally proposed, to migrate to any of Protestant's wells within a half-mile radius of ATP's proposed SWD well.¹⁵ Mr. Pollard asserts that the Delaware strata between the proposed injection interval and Protestant's production zone in the upper Bell Canyon is comprised of sandstones and shale with interbedded limestone streaks, which will contain the injected fluids.¹⁶

Mr. Pollard produced several maps, tabulations, cross-sections and diagrams to demonstrate the mature drilling, production and injection activity within a half-mile and one-mile radius of the proposed SWD well. Of the forty-three surface locations and wells identified within a one-mile radius of the proposed SWD well, there are four dry holes, three plugged and abandoned gas wells, one inactive gas well, one active gas well, four plugged and abandoned oil wells, one shut in oil well, and fourteen active oil wells. Nine of the identified wells are horizontal wells drilled into the Wolfcamp interval.

Nine of the wells identified within the one-mile radius are injection wells, seven of which were converted from oil wells to injection wells by Protestant. Of these seven injection wells, three have been shut in. ATP contends that Protestant is and has been injecting into the upper productive strata of the Bell Canyon¹⁷ and that many of the well completions are also open hole completions into both the lower strata of the halite Lamar section and the upper productive section of the Bell Canyon.¹⁸

Mr. Pollard testified that the North Pecos Brine Station Well No. 1 was originally drilled as a dry hole and then recompleted in 1969 as a brine recovery well. The well was completed with 7-inch casing to a depth of 2,199 feet, with the remainder of the drill hole open to the total depth of 4,390 feet into the Bell Canyon. For several years, an undetermined amount of brine was leached from the Lamar section. Mr. Pollard stated, "I think it's safe to say that there's some pretty good caverns in here from this leaching out,"¹⁹ inferring that the integrity of Finley wells may have been impacted or breached by the corrosive brine recovery operations.

Mr. Pollard opined as to a possible reason for Protestant's issue with injection fluids migrating to the productive zones and wells. During a work over on Protestant's King No. 8 Well, it was noted on the March 2010 Wellwork Chronological Report that the casing would not hold a pressure vacuum between 2,805 and 2,994 feet. Further, the

¹⁴ Page 66, line 22, 23.

¹⁵ Page 70, line 22-24.

¹⁶ Page 57, line 17, 19.

¹⁷ Page 73, line 7, 8.

¹⁸ Page 81, line 20-23.

¹⁹ Page 131, line 24, 25.

report states that after setting a cast iron bridge plug at 4,275 feet and dumping 20 feet of concrete, and cleaning out the open hole, the fluid level rose to 20 feet from surface. After receiving permission to shut in Protestant's nearby injection well, the King No. 6W, the fluid levels in the King No. 8 Well dropped within 20 minutes.²⁰ There is no documentation or other evidence to indicate that any remedial action to correct this issue occurred other than ceasing injections into the King No. 6W Well.

Mr. Pollard testified that ATP would run a full suite of well logs over the injection interval, including porosity, resistivity and gamma logs,²¹ to determine the most appropriate injection strata. ATP would also run a cement bond log on the long string casing to ensure sufficient cement, and ATP is willing to conduct a pressure step test on the injection interval to determine the formation's fluid fracture pressure.²² ATP would be amenable to testing zones above 5,500 feet for hydrocarbons, however Mr. Pollard testified that he doesn't believe it to be necessary.²³ The witness contends that any of Finley's production within the one-mile radius of the proposed SWD well will not be affected.²⁴

Mr. Pollard testified regarding a letter authored by Centennial Resource Production, LLC ("Centennial") and sent to the Director of Hearings at the Commission, dated January 9, 2019. The letter states:

Centennial currently operates and anticipates additional oil and gas wells within a 15-mile radius of ATP's proposed well in Reeves County and elsewhere within Reeves County and the broader Delaware Basin. We believe it is obvious and well known that the existing salt water disposal infrastructure within the Delaware Basin is insufficient to accommodate existing and planned oil and gas production and therefore there is a definite need for additional injection capacity in Reeves County. While some circumstances may exist that would render the installation of a particular salt water disposal well improper or ill informed, we have no objection to this application.²⁵

Upon investigation into Centennial's exploration and production activities, Mr. Pollard stated Centennial has two injection wells, both of which are injecting into the Delaware formation with respective total well depths of 6,630 and 6,850 feet.²⁶

ATP acknowledged there are old wells with integrity concerns in the area of the proposed SWD well, thus posing a potential risk of injection fluid migration. In closing argument, ATP's attorney argued "Pressure problems, you bet. It's their problem

²⁰ Page 139, line 3-4.

