

HEARINGS DIVISION

OIL AND GAS DOCKET NO. 06-0297041

HEARD BY: Richard Eyster, P.G.
Marshall Enquist

Technical Examiner
Administrative Law Judge

REPRESENTING:

LATX Operations, LLC

Attorney
President, LATX Operations, LLC
Vice President, LATX Operations LLC,
Landman
Petroleum Geologist
Petroleum Engineer

Mike Donovan
James Smith

Sheridan Production Company LLC

Attorney Representing Devon/Sheridan
Senior Attorney, Devon Energy
Production company
Geologist
Reservoir Engineer

Brenton McCullough
James W. Bauer

Noel Diane Jones, Eliza Jones Bacon,
Oscar Bennett Jones.

Attorney
Attorney

PROCEDURAL HISTORY

Application Filed:	June 10, 2015
Protest Received:	June 29, 2015
Notice of Hearing:	August 13, 2015
Date of Hearing:	September 17,&18, 2015
Transcript Received:	October 18, 2015
Applicant Closing Received:	October 19, 2015
Protestant's Closings	October 12, 2015
Reopened Hearing:	November 02, 2016
Transcript Received:	November 15, 2016
Record Closed	November 28, 2016
Proposal For Decision Issued:	January 26, 2017

STATEMENT OF THE CASE

Pursuant to Statewide Rule 46 (16 Tex. Admin. Code §3.46)¹ LATX Operating, LLC (LATX) seeks authority to inject produced salt water and RCRA-exempt waste² into a reservoir productive of oil or gas on the T.P. Smith Lease, Well No. 1, (T.P. Smith No.1 Well) Bethany (Travis Peak Cons.) Field, in Harrison County Texas.

The Technical Examiner and Administrative Law Judge (collectively, "Examiners") received a letter from Mr. William "Bill" Hayenga II, attorney for Sheridan Production Company dated October 31, 2016. The letter states that Devon Energy Production Company, L.P. has sold all its rights and interests in the leases and wells, in the area to Sheridan Production Company ("Sheridan"). The letter further states that Sheridan wishes to maintain the protest of LATX's application for the same reasons articulated by the prior operator, Devon. As an offset well owner, Sheridan requested to step into the shoes of Devon and rely on the evidence and testimony in the record.

Notice of the subject application was published in the *Marshall News Messenger*, a newspaper of general circulation in Harrison County. Notice of the application was sent to the Harrison County Clerk, and offset operators within one half mile on November 17, 2014. At the time of the hearing, LATX had an active Form P-5 and a \$25,000 Letter of Credit for financial assurance.

There are two sets of Protestants. First, Devon Energy, now Sheridan, who is an offset operator and operator of an injection well injecting into the Travis Peak Formation in Harrison County. The second set of Protestants are three mineral rights owners with a

¹ 16 Tex. Admin. Code § 3.46 (Fluid Injection Into Productive Reservoirs)

² Resource Conservation and Recovery Act: Examples of RCRA exempt oil and gas waste includes produced water, drilling fluids, hydraulic fracturing flow back fluids, rig wash and workover wastes.

0.043 mineral interest. They are; Noel Diane Jones, Eliza Jones Bacon and Oscar Bennett Jones (collectively "the Jones"). Sheridan is concerned that the injected fluids will (1) not remain in the proposed injection interval, (2) threaten surface and groundwater, and (3) result in waste of hydrocarbons in the Travis Peak Formation. Additionally Devon asserts there is not a public need for the well. The Jones claim the proposed injection (1) will result in waste of hydrocarbons in the Travis Peak Formation, (2) is illegal as LATX does not have a good-faith claim, and (3) there is not a public need for the proposed injection well.

The Examiners conclude LATX has met its burden of proof under Chapter 27 of the Texas Water Code and the Commission's Statewide Rule 46 and recommend the application be approved and the disposal permit issued.

APPLICABLE LAW

The Railroad Commission may grant an application for a disposal well permit under Texas Water Code § 27.051(b)³ and may issue a permit if it finds:

1. The use or installation of the injection well is in the public interest;
2. The use or installation of the injection well will not endanger or injure any oil, gas, or other mineral formation;
3. With proper safeguards, both ground and surface fresh water can be adequately protected from pollution; and
4. The applicant has made a satisfactory showing of financial responsibility as required by Section 27.073.

Statewide Rule 46 [T.A.C. Title 16, Part 1, Chapter 3, Rule §3.46] requires that "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 pollution of freshwater strata unproductive of oil, gas or geothermal resources."

DISCUSSION OF THE EVIDENCE

APPLICANT'S EVIDENCE

The T.P. Smith No. 1 Well (API No. 203-31992), is an existing well that LATX proposes to convert to a commercial disposal well. At the hearing, LATX requested to amend it's application by reducing the disposal volume from 15,000 bbls/d to 5,000 bbls/d. Mike Donovan, LATX's consulting petroleum geologist, testified that LATX plans to replace

³ Tex. Water Code §27.051(b)(1-4).

the existing 2 3/8 inch tubing and install 2 7/8 inch tubing in the proposed injection well. Also, he said that 15,000 bbls/d would not be able to be disposed of due to frictional losses through the 2 7/8 inch tubing. Trying to push 15,000 bbls would exceed the requested surface injection pressure.”⁴ The Examiners conclude no further notice was required as this revised maximum daily injection volume was less than the volume previously noticed.

Facility Design and Operation

The well is located on a 108.9 acre lease, located approximately six miles west of the town of Waskom in Harrison County. LATX currently owns and operates three commercial injection wells and 35 water hauling trucks. The proposed injection interval is the middle and lower Travis Peak Formation between 6,460 ft. and 7,940 ft. The interval is used for disposal in other area disposal wells.⁵ The proposed T.P. Smith No.1 Well will be located on the same site as LATXs’ existing Harrison County SWD No. 1 Well (API No. 203-34657), and its existing surface facilities. The proposed injection well will utilize the existing surface facilities of the Harrison County SWD No. 1 Well, (Harrison No. 1 Well). The produced saltwater and RCRA exempt waste will be delivered to the proposed injection well via pipeline from the existing Harrison County SWD Facility.

LATX’s existing Harrison County SWD No. 1 Well, a Statewide Rule 46 disposal well, is permitted to inject 12,000 bbls/d with a maximum operating pressure of 1,300 psig at a depth from 2,600 ft. to 2,850 ft. The Harrison No. 1 Well, due to surface pressure constraints, is able to dispose of only 5,000 to 6,000 bbls/d, resulting in LATX having to divert its trucks to other facilities located between 9 to 19 miles away from the Harrison SWD Facility.⁶ The proposed injection well will provide additional capacity for the existing Harrison No. 1 Well, which will negate the need for LATX to divert it’s water hauling trucks to third party disposal wells.

The proposed T.P. Smith No. 1 injection well is an existing well that is temporarily abandoned. The proposed injection well will be recompleted and operated as follows:⁷

- The well was drilled to a depth of 9,650 ft.
- Surface casing (8 5/8-inch) was set at a depth of 1,320 ft. with cement circulated to the surface.

⁴ Tr. Vol. 1, pg 25, Ins.18-25; Pg 26, Ins. 1-15. LATX Exhibit No. 4.

⁵ Tr. Vol 2, pg 48, Ins. 20-25; pg 49 Ins. 1-25.

⁶ Tr. Vol 1, pg. 73, Ins. 5-25; pg. 74, Ins. 1-2.

⁷ Tr. Vol 1, pg. 39, Ins.1-25. LATX Exhibit No. 27.

- Long-string casing (4 1/2-inch) was set to a depth of 9,650 ft. with cement circulated to 5,630 ft.
- Injection tubing (2 7/8-inch) will be set with a packer at 6,400 ft.
- The injection interval will be from 6,460 ft. to 7,940 ft. in the middle and lower Travis Peak Formation.
- A bridge plug will be set below the disposal interval at 8,060 ft with 20 feet of cement on top to effectively isolate the perforations from 9,341 ft. to 9,474 ft.
- The maximum daily injection volume will be 5,000 bbls/d with an average daily injection volume of 4,000 bbls/d.
- The maximum surface injection pressure will be 1,725 psig.
- The well will inject produced salt water and RCRA-exempt waste.

Geology, Groundwater and Hydrocarbon Resources

The Travis Peak Formation in Harrison County is a massive fluvial-deltaic depositional system that extends over several counties in east Texas, including Harrison County, and extends into Louisiana. Historical production from the Travis Peak Formation is from sandstones in the upper 200-300 ft. of the Travis Peak. These sands are commonly smaller, isolated sand bodies encased in shales, whereas the bulk of the underlying middle and lower Travis Peak Formation consists of massive sandstone bodies.

The Commission's Groundwater Advisory Unit (GAU) November 13, 2014 letter to LATX stated that the interval from the ground surface to the base of the Wilcox Formation, which is base of usable quality groundwater ("BUQW"), is estimated to occur at a depth of 425 ft. and must be protected. The base of the underground source of drinking water ("USDW") is estimated to occur at 1,025 ft.⁸ The top of the Travis Peak Formation in the proposed well is approximately 6,070 ft.⁹ There is over 6,000 ft. of mostly impermeable shale, clay, limestone, and sandstone strata between the top of the proposed injection interval at 6,460 ft, and the BUQW at 425 ft. The proposed injection well has a minimum of 140 ft. of impermeable shale immediately above the injection zone from 6,460 ft. to

⁸ LATX Exhibit No. 5, GAU letter.

⁹ Tr. Vol 1, pg. 41, Ins. 1-13. LATX Exhibit No. 17, well logs.

6,320 ft. with a minimum of 1,000 ft. of shale between the top of the injection interval and the BUQW.¹⁰

The middle and lower sands of the Travis Peak Formation have never been productive of hydrocarbons in this area.¹¹ The massive middle and lower Travis Peak sands are relied upon for the underground disposal of oil and gas waste in this area of Harrison County. The proposed disposal interval has a gross thickness of about 1,480 ft. with a 495 ft. perforated interval. The average porosity is about 13 percent and permeability averages 20 md.¹²

In this area, only the upper Travis Peak Formation is productive. There are no wells currently producing from the Travis Peak Formation within two miles of the proposed injection well. There are 15 wells within one-mile of the proposed well that have historically produced from the upper 200ft. to 300 ft. portion of the Travis Peak Formation and they have all been plugged. The last reported production from the upper Travis Peak Formation within one-mile of the proposed well was 309 bbls of oil in 2010.¹³

Area of Review

Statewide Rule §3.46(e)(1), Area of Review states: "Except as otherwise provided in this subsection, the applicant shall review the data of public record for wells that penetrate the proposed disposal zone within a 1/4 mile radius of the proposed disposal well to determine if all abandoned wells have been plugged in a manner that will prevent the movement of fluids from the disposal zone into freshwater strata. The applicant shall identify in the application any wells which appear from such review of public records to be unplugged or improperly plugged and any other unplugged or improperly plugged wells of which the applicant has actual knowledge".

According to testimony given by Mr. Donovan, and as shown on LATX Exhibit No.8 (a 1/4 mile radius map centered around the proposed disposal well), there are no well bores within the 1/4 mile area of review.¹⁴

¹⁰ Tr. Vol 1, pg. 39, Ins. 13-15. LATX Exhibit Nos. 17 and 25 (T.P. Smith No. 1 Well logs).

¹¹ Tr. Vol .1, pg. 22, Ins. 15-20; pg 55, Ins. 1-8.

¹² LATX Exhibit No. 2.

¹³ Tr. Vol. 2, pg. 9, Ins. 5-8. LATX Exhibit Nos. 37 & 38.

¹⁴ Tr. Vol. 1, pg. 31, Ins. 6-11. LATX Exhibit No. 8.

There are seven wells, including LATX's Harrison County SWD No. 1 Well, within ½ mile of the proposed TP No. 1 Well.¹⁵ The wells are:

- a. LATX Harrison County SWD No. 1 Well. Drilled to a total depth (TD) of 3,006 ft. The TD of this well is approximately 3,400 ft. above the proposed injection interval. Surface casing, 9 5/8 inch, is set at 451 ft. with cement circulated to surface. The 7-inch long string casing is set at 3,006 ft. with cement circulated to surface.
- b. Sheridan Production Co., L.P. Zach-Abney Unit No. 1 Well (API No. 203-31020). The TD is 9,700 ft. This well has 9 5/8 inch surface casing set at 2,192 ft.; cemented to surface. The 5 ½ inch long string casing is set at 9,680 ft. in the Cotton Valley Formation and is cemented to 1,330 ft. The well is temporarily abandoned.
- c. Memorial Production Operating, LLC - Rogers-Jones No. 1H Well. (API No. 203-35114) is a horizontal well. The 13-3/8 inch surface casing is set at 1,061ft. and cemented to surface. The 5-1/2 inch long string was set at 13,685 ft. and cemented to 4,934 ft. The vertical hole is outside the one-half mile radius and there is cement across the proposed injection interval.
- d. Memorial Production Operating, LLC - Rogers-Jones No. 2H Well. This well is permitted but not yet drilled. The vertical hole will be outside of the ½ mile radius.
- e. Triton Oil & Gas Corp's L.B. Downer No. 1 Well (API No. 203-00929) The well has 9-5/8 inch surface casing set at 1,003 ft. The TD of 6,292 ft. is above the proposed injection interval. The well was plugged in 1978.
- f. Compass Energy Operating, LLC - Downer No. 1 Well (API No. 203-31814). This well has 8 -5/8 surface casing set at 424 ft. and the 4-1/2 inch long string was set at 9,714 ft., and cemented to 4,064 ft. The well is producing from the Cotton Valley Formation with perforations at 9,319 ft. to 9,572 ft.
- g. Exco Operating Company, LP - Downer SWD No. 3 Well (API No. 203-31851). It has a TD of 6,600 ft. This well has 8-5/8 inch surface casing set at 1,014 ft. This well is plugged.

¹⁵ LATX Exhibit No. 19.

Sheridan's Zach Abney Unit No. 1 Well is located about 1/2-mile from the proposed injection well and is a temporarily abandoned well completed in the Cotton Valley Formation. The well has not produced since 2007. This well has 9 5/8 inch surface casing set at 2,192 ft. cemented to surface. The Zach Abney Unit No. 1 Well was previously tested in the upper Travis Peak Formation, but now is completed in the Cotton Valley Formation, a deeper zone than the Travis Peak Formation. In 2005, Devon attempted a Travis Peak completion at 7,704 ft. to 7,801 ft., which is within the proposed injection interval. There was no production reported. The well's G-1 shows that Devon set a bridge plug at 7,704 ft. with 20 ft. of cement to 7,684 ft. Devon then moved up-hole to 6,458 ft. to 6,476 ft. which is an upper Travis Peak sand. Devon produced the well for slightly over one month, producing 1,105 Mcf. In 2005, the Travis Peak perforations were squeezed off with 125 sacks of cement. Devon then drilled out the bridge plug that was on top of the 7,700 ft. perforations and went back to the Cotton Valley Formation and produced that Cotton Valley sand through 2007. Since 2007 the well has been temporarily abandoned.¹⁶

The Examiners note that the proposed injection well is located downdip from the Zach Abney Unit No. 1 Well resulting in a 50 ft. offset between the Zach-Abney well and the proposed injection well, as shown on the geologic cross sections shown on LATX Exhibit Nos. 25 and 52. The 6,458 ft. to 6,476 ft. perforations in the Zach Abney well would correlate to 6,408 ft. to 6,426. ft in the proposed injection well, which is above the proposed injection interval.¹⁷

Mr. Donovan testified that in this particular area of the East Texas Basin, the productive interval of the Cotton Valley Formation occurs in the "Taylor Sand" interval which occurs in the proposed injection well at approximately 9,330 ft. to 9,500 ft. This is 1,600 ft. below the base of the proposed injection interval."¹⁸ There is a minimum of 800 ft. of shale below the base of the injection interval separating the proposed injection interval from the production in the Taylor Sand of the Cotton Valley Formation.¹⁹

On June 10, 2015, LATX received a memo from the Commission's Oil and Gas Division recommending the Examiners include the following 10 special conditions and the standard general conditions to protect surface and groundwater.²⁰

¹⁶ Tr. Vol. I, pg. 49, ln.1 to ln. 15.

¹⁷ LATX Exhibit Nos. 25 and 52.

¹⁸ Tr. Vol 1, pg 279, lns. 1-20.

¹⁹ Tr. Vol. 1, pg. 65, lns. 16-21.

²⁰ Tr. Vol. 1, pg. 52, lns. 1-25. LATX Exhibit No. 23.

- A) Commission records indicate that Channel Production Company is the operator of record for this lease. Injection authority, if granted, is contingent upon the lease being transferred to LATX Operations, LLC (Form P4).
- B) Operator shall perform an initial static bottom hole pressure test to quantify reservoir pressure prior to injection into the permitted formation(s).
- C) Operator shall conduct a pressure fall-off test twelve (12) months after injection has commenced and provide the Commission an opportunity to witness the test as stated in (F) below. The analysis of the fall-off test shall be provided under the supervision, seal, and signature of a registered professional engineer in Texas. The test analysis shall be filed with the Commission's Austin offices within 30 days of completion of the fall-off test.
- D) Measurement for the initial static bottom hole pressure test will be via a pressure bomb run after completion. Measurement for the subsequent bottom hole pressure fall-off test will be either via wireline tool(s), or other Commission approved bottom-hole pressure measurement technique.
- E) If multiple formations are open to injection, steps must be taken to isolate the formations for discrete shut-in bottom-hole pressure measurements for each separate formation.
- F) Operator must notify the District Office 48 hours in advance of the test(s) in order to provide opportunity for the RRC field technician to witness the test(s). Operator is to provide raw data from the test to the District Office and the UIC section of the Oil and Gas Division within 48 hours of completing the test.
- G) Operator shall notify by facsimile or electronic mail the District Office and the UIC section of the Oil and Gas Division 48 hours prior to commencement of injection.
- H) Operator shall provide a log of the subject well with Form W-1 or G-1 for the purpose of identifying Formation Tops of the Rodessa, Pettit and Travis Peak Formations.
- I) Operator will provide a cement bond log (CBL) for the purpose of evaluating the long string top of cement. The CBL must be filed with the initial Form H-5 Injection Well Pressure Test Report documenting compliance with this Special Condition.
- J) A bridge plug must be set below the disposal interval at 8,060 ft. with 20 feet of cement on top to effectively isolate the perforations from 9,341 ft. to 9,474 ft. A copy of Form W-15 Cementing Record must be filed with the

initial Form H-5 Injection Well Pressure Test Report documenting compliance with this Special Condition.

Mr. St. Amant, President of LATX, testified at the hearing that LATX agrees to Special Conditions A through J and the standard conditions A through G contained in LATX Exhibit No. 23, the June 10, 2015, memo from the Commission's Oil and Gas Division.²¹

Mr. Donovan testified that LATX does not believe that their injection operations would cause fracturing. However, to fully address the Protestant's claims that the operation of the proposed disposal well will cause fracturing of the encapsulating shale, allowing the injected fluid to migrate out of the injection interval, LATX would accept a special condition in their permit requiring a step-rate test prior to the start of injection operations. The step rate test will allow LATX to determine whether their injection volumes and pressures will cause fracturing of the encapsulating shale above and below the injection interval, and the test will allow LATX to adjust their operations, if necessary, to prevent fracturing the encapsulating shale.²²

There are five approved disposal well permits allowing the disposal of saltwater and/or RCRA exempt oil and gas waste into the same correlative interval of the middle and lower Travis Peak Formation in Harrison County as requested by LATX in the subject application.²³

Sheridan operates at least one disposal well that is injecting into the Travis Peak Formation. Sheridan's Woodlawn East SWD No.1 Well, (API No. 203-35110) is located 8.9 miles from the proposed injection well and is authorized to inject 10,000 bbls/d of saltwater into the Travis Peak Formation at a depth of 6,450 ft. to 6,750 ft., an interval comparable to the proposed LATX interval of 6,460 ft. to 7,940 ft. The Sheridan Woodlawn East SWD Well No. 1 operates at a maximum surface injection pressure of 2,000 psig. Permeability is between 10-100 md., porosity is about 12%.²⁴

BP America Production Company (BP) has three disposal well permits in Harrison County that LATX contends are in the same Travis Peak formation interval that LATX is proposing to inject. The wells include as follows:

²¹ Tr. Vol 1, pg. 69, Ins. 2-16.

²² Tr. Vol 1, pg. 242, Ins. 1-25; pg. 243, Ins. 1-21.

²³ Tr. Vol 2, pgs. 39-50. LATX Exhibits 41-46.

²⁴ LATX Exhibit No. 45, the H-1A Form for Devon's Woodlawn East SWD No.1 injection Well.

- McGee Gas Unit B Well (API No. 203-32609) is located approximately 16 miles NW of the proposed injection well, and is authorized to inject 3,300 bbls/d of produced water and RCRA Exempt waste into the Travis Peak Formation from 7,500 ft. to 7,800 ft. at a surface pressure of 2,150 psig. Permeability is 10-100 md, and porosity is 18-20%.
- Britton Gas Unit SWD Well No.6. (API No. 203-32517) is located approximately 13 miles NW of the proposed injection well. The well is authorized to inject 4,000 bbls/d of salt water and RCRA Exempt waste into the Travis Peak Formation at a depth of 7,730 ft. to 8,250 ft. at a maximum surface injection pressure of 2,700 psig. Permeability is <1 md, and porosity is 10%.
- McGee Gas Unit Well No. 8. SWD (API No. 203-32974) is located approximately 12 miles SW of the proposed injection well. The well is authorized to inject 5,000 bbls/d of saltwater into the Travis Peak Formation at a depth of 8,000 ft. to 8,300 ft. and a maximum surface injection pressure of 2,310 psig. No permeability or porosity information was provided.

Penn Virginia Oil & Gas, L.P. has one disposal well in Harrison County. The Gibson SWD Well No. 1D (API No. 203-35106). The well is located approximately 13 miles SW of the proposed injection well. The well is authorized to inject 7,750 bbls/d of produced water into the Travis Peak Formation at a depth of 6,700 ft. to 8,000 ft. at a maximum surface injection pressure of 3,350 psig. Permeability is 10-20 md, and average porosity is 12-15%. The disposal interval of the Gibson SWD Well No. 10 is essentially the same interval as the proposed subject well at 6,460 ft. to 7,940 ft.

Seismic Events

A review of the records of the U. S. Geologic Survey identified no seismic events with a magnitude greater than 1.0 within a 9.08 kilometer radius (100 square miles) of the proposed disposal well between January 1, 1973, and November 20, 2014.²⁵

Public Interest

The proposed disposal well will provide additional capacity for LATX's existing Harrison No. 1 Well. The Harrison No. 1 Well is permitted to inject 12,000 bbls/d. The Harrison No. 1 is pressure constrained due to the well approaching the maximum surface pressure. Due to the surface pressure limit LATX can only dispose of 5,000 to 6,000 bbls/d, which is approximately 50% of the permitted capacity. This results in LATX having

²⁵ LATX Exhibit No.7.

to divert its trucks to other facilities located between 9 miles to 20 miles away from the Harrison SWD Facility.²⁶ From January 2015 through September 2015 LATX has had to divert approximately 2,000,000 barrels of water to third-party disposal facilities.²⁷ The proposed injection well will negate the need for LATX to divert its water hauling trucks to third party disposal wells. Mr. Smith testified that "my plan is to use the T.P. Smith Well for overflow of capacity that can't be accommodated by the Harrison County SWD No. 1 Well."²⁸

Financial Assurance

At the time of the hearing LATX had a approved Form P-5 (Organization Report), and \$25,000 letter of credit for financial assurance.

PROTESTANTS EVIDENCE

The application is protested by Sheridan Production Company, an offset operator. Sheridan also operates a disposal well injecting into the Travis Peak Formation in Harrison County. The application is also protested by three mineral owners, "the Jones". Sheridan is concerned that (1) the injected fluids will not remain in the proposed injection interval, (2) the proposed well threatens surface and groundwater, and (3) the well will result in waste of hydrocarbons in the Travis Peak Formation. Additionally, the Protestants claim LATX does not have a good-faith claim to operate, and there is not a public need for the proposed injection well.

Mineral Owners Evidence

Mr. Choate, attorney for the Jones, stated in his opening remarks that "It's our contention that the Travis Peak is a productive formation, and this formation in this area has the potential to produce, and is still capable of producing oil and gas; therefore, injecting wastewater into this formation at the location Applicant has proposed would not only result in damage to the Jones' minerals, but would effectively condemn those minerals. This would result in both waste and would injure the Jones' correlative rights. Further, Applicant does not have a good faith claim to title to inject into the Travis Peak."²⁹

Mr. Choate asked the Examiners to take official notice of Oil and Gas Docket No. 06-0264337, the application of Don H. Wilson, Incorporated for commercial injection authority for its DOE-Co No. 2A, Groom City, (Upper Woodbine) Field, Anderson County Texas.

²⁶ Tr. Vol 1, pg. 73, Ins. 5-25; pg. 74, Ins. 1-2.

²⁷ Tr. Vol 1, pg. 73, Ins. 1-4.

²⁸ Tr. Vol 1, pg.127, Ins.14-16.

²⁹ Tr. Vol. 1, pg. 130, Ins. 1-15.

Mr. Choate stated:

"...and if I could point the Examiner's attention to page 4, in which it states the Protestant's evidence, that because the minerals had been reserved and in this case, it was by the parties called the Chaplines, and Wilson, who in our situation would be LATX, does not own the minerals under the tract; therefore, it was the opinion of the Examiners that because of this, the Applicant did not possess good faith claim to the legal right to operate the proposed commercial disposal well by injection into a productive formation. I would have the Examiners take official notice of the Final Order in that proceeding as well. So based on the precedent already set here at the Railroad Commission, it is the contention of my clients that LATX does not possess good faith claim to title. And on top of that, that's all I have." ³⁰

Sheridan's (Devon's) Evidence

Mr. Hayenga, attorney for Sheridan, stated that he expected Sheridan's evidence to show the injection into the Travis Peak Formation will cause waste of hydrocarbon resources, threaten groundwater, and that there is no public need for the disposal.³¹

Mr. Hayenga introduced Devon Exhibit No.1, and asked Mr. Brenton Joseph McCullough, Devon's geologist, to explain the exhibit. Mr. McCullough stated that it was a map surrounding the proposed T.P. Smith Well No. 1, with a dotted circle indicating a one half-mile radius and a dashed circle indicating a 1.0 mile radius circle. The map shows there are four Devon Wells within one mile of the proposed injection well. One of the four wells, the Zach Abney No.1 Well is located approximately ½-mile from the proposed injection well.³²

Mr. McCullough testified that the gamma ray log enables a geologist to distinguish between shale and non-shale lithologies because shale lithologies have a high gamma ray count and are more radioactive. Non-shale lithologies (sands) have lower gamma ray counts.³³ Mr. McCullough also testified that the gamma ray can be used as a proxy for grain size, and of the sediments comprising the reservoir, where the grains comprising the reservoir are rock.³⁴ Mr. McCullough testified that grain size will correspond to properties of the reservoir rocks, such as porosity and permeability, and that, in most cases, rocks

³⁰ Tr. Vol. 1, pg. 131, Ins. 12- 25; pg. 132, Ins. 1-6.