²¹ Page 143, line 10-11.

²² Page 142, line 20-24.

²³ Page 145, line 1-2.

²⁴ Page 141, lines 2,3.

²⁵ Applicant Exhibit 44.

²⁶ Page 151, line 22-25; Page 152, line 2.

[referring to Protestant]. Leaky old wells, bad casing, bad cement. This isn't a problem for my client, and it's not a problem or shouldn't be a problem for the Commission. It should start and stop with RBJ and Finley (referring to Protestant)."²⁷

C. Protestant's Case

At the onset of the hearing, Finley offered a video of a surface water breakout at the Langford No. 3 Well.²⁸

Finley's Landman, Mr. Charles Ramsey, testified regarding the reason for the protest, the intent of Finley to further develop hydrocarbons in the Delaware section, Finley's complaint regarding RBJ injection wells, the Clark No. 1 Well and the Clark No. 2 Well, and the agreement between Finley and RBJ wherein Finley sold its wellbores to RBJ but retained its existing mineral interests.

Mr. Ramsey stated that Finley believes "wells are being pressured up by the existing disposal wells near their lease, and we've had some issues with leaks at the surface. And, we're concerned that by having additional disposal wells, it's just going to increase the risk that there might be a major blow out or leak of some sort of problem."²⁹

Mr. Ramsey testified that Finley purchased the subject property in 2011 with the intent to develop the hydrocarbons throughout the entire Delaware section as they had done in the Ford (West) Field, a Delaware formation field northwest of the subject proposed SWD well.³⁰

During cross examination, Mr. Ramsey testified that Finley entered into an agreement with RBJ to sell Finley's wellbores, with Finley continuing to operate the wells until March 1, 2019. Finley agreed to drop the complaint against RBJ and RBJ is not refrained from continuing or initiating any fluid injection activity under the agreement. Finley continues to own leasehold mineral rights outside of the wellbores it sold.³¹

Finley's expert witness, Mr. John McBeath, demonstrated via annual production and well count graphs that operators, including Finley, have recompleted and drilled wells beyond the upper Bell Canyon zone into the deeper Delaware sections in the Ford, West (4100) Field, the Scott Field, and the Collie Field. In each of these fields, typically a well's producing interval was deepened in the Delaware section and the respective perforation interval increased from tens of feet to hundreds of feet. Subsequently, average well and field production increased with the deepening re-drills and recompletions.

²⁷ Page150, line 14-18.

²⁸ Protestant's Exhibit 1.

²⁹ page 196-197, line 25-6.

³⁰ page 197, line 4-12.

³¹ Page 204, line 24-25.

Mr. McBeath testified that he interpreted the injection interval in the proposed SWD well of 4800 to 6897 feet includes 500 to 600 feet of the Bell Canyon section.³² Mr. McBeath presented a well log cross-section comprised of wells offset to the proposed injection well and wells in tracts adjacent to the Finley's lease. The cross-section reflects that the interpreted top of the Bell Canyon is at 4,340 feet, the interpreted top of the Cherry Canyon is at 5,345 feet, the interpreted top of the Brushy Canyon is at 6,480 feet, and the interpreted top of the Bone Spring is at 7,750 feet. Mr. McBeath also presented a mud log of the Schwalbe No. 1 Well wherein the mud logger recorded visual lithology inspections of the drill cuttings and percent of oil fluids in the cuttings.³³ Mr. McBeath emphasized that there were several intervals where the oil fluid was reported as 100%, 90%, and 80%, including and within the deeper Cherry Canyon interval at 5,880 feet.³⁴ Mr. McBeath testified that ATP's proposed SWD well would water-out the zone that Finley intends to drill and produce and that Finley is already seeing issues with disposal operations in this area.³⁵

Mr. McBeath presented the potential oil recovery from the Mi Vida (Delaware) Field. The potential oil recovery is based on similar oil recoveries experienced in the Collie, the Ford West, and the Scott fields which also produce from the Delaware formation and where operators have deepened the production zone to include the Cherry Canyon and Brushy Canyon. Mr. McBeath testified that he has calculated "there's a potential for an additional 840,000 Bbls of oil to be produced below the historical production,"³⁶ and in regards to producing this additional production, "There would be an increased risk with additional injection."³⁷