³¹ Tr. Vol 1, pg 133, Ins 1-4.

³² Devon Exhibit No. 1.

³³ Tr. Vol 1, pg. 142, Ins. 9-20.

³⁴ Tr. Vol 1, pg. 143, Ins. 18-24.

with a larger grain size will correspond to higher porosity than those with a fine grain size.³⁵

Devon Exhibit Nos. 3a and 3b are seven-well structural cross sections corresponding to a 2.0 mile radius around the proposed injection well showing the depth of seven wells, including the proposed injection well. The cross section shows the gamma ray logs for the wells, the formation tops for the Pettit Formation, the top and bottom of the Travis Peak Formation, and the top of the Cotton Valley Formation.³⁶ The proposed injection zone is also shown on the cross section. Mr. McCullough stated that the main takeaway he wanted to show with this cross section is that the reservoir has more heterogeneity and the pathways for fluid flow and are more unpredictable given this type of correlation.³⁷

Mr. McCullough stated that in his opinion as a geologist the injected fluid will escape into the Cotton Valley Formation.³⁸ He also said that he had not conducted a study on the Cotton Valley Formation.³⁹ Mr. McCullough said that he thinks the remaining Travis Peak Formation reserves could be essentially washed or bypassed as a result of injection into this well.⁴⁰ Mr. McCullough also testified that in his opinion there are currently hydrocarbons in the Travis Peak that can be produced.⁴¹

Devon Exhibit No. 4. contains two figures. Figure A, *Terrigenous Clastic Depositional Systems*, by Springer-Verlag, New York (1983) and figure B, *Fluvial Facies Models and Their Application* by Douglas J. Cant that Mr. McCullough states are published models for depositional environments associated with the type of sands in the Travis Peak Formation. Devon Exhibit No. 5 is a photograph of a braided fluvial system. Devon Exhibit No. 6 consists of two pictures which corresponds to a meandering type system or a high sinuosity system that Devon believes corresponds to the sands in the upper Travis Peak. Devon Exhibit No. 7 is another picture of a meandering stream. Mr. McCullough stated that

³⁵ Tr. Vol 1, pg. 144, Ins. 7-12.

³⁶ Tr. Vol 1, pg. 145, Ins. 1-14.

³⁷ Tr. Vol 1, pg. 146, Ins. 12-15.

³⁸ Tr. Vol 1, pg. 148, Ins. 20-23.

³⁹ Tr. Vol.1, pgs. 148-149.

⁴⁰ Tr. Vol 1, pg. 157, Ins. 16-25.

⁴¹ Tr. Vol 1, pg. 162, Ins. 6-8.

these pictures indicate that there is connectivity that would allow injected fluid to get out of the injected interval above the Travis Peak Formation.⁴²

Devon Exhibit No. 8 is a map with a 1/2-mile radius and a one-mile radius drawn around the proposed injection well. Devon contends there are 16 wells within the one mile radius that have reported production from the Travis Peak Formation.⁴³

The Examiners asked Mr. McCullough if the production reported from the 16 wells shown on Devon Exhibit No. 8 is current or historical production? Mr. Hayenga answered that "Mr. McCullough didn't distinguish between historic and current production, and he has no way of distinguishing between current and historical production."⁴⁴

Devon Exhibit No. 10, is a one mile radius map surrounding the proposed injection well. Mr. McCullough testified that the map was compiled to show production data from the Travis Peak Formation. Mr. McCullough testified that the map data was put in form of a GOR and plotted as a bubble map. The map purportedly shows high and low GORs.⁴⁵ There are five Travis Peak wells with a low GOR that Mr. McCullough asserted were productive of oil within one mile, and two wells with a high GOR that Devon contends are Travis Peak wells productive of gas. Mr. McCullough stated that he believes there's oil and gas being produced from the Travis Peak Formation.⁴⁶ Devon Exhibit No. 11 is a one mile radius map surrounding the proposed injection well which purports to show 12 wells that are Travis Peak Formation wells and their water cuts.⁴⁷

The Examiners asked Mr. McCullough if on Devon Exhibits 10 and 11 he was mixing current production with historic production. Mr. McCullough testified that "Yes it's undistinguished."⁴⁸ The Examiners note that the wells Mr. McCullough used for his GOR calculations are plugged and abandoned wells. Additionally, Mr. McCullough does not differentiate between the upper Travis Peak Formation and the middle and lower sections of the Travis Peak Formation.

⁴² Tr. Vol 1, pgs. 153-154; pg. 155, Ins. 1-15.

⁴³ Tr. Vol 1, pg. 157, Ins. 8-15. Devon Exhibit No.8.

⁴⁴ Tr. Vol. 1, pg. 159, Ins14-25; pg. 160, Ins. 1-13.

⁴⁵ Tr. Vol1, pg. 162, Ins. 21-25; pg. 163, Ins. 1-6. Devon Exhibit No. 10.

⁴⁶ Tr. Vol 1, pg.163, Ins. 1-15.

⁴⁷ Devon Exhibit No. 11.

⁴⁸ Tr. Vol 1, pg. 165, Ins. 14-20.

Devon exhibit Nos. 12 and 13 are topographic maps showing surface water bodies within one half and one-mile of the proposed injection well. Mr. McCullough testified that the proposed injection well is located above Butler Creek and Paw Paw Bayou. He stated that if there were any tank leaks or surface spills the fluid could run downhill into one of the surface water features.⁴⁹

Mr. Bauer, reservoir engineer for Devon, described Devon Exhibit 14, a reservoir data sheet. Mr. Bauer testified that he looked at the oil, gas and water production from the Travis Peak Formation within a one mile radius of the proposed injection well. Mr. Bauer further testified that out of the Travis Peak Formation about 807,000 stock tank barrels (stb) of oil were produced and 80,000 stbs of water. The wells averaged about a 706 GOR. The Examiners note that the 16 wells Mr. McCullough used for his GOR and production calculations are plugged and abandoned wells that have historically produced from the upper Travis Peak Formation.

Mr. Bauer was asked what effect will the proposed injection have on the reservoir pressure. Mr. Bauer replied that as you inject more material into the reservoir the pressure in the reservoir will increase. Mr. Bauer testified, "when you begin increasing above the natural pressure of the reservoir, you begin over-pressuring it".⁵⁰

On the reservoir data sheet (Devon Exhibit 14) Mr. Bauer calculated the porosity and permeability from the Vaughn No. 1 Well (API No. 203-30933), a plugged and abandoned gas well located approximately 0.6 miles west of the proposed injection well.⁵¹ He calculated the porosity to be 11.5% and a permeability of 700 microdarcies (μ d).⁵²

Mr. Bauer stated that a bottom hole pressure of 3,215 psi as shown on LATX Exhibit No. 2 (the amended H-1 form for the proposed injection well) is near at or near virgin pressure, and it is not depleted, it is partially depleted.⁵³

Mr. Bauer described the EPA RCRA-exempt waste list. He stated that there's produced water, re-washed packer fluids, backwash, drilling fluids, workover waste, produced sands, drill cuttings, cooling tower blowdown, hydrocarbon bearing soil on the list. He stated that the injection of RCRA-exempt waste solids will adversely affect the porosity by plugging pore throats in the most permeable section. He opined that once the pores fill up the porosity and permeability will decrease to the point that the only way to

⁴⁹ Tr. Vol. 1, pgs.166-167.

⁵⁰ Tr. Vol. 1, pg. 174, Ins. 1-10.

⁵¹ Devon Exhibit No. 2.

⁵² Tr. Vol. 1, pg. 176, Ins. 13-23.

⁵³ Tr. Vol. 1, pg. 176, Ins. 13-21.

get fluid into the formation is to fracture the formation, and for that, he believes LATX would need to exceed the fracture gradient of the formation.⁵⁴

Devon Exhibit Nos. 17, 18 and 19 are illustrations showing RCRA-exempt waste escaping into other formations due to fracturing of the upper and lower confining shale units. Mr. Bauer stated that there will be "willy-nilly pathways" through the Travis Peak Formation as the fluid moves into other formations, possibly upwards into the Pettit Formation due to its much lower pressure than the Travis Peak. He also opined that if there were any kind of a connection between those rocks and if there is flow through the rocks then the injected fluid could be flowing (up) into the Pettit Formation or it could flow down into the Cotton Valley Formation.⁵⁵

Devon Exhibits No. 20 and 21 are illustrations showing solid RCRA-exempt waste fracturing the top of the Travis Peak formation and RCRA-exempt solid waste traveling through the Travis Peak Formation, fracturing the cement around the casing and the steel casing in an offset producing well, then traveling down the casing of the offset well, out the perforations into the Cotton Valley Formation.⁵⁶

Mr. Bauer testified that Devon Exhibit No. 22a is an illustration showing the RCRA-exempt waste fracturing the overlying shale and forming a direct hydraulic connection. It also shows the RCRA-exempt waste getting into freshwater aquifers. Additionally it shows the RCRA-exempt waste blowing out around the wellhead in an uncontrolled subsurface blowout or causing sinkholes. Mr. Bauer stated that it will be a random situation where the fluid goes due to the spaghetti-like nature of the of the pathways, and if the RCRA-exempt waste were to contact one of the offset wells, then he believes this kind of problem could occur.⁵⁷

Devon Exhibit No. 22b, is another illustration of the proposed injection well and the Downer No. 1 with surface casing set at 424 ft. and open perforations in the Travis Peak Formation and the Cotton Valley Formation. The illustration shows RCRA-exempt waste fracturing the top of the Travis Peak Formation and waste traveling through the Travis Peak Formation at 6,070 ft. up through 5,645 ft. of shales, limestones and sandstone to the BUQW at 425 ft. It also shows the RCRA-exempt waste fracturing the cement around the off set well casing and then through both sides of the casing in the Downer No. 1 Well, then traveling down the casing, out the perforations into the Cotton Valley Formation, and up

⁵⁴ Tr. Vol. I, pg. 178, Ins. 19-25; pg.179, Ins. 1-23.

⁵⁵ Tr. Vol. 1, pg. 189, Ins. 1-25. Devon Exhibit No.19.

⁵⁶ Tr. Vol. 1, pg. 192, Ins. 14-25; pg. 193, Ins. 1-4. Devon Exhibit No 21.

⁵⁷ Tr. Vol. 1. pg. 193, Ins. 18-25; pg. 194, Ins. 1-25.

through the Travis Peak Formation. It also shows the waste breaking the surface casing seat and flowing into the freshwater aquifer.⁵⁸

Devon Exhibit No. 22c, is another illustration of the proposed injection well and the Downer SWD No. 3, a plugged and abandoned disposal well completed in the Travis Peak Formation.⁵⁹ The illustration shows surface casing set at 1,014 ft. The illustration shows RCRA-exempt waste fracturing the top of the Travis Peak Formation and waste traveling through the Travis Peak Formation at 6,070 ft. up through more than 5,000 ft. of shales, limestones and sandstone to the BUQW at 425 ft. It also shows the RCRA-exempt waste fracturing the cement around the off set well casing and then through both sides of the casing in the well, then traveling down the casing, out the perforations into the Cotton Valley Formation, and up through the Travis Peak Formation. It shows the RCRA waste breaking the surface casing seat and flowing into the freshwater aquifer.

Mr. Bauer testified;

"...injecting these RCRA-exempt waste, the solids will plug up the pore throats, reducing permeability. "Then injecting at a pressure of 3,230 psi at the surface you have the capability of not only fracturing out of the injection zone, and if this carries over to another wellbore you could break down your casing seat and you'd have uncontrolled surface blowout, sink holes and possible pollution of freshwater zones, and that's very concerning for me."⁶⁰

Mr. Bauer stated that his main point from these exhibits is that the Travis Peak is a very sensitive formation.

"Its very sensitive clays and when you have differences in PH and salinity you are going to free up formation fines that are going to reduce your permeability. The other thing is when you start injecting these RCRA wastes, many of these are solids, then these solids will be plugging up the pore throats, reducing permeability. Then when you inject at a pressure of 3,230 psi at the surface you have the capability of not only fracturing out of zone, but if this carries over to another wellbore you could break down your casing seat and you'd have uncontrolled surface blowout, sink holes and possible pollution of freshwater zones, and that's very concerning for me."⁶¹

⁵⁸ Devon Exhibit No. 22b.

⁵⁹ Devon Exhibit No. 2, LATX Exhibit No. 37.

⁶⁰ Tr. Vol 1, pg. 198. Ins. 19-28, pg. 199. Ins 1-17.

⁶¹ Tr. Vol 1, pg. 198. Ins. 19-28, pg. 199. Ins 1-17.

Mr. Hayenga asked Mr. Bauer if, based on his analysis, would every well that penetrates the injection interval possibly be a potential conduit of fluids to the surface? Mr. Bauer answered "That is correct".⁶²

Devon Exhibit No. 23 is a chart showing a voidage calculation.

Mr. Bauer testified;

"So for that 1-mile radius that we had talked about earlier in the 16 wells that we looked at in that 1-mile radius, we had seen a voidage of 806,800 stock tank barrels of oil. And this is equivalent to a voidage in the reservoir of 1.6 million reservoir barrels. By the same fashion, I'd run volumetrics on the Vaughn No. 1 using that formation factor. We see that the production of roughly 6 Bcf of gas results in a roughly 6 million reservoir barrels of voidage in the reservoir. For the salt water, I didn't know what the solution gas was in the saltwater in this field, but I went ahead and used a rough formation volume factor of one for this, which would be relatively close. And so we ended up with about 80,000 reservoir barrels of salt water removed."⁶³

Mr. Bauer stated that "when you add all these up, it ends up being about 7.7 million reservoir barrels of voidage that has occurred within that one mile radius."⁶⁴

Mr. Bauer testified that;

"If you were to fill up every bit of voidage in that one mile radius at 5,000bbls/d it would take about 4.2 years. That's the maximum time its going to take. If you are running down permeability streaks or you are fracking, randomly through the reservoir rock, you could be extending beyond this one mile radius in a much shorter time."⁶⁵

Mr Bauer stated that he believes the reservoir is only partially depleted and that there may be a significant amount of oil and gas and hydrocarbons. He believes that in the past

⁶² Tr. Vol. 1, pg. 199, Ins. 18-21.

⁶³ Tr. Vol. 1, pg. 200, Ins. 14 -25; pg. 201, Ins. 1-5.

⁶⁴ Tr. Vol.1, pg. 200, Ins. 9-25; pg. 201, Ins. 1-8.

⁶⁵ Tr. Vol 1, pg. 201, Ins. 11-20.

Devon Exhibit No. 24 is a chart showing Travis Peak fracture gradients from five of Devon's recently fracture treated wells in Panola County approximately 30 miles from the proposed injection well. The fracture gradient for the five wells averaged .65 psi/ft. Mr. Bauer stated that he used information given to him by Devon's operations personnel during breakdown treatments to calculate the fracture gradient. Mr. Bauer testified that once you exceed the .65 psi/ft. gradient there is a good chance that you would begin fracturing the rock because that's what he saw in the Carthage area.⁶⁷

Mr. Bauer stated;

"when you are fracturing you are not transmitting your pressure through porous media, you actually have rock broken so it is just like a pipe. If you have a pipe going from your injection pump it (fluids) go down, runs across and it U-tubes back up the well, that's pressure transmitted. If you think of it being full of water, when you pump it here, (at the injection well) you will see it right over there (at another well) immediately."⁶⁸

Devon Exhibit No. 25. Mr. Bauer said that he had been talking about a direct hydraulic connection.

"You have a bath here filled with an incompressible fluid like water. On your left you have a 1 inch pipe with a plunger in it. When you put 10 psi on it, that makes it 10 psi inside this incompressible fluid. It transmits pressure instantaneously, and it transmits almost immediately to the 100 inch plunger (on right side of cartoon) and that provides of course, an upward force of 1,000 psi."⁶⁹

Mr. Bauer went on to say;

"...when you have pressure in your fracture system you are really thinking of it as a hydraulic bath. Pressure transmits almost immediately to the tip of your fracture. So if you come to a casing seat And if it exceeds its frac gradient, that, you know, we showed how we calculate it for the Travis Peak; well, it's different for different formations. But if it exceeds that, then it'll break it."⁷⁰

⁶⁷ Tr. Vol 1, pg. 207, Ins. 16-25; pg 208, Ins. 1-2.

⁶⁸ Tr. Vol 1, pg. 213, Ins. 16-24.

⁶⁹ Tr. Vol 1, pg. 216, Ins. 10-23.

⁷⁰ Tr. Vol. 1, pg. 217, Ins. 7-10.

Devon Exhibit No. 26a is Mr. Bauer's calculations that purportedly show the proposed injection well frac gradient to be .89 psi/ft.

Mr. Bauer testified that;

"Referring back to Exhibit No. 24, I feel like the average fracture gradient in the Travis Peak is 0.65 psi per foot. So this will be in excess of that. And so under these conditions, I feel that you would be fracturing the formation, even if you had no plugging of your permeability." ⁷¹

Devon Exhibit No. 26b is another example of what Devon believes is the relationship between the annular pressure threshold (APT) and how it affects the casing seat. Mr. Bauer stated that in this example the surface casing is set at 425 ft. The calculations show a 7.65 psi per foot gradient, which is 11.7 times the APT for the surface casing that is seen on the chart. The "chart" on Devon Exhibit No. 26b is based on 13 3/8 inch surface casing and the proposed injection well utilizes 8 5/8 inch casing and does not take into consideration friction effects. ⁷²

Devon Exhibit No. 27 is a plot of the water cut from Travis Peak wells within one mile of the proposed injection well.

Mr. Bauer testified that;

"...as we begin trying to produce these reservoirs, if we have a breakthrough of water, either through a high permeability streak or through a fracture, that gets into the Travis Peak perforations in these wells, and we're injecting RCRA waste. All of a sudden, we're producing RCRA waste, and that can cause a problem to the operator as far as the expense of how do you dispose of this. We're looking at RCRA waste, and all of a sudden, this is coming to surface; and, as an operator, you've got to deal with it."

Devon Exhibit No. 28 is a map of the GORs of the Travis Peak. This is both current and historical information. Mr. Bauer stated that he believes that as LATX injects RCRA solids into the reservoir, they will be bypassing some of this fluid and the full reserves and wells in the Travis Peak (Formation) could not be produced. It is also his position that it would harm future Travis Peak production that has not been discovered yet, and produced yet. ⁷³

⁷¹Tr. Vol. 1, pg. 220, Ins. 16 - 25.

⁷² Tr. Vol. 1, pg. 223, Ins. 1-25; pg. 224, Ins. 1-9. Devon Exhibit No. 26b.

⁷³ Tr. Vol. 1, pg. 229, Ins. 12-25; pg. 230, Ins. 1-13.

Mr. Bauer stated that based on his engineering analysis and shown on Devon Exhibit 28, it's his opinion that there's still existing reserves in the Travis Peak.

He stated that;

" Now, whether (reserves) have been discovered in the Travis Peak, whether they are economic and present, that could all be different questions. Undoubtedly there's still hydrocarbons in the Travis Peak. And, in the future, you know, we may want to be producing those."⁷⁴

Devon Exhibit No. 30 is a map of disposal wells within a ten mile radius of the proposed injection well. The exhibit compares the injection volumes versus the capacity that's allowed under their permits. The map shows that according to the Protestants, the wells in the 10-mile radius reported that for the last 12 months there is about 26 percent utilization. Mr. Bauer stated that in his opinion there would be disposal capacity in this area.⁷⁵

The Examiners asked Mr. Bauer about the injection zones the eight disposal wells shown on Devon Exhibit No 30 were utilizing. Mr. Bauer responded that they were all different zones. The Examiners then asked Mr. Bauer about his testimony on Devon's (Sheridan) Woodlawn East SWD No.1 Well. The Examiners asked what zone does Devon dispose into? He answered that they (Devon) have different zones also, some of which is Travis Peak.⁷⁶ Devon's Woodlawn Travis Peak disposal well is about 9 miles away, injecting produced salt water at a volume 4,500 barrels a day into about a 242-foot zone in the Travis Peak Formation.⁷⁷ The well is permitted to inject 10,000 bbls/d at a pressure of 2,000 psig.⁷⁸ Mr. Bauer was asked if Devon injects RCRA waste their well? He answered that did not inject RCRA waste. Mr. Bauer also said that Devon has control over this well and if it affected offset production, they would shut in the well.⁷⁹

The Examiners asked Mr. Bauer if Devon (Sheridan) had a disposal well in the area injecting into the Travis Peak Formation, and if they had seen any breakouts or any problems with that well affecting any other wells in the area. Mr. Bauer said that they did

⁷⁴ Tr. Vol. 1, pg. 230, Ins.14-25; pg. 231, Ins. 1-22.

⁷⁵ Tr. Vol. 1, pg. 232, Ins15 -25; pg. 233, Ins. 1-11.

⁷⁶ Tr. Vol. 1, pg. 233, Ins. 22-25; pg. 234, Ins. 1-8.

⁷⁷ Tr. Vol. 1, pg. 234, Ins. 11-22.

⁷⁸ LATX Exhibit No. 45.

⁷⁹ Tr. Vol. 1, pg. 234, Ins. 23-25; pg. 235, Ins. 1-10.

have one, (The Woodlawn East SWD No.1 Well) and that they were pretty well surrounded by their own leasehold and had not seen any problems.⁸⁰

APPLICANTS REBUTTAL

Mr. Neale first rebuttal witness was Mr. Donovan. Mr. Neale asked Mr. Donovan about the special and standard conditions set out in LATX Exhibit No. 23, the Commission staff memo. Mr. Donovan was asked if he saw any of the special conditions or standard conditions relating to anything reflecting a concern on the Staff's part with respect to the fracturing of the reservoir at the requested maximum surface injection pressure. He answered that he did not.⁸¹ He was then asked how the maximum surface pressure was calculated for this well. Mr. Donovan replied that the maximum pressure is based on .5 psi per foot multiplied by the top of the proposed injection interval. Mr. Donovan also stated that he had never been involved in an application that was reviewed by the UIC department that required a different formula for the calculation of the maximum surface injection pressure.⁸²

Mr. Neale asked Mr. Donovan if he agreed with Devon's engineer that there is going to be fracturing of the reservoir under the permit pressure conditions proposed by the UIC Staff and reflected on the application? Mr. Donovan replied that he didn't believe that's going to be the case because the injection pressure is going to be restricted due to friction buildup in the small 2 7/8 inch tubing. He stated that he did not believe LATX would get close to the fracture gradient of the formation itself, and he did not believe the encapsulating shale would be fractured, which he thinks is the concern of the Commission.⁸³

Mr. Neale asked Mr. Donovan to explain how a step rate test is run and what it will show.

Mr. Donovan stated:

"What they (the Commission) want you to do is inject at a particular rate for a duration of time, typically 30 minutes or 60 minutes, depending on the permeability of the reservoir. And then after that, subsequently pick up the rate in steps, as you say. You might start with a half a barrel per minute, then step up to one barrel per minute, one-and-a-half barrel per minute and so forth until you've reached either your maximum surface operating pressure or

⁸⁰ Tr. Vol. 1, pg. 292, lns. 2-10.

⁸¹ Tr. Vol. 1, pg. 239, lns. 17-22.

⁸² Tr. Vol. 1, pg. 240, lns. 11-15.

⁸³ Tr. Vol. 1, pg. 241, lns. 12 - 21.

your volume limit. And then what you do is take those data points on a simple linear graph with the injection rate versus the surface injection pressure, and what you look at is that break over on that curve. If it stays linear relationship, that indicates that there is no fracturing going on. Once it breaks over, then that indicates there has been a fracture. And what the Commission will then do is go to the previous step and limit that as your surface injection pressure. And the purpose of that is to indelibly indicate or establish what the fracture gradient is for the formation at the perforated interval.”⁸⁴

Mr. Donovan stated that he believes a step rate test would, in the Commission's view, establish that the surface pressure and volume are not causing the (fracture) problems that the Protestants believe are going to occur. Mr. Donovan testified that LATX said they would be agreeable to include a step rate requirement as a special condition to the permit.⁸⁵

Mr. Donovan was asked if he thought Devon's geologist and reservoir engineers' inability to distinguish between current and historical data on Devon Exhibits 10 and 28 actually essentially render the exhibits of no use?

He answered:

“ Well, they talk about current and historical production and so forth. He also mentioned recoverable reserves currently connected to these wells. Also, he believes there are reserves remaining in the Travis Peak in these wells as well. But every one of these wells that's he's highlighted has been plugged. So all of this conversation in regard to current production in the Travis Peak is completely incorrect. Reserves connected to those wells is completely incorrect as well.”⁸⁶

Mr. Donovan was asked if the upper part of the Travis Peak Formation is the only part of the Travis Peak in this area that's productive. He answered that is correct.

Mr. Neale asked if the middle and lower part of the Travis Peak Formation had been tested for recoverable reserves? Mr. Donovan answered;

“Yes. Devon tested the Zach-Abney Unit No. 1 Well. Devon did not report any production or test for it. They put a bridge plug over it and dumped 20 foot of cement on it and then went up to the 6,458 ft. to 6,476 ft. which is what

⁸⁴ Tr. Vol. 1, pgs. 242, Ins. 6-25; pg. 243, Ins. 1-2.

⁸⁵ Tr. Vol. 1, pg. 243, Ins. 4-18.

⁸⁶ Tr. Vol. 1, pg. 245, Ins 22-25; pg 246, Ins. 1- 2.

they produced the 1,105 Mcf in 2005. And then, of course, squeezed it and went back down to the Cotton Valley. I would believe that Devon would have tested the best zones in the Travis Peak that they would have had in the wellbore when they went through this exercise. They tested to 7,704 to 7,801 ft., which is within the (injection) interval, and did not gain any production. Devon plugged it off immediately. Then they tested the 6,458 ft. interval, made just a tiny bit of production and then abandoned it, squeezed it off, went back to the Cotton Valley Formation, which they produced through 2007. The wellbore has been sitting there listed as temporarily abandoned since 2007. So they've essentially proven with their own wellbore that the (injection) interval is not productive.⁸⁷

Mr. Donovan was asked "...if someone says that there are reserves in this interval of the Travis Peak or that we might be harming reserves in this interval of the Travis Peak, or we might be affecting somebody's minerals in this interval of the Travis Peak; is any of that correct"? He replied that to meet the test of reserves, it has to be economic to even classify it as reserves. He also said that the Protestants did not enter into evidence any sort of reserve report or analysis on a particular wellbore where they showed some behind the pipe reserves.⁸⁸

Mr. Neale asked Mr. Donovan to explain why he believes Devon Exhibit No. 27, which is the same map as Devon Exhibit No. 11, a map supposedly showing the water cut, is not accurate. Mr. Donovan testified that the Protestant's witnesses stated that they couldn't distinguish between current and historical data. Mr. Donovan also stated that the Protestants did not tell LATX where the water cut data on Devon Exhibit Nos. 11 and 27 came from. He said that "Mr. Bauer also commented on Devon Exhibit 27 that they would be waste at these wells, all these wells have been plugged and abandoned, so there's no way they could be producing waste at these wells."⁸⁹

Mr. Donovan was asked to comment of the applicability of the "perfect" hydraulic connection shown on Devon Exhibit 25.