Mr. McBeath testified regarding the correlation between the commercial injection wells operated by RBJ and the downhole pressures encountered in a selection of Finley's wells. Mr. McBeath asserted via pressure graphs that when the RBJ's Clark No. 2 Well began commercial injection in late 2018, there was a corresponding increase in pressure above the naturally occurring geopressured gradient at Finley's average production depth. Mr. McBeath's opinion is that, "there is no other explanation" that the open hole completion from 4,600 to 7,000 feet in the RBJ Clark No. 2 commercial injection well contributed to the fluid over-pressure and migration issues experienced by the Finley wells.³⁸ Mr. McBeath affirmed his opinion regarding the pressure and fluid source with a graph depicting the bottom-hole pressure of Finley's wells being essentially the same as the bottom-hole pressures of the RBJ Clark No. 1 and RBJ Clark No. 2 commercial disposal wells, which is 2,500+ psi, well above the naturally occurring 2,040 psi at that depth. Mr. McBeath testified that shortly after the RBJ Clark No. 2 injection well commenced operations in April 2018, Finley's Langford No. 3 was temporarily abandoned in July 2018, the King No. 10 Well was plugged and abandoned in July 2018, the Langford

³² Page 225, line 1, 7, 80.

³³ Page 228, line 15-24.

³⁴ Page 229, line 8.

³⁵ Page 229-230, line 24-25, 1-8.

³⁶ Page 55, line 23-25.

³⁷ Page 56, line 3-4.

³⁸ page 233, line 2.

No. 4 was plugged and abandoned in August 2018, and the Langford No. 5 was temporarily abandoned. Mr. McBeath emphasized that although the top of the injection interval in the RBJ Clark No. 2 Well was at 4,600 feet, a depth well below the Finley's production horizon in the top of the Bell Canyon, the injection fluid "isn't contained to that interval"³⁹ and impacted the Finley's wells and the recovery of hydrocarbons.

Mr. McBeath offered the Proposal for Decision and Final Order in the Commission's Docket 08-0249225, wherein the Commission lowered the fluid injection pressure under Permit No. F 16749 to 300 psig to avoid fracturing the injection interval in the Bell Canyon and Cherry Canyon intervals of the Delaware section. It was found in that docket the originally permitted injection pressure of 1,500 psig exceeded the fracture gradient of the Delaware section and contributed to the premature loss of wells and hydrocarbon recovery due to the vertical fracturing of the formation and the subsequent migration of injected brine.

Mr. McBeath contends from his well log analysis on the Quinn 6 Lease, Well No. 6 Well, contrary to ATP's expert witness, that the Bell Canyon, the Cherry Canyon and the Brushy Creek intervals are a mixture of "limestone and sandstone and very little dolomite"⁴⁰ and "fairly uniform with probably varying porosity and maybe some permeability, mixture of sandstone and siltstones but with no confining intervals."⁴¹ The witness reinforced his opinion regarding lithology and fluid migration due to fracturing with a paper authored by the Bureau of Economic Geology at the University of Texas, wherein it states, "Shale is rare in the Delaware Mountain Group, probably owing to sand storage in an eolian (wind blown) environment prior to basinal deposition,"⁴² and "The danger of connecting water bearing and hydrocarbon-bearing intervals with induced fractures or treating out of zone is always present."⁴³

Mr. McBeath presented cumulative psi-day (Y Axis) versus cumulative injection barrels (X Axis) (the "Hall Plot") based on data collected from three currently operating wells injecting fluids into the Delaware section; i.e. the RBJ Clark No. 1, the RBJ Clark No. 2, and the M.A.C. North Pecos 285 No. 1 Well to the south. The accepted premise of the graph's slope is that if the slope is increasing relative to the Y Axis then there is increasing resistance to the injection. If the slope is equal relative to the X and Y axis then the formation is generally accepting fluids. If the slope is increasing or flattening relative to the X Axis then injection resistance is lessening indicating a formation fracturing or loss of well completion integrity. Mr. McBeath testified that when the M.A.C well increased its injection rate from 10,000 Bbl/day to 25,000 Bbl/day, "There was a change in the slope, which shows that they were fracturing or creating new fractures in the injection zone."⁴⁴ The Hall Plot for the RBJ Clark No. 1 Well indicated that the charted slope was flattening

³⁹ Page 237, line 16.

⁴⁰ Page 30, line 12.

⁴¹ Page 32, line 19-21.

⁴² page 35, line 7-10.

⁴³ page 36, line 7-10.

⁴⁴ Page 43, line 3-6.