Mr. Donovan testified;

"It is correct as far as how the hydraulic connection works. I relate this to a garage jack when you jack up you take your car in and they pump it up with a small cylinder, and it lifts, of course, your vehicle, which is a much greater weight than what you're actually pumping on, as he's shown here. The

⁸⁷ Tr. Vol. 1, pg. 248, Ins. 18-25; pg. 249, Ins. 1-19.

⁸⁸ Tr. Vol. 1, pg. 249, Ins. 24-25; pg. 250, Ins 1-10.

⁸⁹ Tr. Vol. 1, pg. 253, Ins. 6 -10.

problem with this model is it's a it's a perfect hydraulic connection. And what we're talking about is a wellbore and another wellbore that may be a half mile, I think that they were talking about wells that were a half mile apart. And what you have in between is, of course, rock. And we've often used the Matthews and Russell equation for pressure front calculations. Of course, what the Matthews and Russell equation tells us is that over distance, the pressure is dispersed, and that's what the Matthews and Russell equation essentially demonstrates, is that over distance through a non-perfect hydraulic medium, the pressure decreases with distance. He used the garage jack model, which can't be used for this geological situation."⁹⁰

Mr. Donovan then addressed Devon Exhibit No. 26B. He said "...this is based on Mr. Bauer's garage jack model; it won't work." He was asked if he believed that's a realistic representation of the reservoir conditions in and around the proposed well? He answered that it wasn't a realistic representation of the reservoir conditions.⁹¹

Mr. Donovan commented on Devon's Exhibit No.24.

"This is showing Travis Peak fracture gradients from the Protestants recently treated wells. The Protestant is talking about fracturing the rock within the interval itself, which typically we do when we're going to go in there and produce a formation that's on the tight side."⁹²

Mr. Neale asked if running of a step rate test would address that (fracturing) issue? Mr. Donovan replied that it would.⁹³

Mr. Donovan addressed Devon Exhibits 17,18 and 19. The exhibits are drawings of what Devon claims to be off set hydrocarbon producing wells affected by the proposed injection well.

Mr. Donovan testified;

Exhibit is 19's essentially the same thing as Devon Exhibit No. 20,. Mr. Bauer talked about "willy-nilly pathways". I just don't agree with that at all on 19. Devon Exhibit 18 is about the similar as before. He talks about the offset producing well. The exhibits shows (wells completed in the) Travis Peak .

⁹⁰ Tr. Vol. 1, pg. 254, ln. 7-25; pg. 255, lns. 1-12.

⁹¹ Tr. Vol. 1, pg 255, lns. 21-25; pg. 256, lns. 1-12.

⁹² Tr. Vol. 1, pg., 256, ln. 25; pg. 257, lns. 1- 22.

⁹³ Tr. Vol. 1, pg. 258, lns. 4-25; pg. 258, lns. 1-9.

And there are no Travis Peak producing wells. So this exhibit is incorrect as well. Exhibit No. 17, it's the same issue, an offset hydrocarbon producing well. There is no offset producing well in the Travis Peak.⁹⁴

Mr. Donovan addressed Devon's claim that the injection of solid RCRA-exempt waste will plug up the injection zone and cause fracturing.

"We have recently been attaching the RCRA-exempt list to our applications because we know that we might receive a tiny bit of non-flowback or non-saltwater fluids that could arise through the disposal of the salt water. And so we wanted to be on the right side and be sure that we have permission to dispose of those. Certainly, we're not going to make an effort to be pumping down pipe scale and sludges and stuff like that. And, in fact, we run filters at the tanks and pumps to be sure we don't pump in a bunch of junk into our wellbore. Obviously, if we pump a bunch of junk into that, just like he said, plugs it off and renders our saltwater disposal well ineffective. We don't want to do that. But we always attach this list to the application, just in case there is something that occurs that we have to report."⁹⁵

After discussing Devon's exhibits Mr. Neale proceeded to introduce LATX's rebuttal exhibits and asked Mr. Donovan to explain each exhibit.

LATX Exhibit No. 31 is a worksheet for estimating surface injection pressure. Mr. Donovan testified that the worksheet predicts a 1,725 psi surface injection pressure through 2-and-7/8ths at 5,000 barrels a day. He stated that he used a friction loss correlation chart that he downloaded from the EPA website (LATX Exhibit No.32) for determining the friction pressure for the 2-7/8 inch tubing and flow rates.⁹⁶

Mr. Donovan was asked how many counties would the Travis Peak Formation cover? He replied that "the Travis Peak Formation goes all the way up to Red River county area, Bowie, Cass County, Marion County over to Smith County. It gets really deep when you get down Shelby, San Augustine Counties. Mr. Neale asked if there would be any difference in plus or minus 10 miles from the proposed location to another location in the Travis Peak Formation? Mr. Donovan answered not with the massive interval. The upper stratigraphic members, are select, small, tight confined intervals, and that's why they deplete."⁹⁷

⁹⁴ Tr. Vol. 1, pg 265, Ins. 21-25; pg. 266, Ins. 1-6.

⁹⁵ Tr. Vol. 1, pg. 266, Ins.13-25; pg. 267, Ins. 1-9.

⁹⁶ Tr. Vol 1, pg. 288, Ins. 10-25; pg. 289, Ins.1-8.

⁹⁷ Tr. Vol. I, pg. 272, Ins.16-25; pg. 274, Ins. 1-13.

On day two of the hearing, September 18, 2016, Mr. Choate, who appeared on the first day of the hearing on behalf of the Jones was unable to attend so Kelli Kenney, attorney, substituted for Michael Choate.

Mr. Donovan turned to Devon Exhibit No. 8, a map showing wells producing from the Travis Peak Formation within one-mile of the proposed injection well. He said that the Devon witnesses were unable to distinguish between active production and historical production. The Examiners note that all the Travis Peak wells that have historically produced in this area have been either plugged or abandoned, and there's the one (operated by Devon) that has the status of the 14(b)2.⁹⁸

Mr. Donovan testified that LATX Rebuttal Exhibit No. 34 is, an estimation of the surface injection pressure where LATX ran a sensitivity analysis, this time changing the permeability value. Mr. Donovan said that Mr. Bauer testified that he believed that the permeability of the Travis Peak Sands was 700 microdarcies.⁹⁹ Mr. Donovan said he plugged in 700 microdarcies or .7 millidarcies and the result is a delta P of 21,146 psi. That would certainly be outside the range of injectabilities. He was asked if he believed that his estimate of that 700 microdarcies is correct for this interval? Mr. Donovan answered "The 700 microdarcies is completely incorrect".¹⁰⁰

Mr. Donovan expressed his opinion that the proposed injection well would not cause fracturing of the shale barriers.¹⁰¹

Mr. Donovan identified LATX Exhibit No. 37, a table of wells that were previously discussed in this hearing that produced historically from the Travis Peak within a 1-mile radius of the T.P. Smith but are now plugged. Mr. Donovan opined that there seemed to be some confusion regarding the Protestant's testimony on whether the Travis Peak wells in the 1-mile radius were actually producing or not. There was testimony by the Protestants that the reserves in those wells would be damaged and that those wells would be producing RCRA waste. The table shows all the wells in the 1-mile radius are plugged or temporarily abandoned.¹⁰²

⁹⁸ Tr. Vol. I, pg. 9, Ins. 1-8.

⁹⁹ Tr. Vol. 1, pg. 177, Ins. 2-5.

¹⁰⁰ Tr. Vol. 2, pg. 21, Ins. 3-17.

¹⁰¹ Tr. Vol. 2, pg. 23, Ins. 6-25; pg. 24, Ins. 1-9.

¹⁰² Tr. Vol. 2, pg. 27, Ins. 17-25; pg. 28, Ins. 1-2.

Mr. Neale asked Mr. Donovan if based on his study, did he believe there is any volume of reserves in this proposed interval of the Travis Peak Formation that we would like to inject that's going to be affected by the proposed operations?"

Mr. Donovan replied; "the interval that we're planning on injecting, it is nonproductive. So as far as the interval itself, that answer is no. There has been historical production from the upper Travis Peak Sands above where we're planning on injecting. That's all been plugged out or abandoned.." ¹⁰³

LATX Exhibit No. 39 is a pressure front calculation for the proposed injection well. Mr. Donovan used the Matthews and Russell, equation for infinite unbounded reservoirs. The equation shows that after injection for 50 years, at a distance of one-half mile from the proposed injection well LATX expects a delta P increase of 212 pounds in the reservoir. The calculations show that it would take a formation pressure of 345 psi at the interval midpoint of 7,146 ft. to stand a column of 9.5 pound fluid to ground surface at one-half mile. ¹⁰⁴

Exhibit No. 40 is, another pressure front calculation. The calculation shows the radius from the proposed injection well where a pressure of 3,530 psi, at the interval midpoint that would stand a 9.5-pound-per-gallon fluid to the surface. After 50 years of injection the impacted area would be 625 feet. That would be the distance from the wellbore in which the reservoir pressure would have been raised enough to have enough energy to raise a column of 9.5 pound per gallon fluid to surface. There are no unplugged or improperly plugged wells within 625 ft. of the proposed injection well. There are no conduits within a one quarter-mile half-mile radius, nor is there any conduits to the surface within a 1-mile radius of the proposed injection well. ¹⁰⁵

LATX Exhibit No. 41 is a Railroad Commission disposal well filing packet for BP America, McGee Gas Unit B, well No. 2. This packet contains Railroad Commission Forms H-1, H-1A, H-10, and, the permit that goes along with it. The reservoir that is utilized for injection is the Travis Peak. This is an application for disposal of salt water and RCRA-exempt oil and gas waste in Harrison County. The H-1A shows the injection interval to be from 7,500 ft. to 7,800ft. which would be correlative to the upper portion of LATX's proposed injection interval. The H-10 reports injection ranging from 15,000 barrels per month up to approximately 47,000 barrels per month. Surface injection pressures range from 1,600 psi to 2,147 psi, which, is in the range of what LATX expects as well. ¹⁰⁶ Mr. Donovan stated that this well is injecting into the same interval as the proposed T.P. Smith

¹⁰³ Tr. Vol 2, pg 29, Ins 10-25; pg. 30, Ins. 1-4.

¹⁰⁴ LATX Exhibit No. 39; Tr. Vol. 2, pg. 34, Ins 9-25; pg. 35, Ins. 1- 22.

¹⁰⁵ Tr. Vol.2, pg. 38, ln. 5; pg. 38, ln.10.

¹⁰⁶ Tr. Vol.2, pg. 39, Ins. 2-25; pg. 40, Ins 1-7.

Well and that although it's a smaller interval that it would be contained in the upper section of our interval."¹⁰⁷

LATX Exhibit No. 42 is a Railroad Commission disposal well filing packet for the BP America Britton Gas Unit SWD No. 6 Well, which is another injection well in the Woodlawn Field in Harrison County, injecting into the Travis Peak Formation. This well is also injecting saltwater and RCRA-exempt waste into the Travis Peak at a depth of 7,730 ft. to 8,250 ft. The H-10 for this well shows that in February of 2015, BP reported 73,000 barrels at a maximum surface injection pressure of 2,338 psi. LATX Exhibit No. 43 is a Railroad Commission disposal well filing packet for the BP America Britton Gas Unit SWD No. 8 Well, which is another injection well in the Woodlawn Field in Harrison County, injecting into the Travis Peak Formation. This well is also injecting saltwater into the Travis Peak at volume of 5,000 BPD at a depth of 8,000 ft. to 8,300 ft. with a maximum pressure of 2,141 psi.¹⁰⁸ LATX Exhibit No. 44 is a Railroad Commission disposal well filing packet. This exhibit is for the Penn Virginia Gibson SWD Well No. 1D, which is another injection well in Harrison County injecting into the Travis Peak Formation/ Cotton Valley Formations at a depth of 6,700 ft. to 8,000 ft. The Form H-1A included in the packet for the well shows a maximum permitted injection volume of 7,750 BPD with a maximum surface injection pressure of 3,350 psi.¹⁰⁹

LATX Exhibit No. 45 is also a Railroad Commission disposal well filing packet. This exhibit is for the Protestant's Devon Energy Woodlawn East SWD No. 1 Well, also in Harrison County.

Mr. Donovan testified

" the Form H-1A, shows the proposed injection interval to 6450 to 6750. You'll note that they've actually requested 10,000 barrels per day, which is twice the amount that we're requesting. You can see on the next page, Form H-10, you can see that they're injecting quite a bit of fluid. The low being 72,379 barrels in the month of October 2014; and the high being 130,347 barrels in the month of December 2013. The accompanying maximum injection pressures, it looks like, ranges from a low of 1,828 psi to a high of 2,007 psi, and then following that is the injection permit." The injection

¹⁰⁷ Tr. Vol. 2, pg. 42, Ins 6-8.

¹⁰⁸ LATX Exhibit No. 43.

¹⁰⁹ LATX Exhibit No. 44.

Permit for Devon Energy's Woodlawn East SWD No. 1 Well, Project No. F-18901, sets the maximum injection pressure as 2000 psi.¹¹⁰

Mr Donovan was asked if the wells listed in LATX Exhibits 42-45 would all encounter the same depositional environment that was depicted by Mr. McCullough in his testimony yesterday?" Mr Donovan answered "Yes, sir." Mr. Donovan went on to say I would simply say that the testimony offered by Mr. McCullough and Mr. Bauer does not have the technical merit necessary to determine the merits of the application in this case.¹¹¹ He also stated that he believed the proposed injection well complies with Rule 46.¹¹²

LATX Exhibit No. 46 is a Commission permit modification letter that was issued to approximately 74 disposal operators in Harrison, Panola and, Shelby County including LATX's Harrison County SWD Well No.1, which is the well that's just adjacent to the proposed injection well.