"so, they're definitely frac'ing the zone that they are in."⁴⁵ The Hall Plot for the RBJ Clark No. 2 Well reflected a flattened charted slope upon initial injection operations indicating "Clark No. 2 was connecting up with previous fractures and injection created by the Clark No. 1"⁴⁶ with the Clark No. 2 Well having the top of its injection interval at 4,600 feet versus the Clark No. 1 Well having the top of its injection interval at 4,000 feet."⁴⁷

Mr. McBeath pointed out that the Commission's policy regarding injection wells is that, "All injection and disposal permits require that injected fluids be confined to the authorized zone"⁴⁸ and "Injection at or above formation fracture pressures may allow injected fluids to migrate through the fractures into adjoining zones or go around the production casing annular cement and escape the authorized zone."⁴⁹ The witness presented a map superimposed with his interpretation of the orientation of fracture propagation in the Delaware section, with such fracture propagation extending generally northwest to southeast and connecting the two RBJ injection wells and ATP's proposed SWD well with the area of Finley's Bell Canyon wells.

Mr. McBeath confirmed that if ATP were to propose injecting into either of the deeper Fusselman or Ellenburger formations, then Finley would not protest that respective injection permit application. Further, Mr. McBeath testified "I think the Delaware is a good zone to inject into, but not when you're near historic production."⁵⁰

VI. EXAMINER'S ANALYSIS

The Examiners' recommendation is to deny ATP's application based on the evidence and testimony presented at the hearing. ATP failed to provide sufficient evidence that all statutory requirements will be met for the Commission to issue the requested permit for the proposed SWD well.

A. ATP failed to show the use or installation of the injection well will not endanger or injure any oil, gas, or other mineral formation.

ATP failed to establish the use or installation of the proposed SWD well will not endanger or injure oil and/or gas bearing formations known as the Bell Canyon, the Cherry Canyon and the Brushy Creek formations; i.e. the Delaware Mountain Group. There are recoverable reserves in the area of the proposed SWD well in the deeper sections of the Delaware Mountain Group. ATP did not establish there is a confining barrier between the proposed SWD injection interval and other deeper productive intervals. Additionally, there is evidence that the proposed injection interval overlaps deeper productive reservoirs. ATP acknowledges it owns no mineral rights where the proposed SWD would be located, and there is Commission precedent denying an

⁴⁵ Page 43, line 23-24.

⁴⁶ Page 44, line 18-19.

⁴⁷ Page 44, line 18-19.

⁴⁸ Page 48, line 6-8.

⁴⁹ page 48, line 9-13.

⁵⁰ Page 132, line 21-23.

applicant authority to drill a disposal well into a productive reservoir when the applicant does not own mineral rights.

There is evidence of recoverable reserves in the area of the proposed SWD well in the deeper sections of the Delaware Mountain Group. It is not contested that operators, including Finley, have re-drilled or deepened wells in similar Delaware Mountain formations in nearby fields and have found and increased recoverable reserves. Furthermore, it is not contested that the mud log of the Schwalbe No. 1 Well indicates significant hydrocarbon showings in the deeper intervals of the Delaware Mountain Group. The hydrocarbon showings in the lower sections of the Delaware Mountain Group in the Schwalbe No. 1 Well are relevant because it is offset to the southeast of Finley's King lease. The estimate of recovering an additional 840,000 stock tank barrels of oil from the lower Delaware Mountain sections was not successfully challenged by ATP.

There is evidence that the proposed injection interval also includes the historic producing Bell Canyon section, as well as, deeper productive sections of the Delaware Mountain Group. The historic Delaware Mountain formation production in this area has come from the uppermost Bell Canyon section. Finley's expert testified that the proposed injection interval of 4800' to 6897' would include 500' to 600' of the Bell Canyon section. ATP's witness agreed the bottom of the Bell Canyon could be between 4,700' and 5,300' depending on the expert correlating the strata. ATP's H-1 specifically states the Bell Canyon as one of injection formation sections. Injecting into the formations, as stated in testimony, the submitted H-1, and the notice of hearing, would endanger or injure the oil and/or gas bearing formations.

ATP failed to establish that the injected fluids would be confined to the proposed SWD well injection interval. ATP did not effectively counter Finley's evidence that the lithology of the Delaware formation is a mixture of "limestone and sandstone and very little dolomite" and "fairly uniform with probably varying porosity and maybe some permeability, mixture of sandstone and siltstones but with no confining intervals." Furthermore, ATP's testimony contradicts its submitted H-1 which specifically states the injection formation lithology to be sand, and injection formations to be the Bell Canyon, the Cherry Canyon and the Brushy Creek. The Examiners find that the injected fluids will not be confined to the injection interval in the proposed SWD well.