The first paragraph reads:

Commission Staff is attempting to assess and limit the extent to which intervals overlying the primary productive horizons in the area of the Sabine Uplift have become overpressured to the point that continued injection operations may present a predictable threat of pollution to usable-quality water sources, escape of injectates from permitted zones and/or waste of otherwise recoverable hydrocarbon resources.¹¹³

Mr. St. Amant was asked, as the president of LATX, how does he interpret that statement as it affects the Harrison County SWD No. 1 Well. He replied that the Harrison County SWD Well No.1 is completed above the Rodessa Formation and he believed that activity in the injection zones above the Rodessa will be reduced whether that be volumes or pressure. He further stated that if the pressures and volumes were reduced for the Harrison County SWD No. 1 Well LATX wouldn't be able to accommodate their current disposal demand. He also said that LATX would have to acquire more disposal capacity.¹¹⁴

Mr. Neale asked Mr. St. Amant if that's not exactly what this application was intended to do? Mr. St. Amant responded that they are attempting to respond to what the Railroad

¹¹⁰ LATX Exhibit No. 45., Tr. Vol.2, Pg 49., Ins.15-25; pg.,50, Ins 1- 3.

¹¹¹ Tr. Vol.2, pg., 50. Ins. 4-25; pg.51, In.1.

¹¹² Tr. Vol. 2, pg. 51, Ins 22-25; pg. 52, In.1.

¹¹³ LATX Exhibit No. 46.

¹¹⁴ Tr. Vol 2, pg. 58, Ins 2-15.

Commission has asked the industry to do, which is find alternative disposal capacity that is deeper than the Rodessa.”¹¹⁵

REOPENED HEARING

On November 2, 2016, the Examiners reopened the hearing for the limited purpose of receiving evidence and written argument regarding the "good faith claim" of LATX to operate the Smith, T.P. (139938) Lease, Well No. 1, in the Bethany (Travis Peak Cons.) Field, Harrison County, Texas as stated in the October 12, 2106 letter.

The October 12, 2016 letter to the Applicant and Protestants reads:

To the Parties,

The ALJ and Technical Examiner are reopening the captioned hearing the limited purpose of receiving evidence and written argument regarding the "good faith claim" of LATX to operate the Smith, T.P. (139938) Lease, Well No. 1, in the Bethany (Travis Peak Cons.) Field, Harrison County, Texas. Several areas will be explored, including (1) what rights LATX might receive from Channel Production Company in the event the application is granted and if those rights would include a good faith claim to operate; (2) the per cent mineral interest (and to what depths) held by protestants Noel Diane Jones, Eliza Jones Bacon and Oscar Bennett Jones; and (3) whether Commission designation of a large field interval requires that a party proposing disposal in that field interval must obtain a lease from the mineral owners or whether Commission designation of a large field interval creates a rebuttable presumption that all of the interval is productive, which can be overcome by proof to the contrary for all or a portion of that interval and whether that negates the need for a lease from the mineral owners.

Mr. Choate representing the Jones family stated that he had a division order from Memorial Production Operating.

Mr. Choate stated that;

"It's basically the division order to my clients (Jones) stating that they have a .043 royalty interest, mineral interest in the in the lands in question. It is to all depths, and so that's the nature of their mineral interest."¹¹⁶

¹¹⁵ Tr. Vol. 2, pg. 55, Ins 10-25; pg 58, Ins. 1-21.

¹¹⁶ Tr. Vol. 3, pg. 9, Ins.12-19.

Mr. Neale stated that he would stipulate that the Jones had a mineral interest in the tract. Mr. Choate responded that it was fine with him."¹¹⁷

LATX Exhibit No. 48 is a ground lease agreement between A3M Properties, who currently owns the surface location, and LATX Operations. Mr. Neale asked Mr. Land if he had an opinion as to whether or not this document authorizes LATX to conduct the operations not only on the Harrison County SWD but on the proposed well if the Commission were to approve the application? Mr. Land replied that it allows LATX to inject or dispose of oil field exempt fluids on this property".¹¹⁸

LATX Exhibit No. 49, is a Non-Binding Letter of Intent from Channel Production Company, (Channel) to LATX. Mr. Land testified that the letter is an agreement between Channel Production and LATX that if LATX can get the existing wellbore transferred over to LATX for saltwater disposal, then Channel will release the wellbore to LATX. The terms of the agreement state that Channel will convey the well to LATX within a reasonable time after LATX obtains the permits required to operate the well as a commercial saltwater disposal well. The letter also stated that LATX is not acquiring any mineral leasehold interests from Channel and will not assume any liability associated with Channel's mineral leases, if any.¹¹⁹

Mr. Neale told the Examiners;

"I looked back at your October 12th letter, and your question No. 1 was, Mr. Examiner, what rights LATX would receive from Channel if the application is granted and if those rights would include a good faith claim to operate. I presume you meant to operate the well? I think that those exhibits we just submitted, 47, 48, and 49, were intended to address the Question No. 1 on your October 12th letter."¹²⁰

Q. (Examiners)

How you get a good faith claim to operate out of that when you have no mineral rights?

¹¹⁷ Tr. Vol. 3, pg. 61, Ins. 17-23.

¹¹⁸ Tr. Vol. 3, pg. 18, Ins. 24-25; pg.19, Ins. 1-5.

¹¹⁹ LATX Exhibit No. 49. Tr. Vol. 3, pg. 20, Ins. 16-20.

¹²⁰ Tr. Vol. 3, pg. 24, Ins. 17-25; pg 25, Ins. 1-3.

A. (Neale)

Because we're not affecting the mineral state. We're going to be injecting fluid into a nonproductive portion of the (Travis Peak) Field.¹²¹

LATX Exhibit No. 50 is a Final Order and Examiner's report and final order for the 2008 field consolidation for the Bethany (Travis Peak Cons.) Field. The consolidated field is the field in which LATX filed the application for the proposed injection well. The correlative interval is from 5,798 ft. to 7,858 ft. as shown on the log of the Texaco E&P Inc.-G.W. Brumble G.U. No. 1, Well No. 3, Panola County.¹²²

LATX Exhibit No. 51 is a two well cross section with the type log, the G.W. Brumble G.U. No. 1, Well No. 3 and the proposed injection well. The cross section shows the consolidated field interval. The interval is from the top of the Travis Peak Formation to the base of the Traffic Peak Formation. The cross section shows the proposed injection interval is a section of the full field designation interval. On the top of the Travis Peak Formation on the proposed injection well log, the historically productive interval from 6,070 ft. to 6,320 ft. is noted. The cross section also shows approximately 140 ft. of shale separating the proposed injection interval in the middle and lower Travis Peak formation and the historically productive upper Travis Peak Formation at 6,070 ft. to 6,320 ft.¹²³ Mr Donovan testified that what he was showing is that the productive interval in the Travis Peak Formation is actually the top interval which is above the proposed injection interval, which is the massive sand interval in the middle and lower Travis Peak section,¹²⁴ The cross section also shows that above the top of the Travis Peak Formation at 6,070 ft., is the Pettit Lime Formation from 6,070 ft to 5,770 ft. Above the Pettit Lime Formation is the James Lime Formation from approximately 5,480 ft. to 5,770 ft. The exhibit also shows the Bexar Shale Formation from 5,410 ft. to 5,480 ft.¹²⁵

Mr. Neale introduced LATX Exhibit 52, a two well cross section showing Sheridan's Zach- Abney No. 1 Well and the well log of the proposed injection well. Mr Neale asked Mr. Donovan to explain the exhibit.

Mr. Donovan stated;

¹²¹ Tr. Vol.3, pg. 24, Ins.17-25; pg. 25, Ins. 1-10.

¹²² LATX Exhibit No.50.

¹²³ LATX Exhibit No. 51.

¹²⁴ Tr. Vol. 3, pg. 32, Ins. 5-17.

¹²⁵ LATX Exhibit No. 51

"As we discussed in the first hearing, Devon tested in this particular well, the Zach-Abney No. 1. They actually tested the interval of 7,704 ft. to 7,801ft. which is within the proposed injection interval, and did not report any production from these intervals. And then, as we discussed in the prior hearing, Devon moved up and briefly produced some sand intervals between 6,456 ft, I believe, which is above the proposed injection interval. Devon produced that interval in 2005, squeezed it off with 125 sacks of cement and then drilled all the plugs above this Travis Peak and then went back to producing the Cotton Valley interval, which they produced through 2007. And, of course, since then the well has been temporarily abandoned.¹²⁶

LATX Exhibit 53 is the open-hole well log incorporating the mud log that was utilized when the the proposed injection well was drilled. The log starts at the top of the proposed injection interval at 6,460 ft. through the base of the proposed injection interval at 7,940 ft.

Mr. Donovan described the exhibit;

"What I've done is gone through and color hatched in all the porosity and permeability as indicated on the SP curve of the T. P. Smith No. 1. I've also calculated the porosity of water saturation, and then I've laid down. And, of course, you can look down the gas chromatograph and you can see that there are absolutely no mud log shows anywhere in this interval. And for each sand, I've gone through and identified that they are non-productive."

Mr. Donovan was asked if he had an opinion as to whether or not any of the interval identified on Exhibit No. 53 of is describable as productive? He replied that there are no sands within this interval that appear to be productive.¹²⁷

Mr. Donovan testified that in his opinion the proposed injection well will not affect oil and gas reserves.¹²⁸

LATX Exhibit No. 55 is a map of the Travis Peak wells in the general area that have produced from the middle and/or lower Travis Peak interval within three miles of the proposed injection well. The map shows that there are no wells that have produced from the middle or lower Travis Peak Formation within two miles of the proposed T. P. Smith No. 1 Well.

¹²⁶ Tr. Vol. 3, pg. 34, Ins. 6-20.

¹²⁷ Tr. Vol. 3, pg. 38, Ins. 4-9.

¹²⁸ Tr. Vol.3, pg. 37, Ins. 24-25; pg. 39, Ins. 1- 19.

Mr. Neale asked Mr. Donovan to look back at LATX commission No. 45, a packet of the H-1, H-1A and H-10 and the permit for a an injection well operated by Devon Energy. The well is the Woodlawn East SWD Well No. 1, in Harrison County. The injection interval is from 6,450 ft. to 6,750 ft. and it is permitted to inject 10,000 bbls/d. Mr. Donovan stated that he believed that the Woodlawn well's injection interval is in the middle of the Travis Peak Formation.¹²⁹

Mr. Choate asked Mr. Land about LATX Exhibit No. 48, a ground lease agreement. Mr. Choate asked Mr. Land if he believed that the ground lease agreement gives LATX the authority to inject into the proposed interval. Mr. Land replied that he did believe that Section 8 of the agreement does. He also stated that the agreement did not grant any mineral rights.¹³⁰ Mr. Choate asked Mr. Land if the letter agreement between LATX and Channel Production company conveyed any mineral interests. Mr. Land stated that it did not convey any mineral interests.¹³¹

Mr. Hayenga asked Mr. Land if there was anywhere in the Ground Lease Agreement that gives LATX permission to inject RCRA-exempt waste. Mr. Land said that the agreement says "without limitation". The Examiners asked Mr. Land to read the first sentence of the agreement.

The first sentence of Section 8 of the land lease agreement states:

Tenant may use the Leased Premises including, without limitation, the subsurface thereof, for any legal activities it so chooses, including, without limitation, use as a saltwater disposal facility, processing facility, treating facility, and/or storage yard and such other uses as permitted by applicable zoning and use regulations and covenants, conditions and restrictions.¹³²

Mr. Hayenga asked Mr. Donovan if there was production from the Lower Travis Peak formation. Mr. Donovan replied that there was no production within two miles. He was then asked to look at LATX Exhibit No. 50, the PFD and Final Order (06-0254848) consolidating 15 Travis Peak fields into the Bethany (Travis Peak Cons.Field). Mr. Hayenga asked Mr. Donovan if the Bethany (Travis Peak Consolidated) Field was the field LATX was planning to inject in. Mr. Donovan replied that it was the correct field.

¹²⁹ Tr. Vol 3, pg. 47, Ins. 9-25; pg. 48, Ins. 1-24.

¹³⁰ Tr. Vol. 3, pg. 65, Ins. 12-25; pg. 66, Ins. 1-3.

¹³¹ Tr. Vol 3, pg. 66, Ins. 5-14.

¹³² LATX Exhibit No. 48.

Mr. Donovan was asked if he had done any reserve calculations for any of the Travis Peak Formation wells within one mile of the proposed injection well. Mr. Donovan replied that he had not done any reserve calculations because all the wells within one-mile have been plugged and abandoned, so there are no reserves in the well bores.¹³³

Mr. Donovan identified two wells on LATX Exhibit 55, a map with a one, two and three mile circles drawn around the proposed injection well that produced from the middle and lower Travis Peak Formation. The two wells are the Ireland Williams No. 1 Well and the Downer No. 8, both located approximately 2.5 miles from the proposed injection well. He was asked to read into the record the cumulative volume of production was from that portion of the referred to on Exhibit 55. Mr. Donovan responded that the Downer No. 8 produced 5,165 mcf, and the Ireland Williams No. 1 produced 10,951 mcf." Mr. Donovan testified that based upon those reported volumes, it was his opinion as a petroleum geologist that the volumes were not commercial."¹³⁴

Mr. Neale then turned to Sheridan Cross examination Exhibit No.1 , a June 6, 1995 PFD and Final Order Oil & Gas Docket No. 06-02080035, a complaint by Fina Oil & Chemical Company that two wells in Panola County were improperly classified in the Bethany (Travis Peak 6300, Gas) and the Bethany (Travis Peak 6400, Gas) Fields. He asked Mr. Donovan if he had any issues with the statement on page 3 of the PFD referring to the Travis Peak Formation as being lenticular.

Mr. Donovan replied;

"Yes, sir, for the entire interval, that's correct. The productive intervals do tend to be lenticular, small stratigraphic members as we discussed in the original hearing and as demonstrated back on our Exhibit No. 25. Recall that the production occurs in this top 200 - 300 ft., which is predominantly a shale interval with small lenticular sands that occur within the interval. Whereas, the proposed injection interval are massive deltaic sands, and typically they are interconnected. And that's why they're not productive."¹³⁵

Mr. Donovan stated that the interval referred to in the final order (LATX Exhibit No. 25) and decision interval that was referred to as lenticular was in the upper Travis Peak Formation."¹³⁶

¹³³ Tr. Vol 3., pg. 80, Ins. 1-24.

¹³⁴ Tr. Vol. 3, pg. 92, Ins.15-25; pg. 93, Ins. 1-24.

¹³⁵ Tr. Vol. 3, pg. 95, In. 25; pg. 96, Ins. 1-9.

¹³⁶ Tr. Vol. 3, pg. 95, In. 25; pg. 96, Ins. 1-23.

Mr. Neale asked Mr. Donovan if he had an opinion, based on his geologic study, whether or not the proposed injection well was going to have any negative impact on the upper Travis Peak Formation? Mr. Donovan replied that he did have an opinion. His opinion was that this proposed injection would not affect any production because there's no current production in the area.¹³⁷

Mr. Neale then asked Mr. Donovan to look at Sheridan's Cross-examination Exhibit No.2, and asked Mr. Donovan if he agreed that injection into the proposed interval would not cause waste of hydrocarbons. Mr. Donovan replied that the Bethany (Travis Peak Consolidated) Field is a multi-county field. In this (LATX's) particular application, there are no stratum capable of producing gas in paying quantities in the proposed injection interval within a two-mile radius of this wellbore. So this particular document is really irrelevant to this application."¹³⁸

At the end of the November 2, 2016 hearing the Examiners asked the Applicant and Protestants to provide the Examiners with a 10 page brief on Item No. 3 from the October 12, 2016 letter to both parties by November, 28, 2016.

Item 3. states: "whether Commission designation of a large field interval requires that a party proposing disposal in that field interval must obtain a lease from the mineral owners or whether Commission designation of a large field interval creates a rebuttable presumption that all of the interval is productive, which can be overcome by proof to the contrary for all or a portion of that interval and whether that negates the need for a lease from the mineral owners.

EXAMINERS' ANALYSIS OF THE EVIDENCE

The evidence in the record demonstrates LATX has met its burden of proof and that the proposed disposal well application for the TP Smith No. 1 Well meets the requirements of Chapter 27 of the Texas Water Code and Statewide Rule 46. The Examiners conclude that the applicant has a good faith claim and that the proposed TP Smith No. 1 Well will not endanger or injure any oil, gas, or other mineral formation. Both fresh ground and surface water will be adequately protected from pollution, the well is in the public interest and LATX has adequate financial assurance. As a result, the Examiners recommend the subject disposal well application be approved and the permit issued. The required elements of the Texas Water Code § 27.051(b) will be taken in turn.

¹³⁷ Tr. Vol. 3, pg.103, ln. 6, to ln.20.

¹³⁸ Tr. Vol. 3, pg.104., ln 10 to ln.16.

Good Faith Claim

LATX is applying to dispose into a productive field, the Bethany (Travis Peak Consolidated) Field. This field was designated by the Commission by consolidating several small fields into one larger field, (LATX Exhibit No. 50, Final Order 06-0254848). The Protestants consistently refer to production in this field as production from the Bethany (Travis Peak Consolidated) Field, as though production came from all intervals of the field. However, more specifically, LATX has shown that the production in this area occurs from a limited portion of the designated field interval, the upper Travis Peak. LATX has also shown that even the upper Travis Peak, at this location, is only historically productive for a two-mile radius.

The middle and lower Bethany (Travis Peak Consolidated) Field, at this location, has been shown by LATX not to be productive. Undoubtedly, at the time this field in the Travis Peak was consolidated, the middle and lower Travis Peak were shown to be productive in some area. LATX has demonstrated that the middle and lower Travis Peak are not productive in this area. Moreover, LATX has shown that the middle and lower sections of the Bethany (Travis Peak Consolidated) Field are commonly used for disposal purposes in this area.

In Texas, it is commonly understood that the owner of the mineral estate is the proper party needed to grant a lease to any operator planning to dispose into the pore space of the mineral estate. The ALJ and Technical Examiner believe there is a distinction in this docket that bears consideration. The middle and lower portions of the Bethany (Travis Peak Consolidated) Field, at this location, are considered productive solely because the Commission has designated those portions of the interval as part of a named field. They are nominally productive, but are not, in fact, productive. LATX has affirmatively demonstrated that the middle and lower portions of the field, at this location, have never been productive and are not productive today.

If the middle and lower portions of the Bethany (Travis Peak Consolidated) Field had been shown to have been productive in the past, but now merely depleted, the ALJ and Technical Examiner would agree that LATX would be required to demonstrate that it had a lease from the mineral owners to dispose into the middle and lower portions of the Bethany (Travis Peak Consolidated) Field. Under the unusual facts of this docket, the ALJ and Technical Examiner are persuaded that LATX has demonstrated that the middle and lower portions of the Travis Peak, at this location, are not productive, never have been productive, and consist of what is commonly referred to as empty pore space (a slight misnomer, as the pore space is probably filled with saltwater). Consequently, we believe that LATX must demonstrate that it has a lease from the surface owner, the party that is considered, in Texas, to own the empty pore space beneath a tract. LATX has a ground lease from A3M Properties, the owner of the surface, allowing LATX to use the subsurface for a disposal well pursuant to Section 8 of the Agreement.

8. Tenant may use the leased Premises including, without limitation, the subsurface thereof, for any legal activities it so chooses, including, without limitation, use as a salt water disposal facility, processing facility, and/or storage yard...

Ground Lease Agreement, A3M Properties to LATX Operation, LLC, effective January 1, 2014.¹³⁹ Under the unusual, and rare, facts of this case, the ALJ and Technical Examiner are persuaded that LATX has demonstrated a good faith claim to dispose into its requested interval, from 6,460 feet to 7,940 feet, at their requested location.

Public Interest

The proposed T.P. Smith Well will be used to provide additional capacity to handle fluids that can't be accommodated by LATX's Harrison County SWD Well located on the same site. The Harrison No. 1 Well is permitted to inject 12,000 bbls/d. However, due to surface pressure constraints the well can only dispose of 5,000 to 6,000 bbls/d, resulting in LATX having to divert its trucks to other facilities located between 9 miles to 20 miles away from the Harrison SWD Facility.¹⁴⁰ From January 2015 through September 2015 LATX had to divert approximately 2.0 million barrels of water to third-party disposal facilities. The proposed injection well will negate the need for LATX to divert its water hauling trucks to third party disposal wells, thus reducing the drive time of LATX's trucks, resulting in lower waste disposal costs. This increase in efficiency may extend the economic life of producing wells, preventing waste and protecting correlative rights of mineral owners.¹⁴¹ The safe and proper disposal of produced saltwater serves the public interest.

The Protestants assert there is excess disposal capacity in the area and therefore the proposed injection well is not in the public interest.¹⁴²

There are multiple issues associated with attempts to link the actual disposal capacity to the permitted disposal capacity in a given area. A disposal permit issued by the Commission stating the maximum volume a well is permitted to inject is a regulatory limit, not the volume that can actually be injected. This is true for several reasons; (1) There is no guarantee that the permitted well will become operational, either because the operator may not construct the facility, or the facility may not be physically able to inject the permitted volume. The physical limitations could be due the way the operator constructed the well. For example, the size of the disposal tubing, limitations of the disposal pumps to be able to inject the permitted volumes, or limitations of the disposal formation to accept the permitted volume of fluid. For example, LATX's Harrison County SWD No. 1 disposal well

¹³⁹ LATX Exhibit No. 48

¹⁴⁰ Tr. Vol 1, pg. 73, Ins. 5-25; pg. 74, Ins 1-2.

¹⁴¹ Tr. Vol 1, pg. 73, Ins. 1-4.

¹⁴² Tr. Vol 1, pg. 133, Ins. 1-4.

is permitted for 12,000 bbls/d, but due to surface pressure constraints it can only dispose of 5,000-6,000 bbls/d. (2) Operators are not required to report production of flow back and salt water from their wells, which is the source of most of the waste requiring disposal in commercial SWDs in Harrison County. This hinders any estimation of current or potential future demand for wastewater disposal. Generally there is no reliable correlation between a well's permitted disposal capacity (the maximum daily rate authorized by a permit), the functional capacity (the maximum sustainable disposal rate based on the mechanical limitations of the injection system. (3.) The ability of the injection formation to take fluids may decline over time, as observed by increasing injection pressures and (4) For any given injection well, it may not be possible to interpret the difference between the permitted injection capacity and the actual injected volume as being attributable to mechanical causes or market conditions based on publicly-available information. Consequently, simply because some wells in the area are not injecting their permitted volumes does not mean there is excess capacity in the area.

With Proper Safeguards, Both Ground and Surface Fresh Water Can Be Adequately Protected from Pollution

The proposed injection well will be completed and operated in a manner that is protective of fresh water resources. Surface casing (8 5/8-inch) was set at a depth of 1,320 ft. with cement circulated to the surface. The BUQW is 425 ft. There is over 6,000 ft. of mostly impermeable strata between the top of the proposed injection interval at 6,460 ft. There is a minimum of 140 ft. of contiguous impermeable shale immediately above the injection zone.¹⁴³ There are no unplugged or improperly plugged wells within the required one-quarter mile area of review, or within one half-mile that penetrate the disposal zone.¹⁴⁴

Will Not Endanger or Injure Any Oil, Gas, or Other Mineral Formation.

The evidence in the record demonstrates no oil, gas, or other mineral formations will be harmed by the proposed disposal well. While the upper 200 ft. to 300 ft. of the Travis Peak Formation has had historic production within a 2.5 mile radius of the proposed injection well, the middle and lower sands of the Travis Peak Formation have never been productive of hydrocarbons in this area.¹⁴⁵

The proposed injection well will be completed and operated in such a manner as to protect oil, gas, or other mineral formations both above and below the proposed injection zone. Surface casing (8 5/8-inch) was set at a depth of 1,320 ft. with cement circulated to the surface. There is a 140 ft. contiguous shale layer immediately above the top of the injection zone at 6,460 ft. to 6,320 ft. This shale layer will isolate the proposed injection

¹⁴³ Tr. Vol. 1, pg 39, Ins. 13-15. LATX Exhibit Nos. 17, 53, & 55. (Well logs).

¹⁴⁴ LATX Exhibit No. 8. Tr Vol.1, pg. 31, Ins 1-11.

¹⁴⁵ Tr. Vol .1, pg. 22, Ins 15-20; and pg 55, Ins. 1-8.

interval from the historically productive upper 200 ft. to 300 ft. of the Travis Peak Formation.¹⁴⁶ A bridge plug will be set below the disposal interval at 8,060 ft. with 20 ft. of cement on top of the plug to effectively isolate the perforations from 9,341 ft. to 9,474 ft. Additionally there is a minimum of 800 ft. of shale separating the base of the injection zone at 7,940 ft. from the productive Cotton Valley (Sand) Formation at approximately 9,300 ft.¹⁴⁷

Sheridan's and the Jones's protest is predicated on their claim that the injection of RCRA - exempt waste solids will plug off the permeability in the well, cause fracturing of the formation and the remaining hydrocarbon reserves would be essentially washed or bypassed as a result of injection into this well causing waste.¹⁴⁸ According to Sheridan, fracturing of the "rock" will cause a direct instant hydraulic connection to offset wells possibly fracturing casing seats, fracturing of cement around the casings, and actually causing holes in well casing, contamination of groundwater, possible blowouts and sinkholes.¹⁴⁹

The Examiners asked Mr. McCullough if the wells shown on Devon Exhibit No. 8, (a map of Travis Peak Producing wells in a one-mile radius around the proposed injection well) show current or historical Travis Peak production? Mr. McCullough answered that it showed both current and historical production and that he was unable to divide them out, using the data base he used. Mr. Hayenga stated that Mr. McCullough didn't distinguish between historic and current production, and he had no way of distinguishing between current and historical production."¹⁵⁰

The Examiners note that the wells Mr. McCullough used in his study were all plugged at the time of his study and the hearing. Therefore, The Examiners give little weight to Mr. McCullough's testimony that there are currently hydrocarbons in the Travis Peak that can be produced, and consider that testimony limited to the upper Travis Peak.¹⁵¹ Also, the Protestants did not enter into the record any current reserve calculations that would show there are recoverable hydrocarbon reserves in the Travis Peak Formation within two miles

¹⁴⁶ LATX Exhibit No. 2 (Form H-1A), LATX Exhibit Nos. 17 and 53 (Well logs).

¹⁴⁷ LATX Exhibit No. 23 (Special Conditions), LATX Exhibit Nos. 17 and 53 (Well logs of the T.P. Smith No. 1 Well.)

¹⁴⁸ Tr. Vol. 1, pg 157, Ins. 16-25.

¹⁴⁹ Tr. Vol. 1, pg 193, Ins. 18-25; pg 194, Ins. 1-25.

¹⁵⁰ Tr. Vol. 1, pg 159, Ins. 14-25; pg. 160, Ins. 1-13.