ATP acknowledges it owns no mineral rights where the proposed SWD well would be located. There is Commission precedent in Oil and Gas Docket No. 06-0264337, wherein the Commission denied the applicant authority to drill a disposal well and inject into a productive reservoir when the applicant did not own mineral rights.

For these reasons, the Examiners recommend the Commission find ATP failed to establish the use or installation of the proposed SWD well will not endanger or injure oil and/or gas bearing formations.

B. ATP did not establish that ground and surface water can be adequately protected from pollution.

The Examiners find there is insufficient evidence that the injected fluids will not migrate from the proposed injection interval through the Delaware formation to surrounding mature, compromised wellbores and subsequently into strata containing useable groundwater.

It is uncontested that there are leaky old wells, bad casing, and bad cement within the $\frac{1}{4}$ to $\frac{1}{2}$ mile radius of the proposed SWD well. Finley produced a video demonstrating surface breakthrough of fluids at their Langford No. 3 Well. ATP produced a workover report showing loss of casing integrity and injected fluid intrusion in Finley's King No. 8 Well. The current status of each the respective well's deteriorated condition is uncontested.

Within a one-mile radius surrounding ATP's proposed injection well is mature development as demonstrated by the forty-three (43) drilling sites with initial production dates beginning in the mid 1960's. The mixture of drilling sites includes injection wells, dry holes, producing wells and a brine production well. ATP conceded "there's some pretty good caverns in here from this leaching out" from the brine recovery well that operated in the 1960's, inferring that the integrity of other Finley wells may have been impacted or breached by the corrosive brine recovery operations.

For these reasons, the Examiners recommend the Commission find ATP failed to establish that the use or installation of the proposed SWD well will adequately protect ground and surface water from pollution.

C. ATP failed to show the use or installation of the proposed SWD is in the public interest.

ATP failed to establish the proposed SWD well is in the public interest. While there is a need for commercial injection capacity in the Delaware basin, ATP failed to prove that the proposed SWD well would not contribute to existing groundwater contamination issues already existing in this maturely developed field in Reeves County. ATP failed to show that the proposed SWD well will not endanger other mineral formations. Protection of groundwater and other mineral formations is in the public interest. For these reasons, the Examiners recommend the Commission find the proposed SWD well is not in the public interest.

D. Applicant has made a satisfactory showing of financial responsibility as required by Texas Natural Resources Code, § 91.142.

Except as may be specifically excluded, Statewide Rule 78 states that any person, including any firm, partnership, joint stock association, corporation, or other organization,

is required by Texas Natural Resources Code, § 91.142, to file an organization report with the Commission must also file financial security. ATP meets this requirement.

**VII. EXAMINER'S RECOMMENDATION, PROPOSED FINDINGS OF FACT
AND PROPOSED CONCLUSIONS OF LAW**

Based on the evidence, the Examiners recommend that the Commission deny the application of Aqua Terra Permian, LLC for commercial disposal authority pursuant to Statewide Rule 46 for the North Pecos 285 Lease, Well No. 1, Pecos, North (Delaware) Field, Reeves County, Texas, and adopt the following findings of fact and conclusions of law.

Findings of Fact

1. Aqua Terra Permian, LLC (Operator No. 028618) filed an application requesting commercial disposal authority pursuant to Statewide Rule 46 *Fluid Injection into Productive Reservoirs* for the North Pecos 285 Lease, Well No. 1, Pecos, North (Delaware) Field, Reeves County, Texas.
2. A review of U.S. Geological Survey seismic data shows no earthquakes have been reported within 100 square miles (a 9.08 km radius circle) of the proposed SWD well.
3. Notice of the application was published in the in the *Pecos Enterprise*, a newspaper having general circulation in Reeves County, on June 21, 2018. On June 18, 2018, a copy of Forms H-1, H-1A, were mailed to the surface owner (Ward County Irrigation District), surface owners of adjacent tracts, operators of wells within one-half mile (Carrizo Permian LLC, Finley Resources, Inc. and RBJ & Associates, LP), and the Reeves County Clerk.
4. The application is protested by Finley Resources, Inc.
5. On November 13, 2018, the Hearings Division of the Commission sent a Notice of Pre-Hearing Conference ("Notice") via first-class mail to Applicant and all affected parties setting a pre-hearing conference date of December 11, 2018.
 - a. The Notice contains (1) a statement of the time, place, and nature of the pre-hearing conference; (2) a statement of the legal authority and jurisdiction under which the hearing is to be held; (3) a reference to the particular sections of the statutes and rules involved; and (4) a short and plain statement of the matters asserted.
 - b. The pre-hearing conference was held on December 11, 2018. Both Applicant and Protestant appeared and participated.

- c. At the pre-hearing conference, the parties agreed to commence the hearing on the merits on January 15, 2019.
- d. The hearing on the merits was held on January 15 and 16, 2019.
- e. Applicant and Protestant attended and participated in the hearing on the merits.

All parties received more than 10 days' notice of hearing and opportunity for hearing.

- 6. The proposed injection site is a ten-acre tract and the proposed injection interval is 4,800 to 6,987 feet into the Bell Canyon, Cherry Canyon and Brushy Canyon formation, all recognized segments of the Delaware Mountain Group formation, the formation's lithology is sand.
- 7. There is an estimated 840,000 Bbls of oil to be recovered from the lower Delaware Mountain sections in the Mi Vida (Delaware 4400) Field area.
- 8. There is insufficient evidence of a confining barrier for the injection interval.
- 9. ATP does not own the mineral interests underlying the proposed SWD well's ten-acre tract.
- 10. ATP failed to show the use or installation of the injection well will not endanger or injure any oil, gas, or other mineral formation.
- 11. Two wells within the $\frac{1}{4}$ to $\frac{1}{2}$ mile radius of the proposed SWD well demonstrate a lack of well casing and/or cement integrity:
 - a. Finley produced a video demonstrating surface breakthrough of fluids at their Langford No. 3 Well, and
 - b. ATP produced a workover report showing loss of casing integrity and injected fluid intrusion in Finley's King No. 8 Well.
- 12. Within a one-mile radius surrounding ATP's proposed injection well is mature development as demonstrated by the forty-three (43) drilling sites with initial production dates beginning in the mid 1960's. The mixture of drilling sites includes injection wells, dry holes, producing wells and a brine production well. The integrity of wells in the area of the proposed well may have been impacted or breached by the corrosive brine recovery operations.
- 13. ATP failed to provide sufficient evidence the injected fluids will not migrate from the proposed injection interval through the Delaware formation to surrounding

mature, compromised wellbores and subsequently into strata containing useable groundwater

14. ATP did not establish that ground and surface water can be adequately protected from pollution.
15. Aqua Terra Permian, LLC has an active P-5 Organization Report, and a \$50,000 bond as financial assurance.
16. ATP failed to show the use or installation of the proposed SWD well is in the public interest.

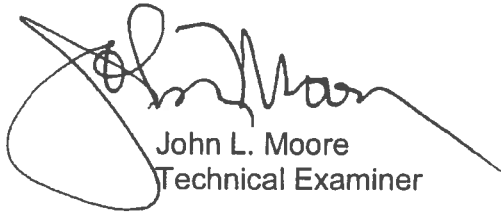
Conclusions of Law

1. Proper notice of hearing was timely issued to persons entitled to notice. *See, e.g.*, Tex. Gov't Code § 2001.051; 16 Tex. Admin. Code §§ 1.41, 1.42, 1.45, 3.46.
2. The Commission has jurisdiction in this case. *See, e.g.*, Tex. Nat. Res. Code § 81.051; Tex. Water Code §§ 27.031, 27.051(b).
3. Aqua Terra Permian, LLC, failed to demonstrate the proposed fluid disposal operations will not endanger oil, gas, or geothermal resources. Tex. Water Code § 27.051(b)(2); 16 Tex. Admin. Code § 3.46(a).
4. Aqua Terra Permian, LLC failed to demonstrate groundwater and surface fresh water can be adequately protected from pollution.
5. Aqua Terra Permian, LLC failed to demonstrate approval of the proposed injection well is in the public interest.
6. Aqua Terra Permian, LLC failed to demonstrate the application for the North Pecos 285 Lease, Well No. 1, Pecos, North (Delaware) Field, Reeves County, Texas, meets the requirements of chapter 27 of the Texas Water Code and the Railroad Commission's Statewide Rule 46.

Recommendations

The Examiners recommend that the application of Aqua Terra Permian, LLC for commercial disposal authority pursuant to Statewide Rule 46 for the North Pecos 285 Lease, Well No. 1, Pecos, North (Delaware) Field, Reeves County, Texas, be denied, as set out in the attached proposed Final Order.

Respectfully submitted,



John L. Moore
Technical Examiner



Jennifer N. Cook
Administrative Law Judge