¹⁵¹ Tr. Vol 1, pg 162, Ins. 6-8.

of the proposed injection well. The last reported production from the Travis Peak Formation within two miles was 309 bbls of oil in 2010.¹⁵²

The Examiners note that Mr. Bauer opined that based on his engineering analysis, it's his opinion that there's still existing reserves in the Travis Peak Formation. However, he also testified;

" Now, whether (reserves) have been discovered in the Travis Peak, whether they are economic and present, that could all be different questions. "¹⁵³

To allay the Protestants concerns that the injection of RCRA-exempt solids will cause fracturing of the encapsulating shale above and below the proposed injection zone, allowing the injectate to migrate out of the disposal interval, Mr. Donovan testified that LATX would accept a special condition in their permit requiring a step-rate test prior to the start of injection operations. The step-rate test will determine whether their injection volumes and pressures would cause fracturing of the formation and the encapsulating shale.¹⁵⁴ Additionally, Mr. St. Amant, President of LATX testified that LATX agreed to Special Conditions A through J, contained in the June 10, 2015 memo from the Commission's Oil and Gas Division.¹⁵⁵

The Examiners give little weight to Sheridan's claim that injecting RCRA-exempt waste solids will plug off the permeability in the well and cause fracturing of the formations. According to Sheridan, fracturing of the "rock" will cause a direct instant hydraulic connection to offset wells which will cause fracturing of casing seats, fracturing of cement around the casings and causing holes in well casings, contaminate groundwater, and possibly causing blowouts and sinkholes.¹⁵⁶ There are several reasons why the Examiners give little weight to this claim.

1. There are no existing offset Travis Peak Formation wells within one mile of the proposed injection well for the RCRA-exempt waste to reach. All the Travis Peak wells within one mile are plugged.¹⁵⁷

2. The instant pressure U-Tube theory put forward by Sheridan is not appropriate for this application because the Travis Peak Formation is sandstone and shale in a non-perfect

¹⁵² Tr. Vol. 2, pg. 9, Ins. 5-8. LATX Exhibit Nos. 37 & 38.

¹⁵³ Tr. Vol. 1, pg. 230, Ins. 14-22.

¹⁵⁴ Tr. Vol 1, pg. 242, Ins. 1-25; pg. 243, Ins. 1-21.

¹⁵⁵ Tr. Vol 1, pg. 69, Ins. 2-16. LATX Exhibit No. 23.

¹⁵⁶ Tr. Vol 1, pg. 193, Ins. 18-25; pg. 194, Ins. 1-25.

¹⁵⁷ Tr. Vol .2, pgs. 19-20. LATX Exhibit No. 37.

hydraulic medium. Fluid traveling through "fractured" sandstone will have friction and diffusion losses so there cannot be a "perfect direct hydraulic connection" in a real world setting. To the Examiners' knowledge calculations based on the U-Tube and perfect direct hydraulic connection have never been used to calculate pressure fronts.

The Examiners note that the Protestants did not contest the accuracy of the Applicants pressure front calculations.

3. The Mathews and Russell pressure front calculations submitted into the record by LATX shows that over distance, the pressure is dispersed, and that over distance through a non-perfect hydraulic medium, the pressure decreases with distance. The two Mathews and Russell pressure front equations introduced by Mr. Donovan, (LATX Exhibit Nos. 39 and 40) show that after injection for 50 years, at a distance of one-half mile from the proposed injection well LATX expects a delta P (pressure) increase of 212 pounds in the reservoir. The calculations show that it would take a formation pressure of 345 psi to stand a column of 9.5 pound fluid to ground surface at one-half mile.

Additionally, the pressure front equations show that after 50 years of injection the injected fluid would migrate 625 ft. from the proposed injection well.¹⁵⁸ To cause fracturing of the rock the wellhead injection pressure would have to be 6,737 psi which would exceed the maximum permitted injection pressure.¹⁵⁹

4. There are six approved disposal permits in Harrison County allowing the disposal of saltwater and/or RCRA exempt oil and gas waste into the same correlative interval of the middle and lower Travis Peak Formation, as requested by LATX. One of the wells is Sheridan's Woodlawn East SWD Well No.1.¹⁶⁰ The Examiners note that although the Protestants claim that the proposed disposal well will cause breakouts and any remaining hydrocarbon reserves could be essentially washed or bypassed as a result of injection into this well, and the well would contaminate surface groundwater, the Protestants did not provide any evidence of breakouts or report other problems from any of the six approved disposal wells injecting into the Travis Peak Formation in Harrison County.

In fact, at the end of the first day of testimony the Examiners asked Mr. Bauer if Devon (Sheridan) had an disposal well in the area injecting into the Travis Peak Formation, and if they had seen any breakouts or any problems with that well affecting any other wells in the area. Mr. Bauer responded that Devon does indeed have an injection well, the Woodlawn East SWD Well No.1, located approximately 8.9 miles away from the proposed injection well that is injecting into the Travis Peak formation.

Mr. Bauer testified:

¹⁵⁸ LATX Exhibit No. 39. Tr. Vol. 2, pg. 34, Ins. 9-25; pg. 35, Ins. 1-22.

¹⁵⁹ Tr. Vol 2, pg. 17, Ins. 21-25; pg. 18, Ins. 1-2.

¹⁶⁰ Tr. Vol 2, pgs 39-50, LATX Exhibits 41-46.

"We're pretty well surrounded by our own leasehold, and, you know, we haven't had any problems in that area. But, you know, I don't think we're going to frac any, I don't know for sure, but, you know, we haven't seen any problems." ¹⁶¹

For these reasons, the Examiners conclude that the proposed T.P. Smith No. 1 Well will not harm oil, gas, or other mineral formations.

Financial Assurance

LATX has an active P-5 and financial assurance in the form of a \$25,000 letter of Credit. ¹⁶²

EXAMINERS RECOMMENDATION:

The Examiners conclude that the evidence in the record demonstrates the proposed disposal well will be completed (i.e., drilled, cased, cemented) and operated in a manner protective of ground and surface water and will not adversely affect any oil, gas, or other mineral formations pursuant to Texas Water Code § 27.051(b)(2) Statewide Rule 46. The well construction, the encapsulating shale above and below the proposed injection zone along with the 11 special conditions, including the step rate test will prevent the injected fluids from migrating out of the proposed injection interval.

The Examiners conclude that the Applicant has met its burden of proof and recommend the subject application be approved.

FINDINGS OF FACT

1. Notice of this hearing was given to all parties entitled to notice at least ten days prior to the date of hearing.
2. Notice of the subject application was published in the *Marshall News Messenger*, a newspaper of general circulation in Harrison County. Notice of the application was sent to the Harrison County Clerk, and offset operators within one half mile on November 17, 2014.
3. At the hearing LATX reduced the requested maximum daily injection volume to 5,000 bbls/d. Additional notice was not required as this revised maximum daily injection volume was less than the volume previously noticed.
4. The proposed disposal well has been drilled, and casing set. The well will be completed and operated as follows:

¹⁶¹ Tr. Vol. 1, pg 291, Ins.19-25; pg.,292, Ins, 1-10.

¹⁶² LATX Exhibit No.16.

- a. Surface casing (8 5/8-inch) was set at a depth of 1,320 ft. with cement circulated to the surface.
- b. Long-string casing (4 1/2-inch) was set to a depth of 9,650 ft. with cement circulated to 5,630 ft.
- c. Injection tubing (2 7/8-inch) will be set with a packer at 6,400 ft.
- d. The injection interval will be from 6,460 ft and 7,940 ft.
- e. A bridge plug will be set below the disposal interval at 8,060 ft. with 20 ft. of cement on top to effectively isolate the perforations from 9,341 ft. to 9,474 ft.
- f. The maximum daily injection volume will be 5,000 bbls/d with an average daily injection volume of 4,000 BPD.
- g. The maximum surface injection pressure will be 3,230 pounds per square inch gauge (psig).
- h. The well will inject produced salt water and RCRA-exempt waste.

5. Financial Assurance:

- a. The applicant has made a satisfactory showing of financial responsibility as required by Section 27.073.
- b. At the time of the hearing, LATX had an active Form P-5 and a \$25,000 Letter of Credit for financial assurance.

6. The use or installation of the injection well is in the public interest.

- a. LATX's existing Harrison County SWD No.1 Well is pressure constrained
- b. The proposed injection well will provide additional capacity for the existing Harrison No. 1 Well, which will negate the need for LATX to divert it's water hauling trucks to third party disposal wells.
- c. The use of the well will reduce operating and disposal costs.

7. The use or installation of the injection well will not endanger or injure any oil, gas, or other mineral formation.

- a. The proposed disposal well will be completed (i.e., drilled, cased, cemented,) and will be operated in a manner protective of oil, gas, or other mineral formations pursuant to Texas Water Code § 27.051(b)(2) and Statewide Rule 46.
 - b. LATX will run a step-rate test prior to the start of injection operations to determine whether their injection volumes and pressures would cause fracturing of the formation and the encapsulating shale.
 - c. The injection interval in the middle and lower portions of the Travis Peak Formation is not productive within 2.5 miles.
 - d. The nearest production is in the Taylor member of the Cotton Valley Formation and the injection interval is separated from the productive Taylor Sand member of the Cotton Valley Formation by a minimum of 800 ft. of shale.
8. LATX has agreed to 11 special conditions including a step rate test.
- a. Commission records indicate that Channel Production Company is the operator of record for this lease. Injection authority, if granted, is contingent upon the lease being transferred to LATX Operations, LLC.
 - b. Operator shall perform an initial static bottom hole pressure test to quantify reservoir pressure prior to injection into the permitted formation(s).
 - c. Operator shall conduct a pressure fall-off test twelve (12) months after injection has commenced and provide the Commission an opportunity to witness the test as stated in (F) below. The analysis of the fall-off test shall be provided under the supervision, seal, and signature of a registered professional engineer in Texas. The test analysis shall be filed with the Commission's Austin offices within 30 days of completion of the fall-off test.
 - d. Measurement for the initial static bottom hole pressure test will be via a pressure bomb run after completion. Measurement for the subsequent bottom hole pressure fall-off test will be either via wireline tool(s), or other Commission approved bottom-hole pressure measurement technique.
 - e. If multiple formations are open to injection, steps must be taken to isolate the formations for discrete shut-in bottom-hole pressure measurements for each separate formation.

- f. Operator must notify the District Office 48 hours in advance of the test(s) in order to provide opportunity for the RRC field technician to witness the test(s). Operator is to provide raw data from the test to the District Office and the UIC section of the Oil and Gas Division within 48 hours of completing the test.
 - g. Operator shall notify by facsimile or electronic mail the District Office and the UIC section of the Oil and Gas Division 48 hours prior to commencement of injection.
 - h. Operator shall provide a log of the subject well with Form W-1 or G-1 for the purpose of identifying Formation Tops of the Rodessa, Pettit and Travis Peak Formations.
 - i. Operator will provide a cement bond log (CBL) for the purpose of evaluating the long string top of cement. The CBL must be filed with the initial Form H-5 Injection Well Pressure Test Report documenting compliance with this Special Condition.
 - j. A bridge plug must be set below the disposal interval at 8,060 ft. with 20 feet of cement on top to effectively isolate the perforations from 9,341 ft. to 9,474 ft. A copy of Form W-15 Cementing Record must be filed with the initial Form H-5 Injection Well Pressure Test Report documenting compliance with this Special Condition.
 - k. LATX will run a step-rate test prior to the start of injection operations. The operator shall demonstrate by completion of a step rate test, conducted in accordance with Commission guidelines, that the formation fracturing will not occur at the proposed injection pressure. The operator must notify the District Office 48 hours in advance of the test in order to provide opportunity for the District Office to witness the test.
9. With proper safeguards, both ground and surface fresh water will be adequately protected from pollution.
- a. The base of usable quality groundwater ("BUQW") occurs at a depth of 425 ft. and the base of the underground sources of drinking water ("USDW") is 1,025 ft.
 - b. Surface casing (8 5/8-inch) was set at a depth of 1,320 ft. with cement circulated to the surface.
 - c. There are no wells within a one-quarter mile area of review.
 - d. A minimum of 140 ft. of shale directly overlies the injection interval.

- e. A minimum of 800 ft. of shale is located directly below the injection interval.
- 10. The use or installation of the injection well is in the public interest.
 - a. LATX's existing Harrison No. 1 Well is pressure constrained, and due to the surface pressure constraints LATX can only dispose of 5,000 to 6,000 bbls/d, resulting in LATX having to divert its trucks to other facilities located between 9 to 20 miles away.
 - b. The proposed injection well will provide additional capacity for the existing Harrison No. 1 Well, which will negate the need for LATX to divert its water hauling trucks to third party disposal wells.
 - c. The use of the well will reduce operating and disposal costs.
- 11. LATX has a lease with the surface owner, A3M Properties, allowing it to use the surface to conduct operations for its proposed T.P. Smith Lease, Well No. 1.

CONCLUSIONS OF LAW

- 1. All notice requirements have been satisfied. 16 Tex. Admin. Code § 3.46.
- 2. The evidence in the record is sufficient to establish that the use or installation of the injection well is in the public interest. Tex. Water Code § 27.051(b)(1).
- 3. The evidence in the record is sufficient to establish that the use or installation of the injection well will not endanger or injure any oil, gas, or other mineral formation. Tex. Water Code § 27.051(b)(2).
- 4. The evidence in the record is sufficient to establish that, with proper safeguards, both ground and surface fresh water can be adequately protected from pollution. Tex. Water Code § 27.051(b)(3).
- 5. The applicant has made a satisfactory showing of financial responsibility as required by Section 27.073 of the Texas Water Code. Tex. Water Code § 27.051(b)(4).
- 6. LATX has demonstrated a good faith claim to operate the T.P. Smith Lease, Well No. 1 as a disposal well.

EXAMINERS RECOMMENDATION

Based on the above findings of fact and conclusions of law, the Examiners recommend the Commission enter an order approving the application of LATX Operating, LLC, Pursuant to Statewide Rule 46 for a permit to inject fluid on the T.P. Smith Lease, Well No. 1, Bethany (Travis Peak Cons.) Field, in Harrison County Texas.



Richard Eyster, P.G.
Technical Examiner

Respectfully submitted,



Marshall Enquist
Administrative Law Judge