RAILROAD COMMISSION OF TEXAS

HEARINGS DIVISION

PROPOSAL FOR DECISION

OIL AND GAS DOCKET NO. 08-0297874

THE APPLICATION OF PRIMEXX OPERATING CORPORATION PURSUANT TO STATEWIDE RULE 9 FOR A COMMERCIAL PERMIT TO DISPOSE OF OIL AND GAS WASTE BY INJECTION INTO A POROUS FORMATION NOT PRODUCTIVE OF OIL OR GAS, CAMPBELL LEASE, WELL NO. 1, WOLFBONE (TREND AREA) FIELD, REEVES COUNTY, TEXAS

HEARD BY: Paul Dubois – Technical Examiner
Ryan Lammert– Administrative Law Judge

APPEARANCES:	REPRESENTING:
APPLICANT:	
David Gross	Primexx Operating Corporation
Dale Miller	
Travis Wilson	
Eric Nelson	
Darrel Lester	
PROTESTANT:	
David Earle Shifflett	D & K Farms
Kay Shifflett	

PROCEDURAL HISTORY

Application Filed:	March 25, 2015
Protest Received:	April 6, 2015
Request for Hearing:	August 4, 2015
Notice of Hearing:	September 11, 2015
Date of Hearing:	January 4, 2016
Transcript Received:	January 14, 2016
Proposal For Decision Issued:	May 5, 2016

STATEMENT OF THE CASE

Pursuant to Statewide Rule 9 (16 Tex. Admin. Code § 3.9), Primexx Operating Corporation ("Primexx") seeks a commercial permit to dispose of oil and gas waste by injection into a porous formation not productive of oil or gas, for the Campbell Lease, Well No. 1, in the Wolfbone (Trend Area) Field, Reeves County, Texas. Primexx seeks authority to dispose of 10,000 barrels of water per day ("bwpd") into the Delaware Formation in the depth interval from 4,751 feet to 6,007 feet. The application is protested by D & K Farms, an adjoining land owner.

The Technical Examiner and Administrative Law Judge (collectively, "Examiners") recommend the application be granted and the commercial disposal permit issued. Primexx has met its burden of proof under Chapter 27 of the Texas Water Code and the Commission's Statewide Rule 9.

APPLICABLE LAW

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

1. The use or installation of the injection well 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.

DISCUSSION OF EVIDENCE

APPLICANT'S EVIDENCE

Three witnesses testified and offered evidence on behalf of Primexx: (1) Dale Miller, consulting Geophysicist engineer; (2) Eric Nelson, Vice President for Exploration; and (3) Travis Wilson, Geophysist.

Notice

On March 20, 2015, notice of the application was published in the *Pecos Enterprise*, a newspaper of general circulation in Reeves, Ward and Loving Counties, Texas. On

March 25, 2015, Primexx notified the owner of the surface tract, owners of adjacent surface tracts, the Reeves County Clerk, and operators of wells within one-half mile of the proposed disposal well of the application. Primexx is the only operator of wells within a one-half mile radius of the proposed disposal well.

The hearing was originally scheduled to convene on November 18, 2015. Primexx published notice of the original hearing date in the *Pecos Enterprise* on September 15, September 22, September 29, and October 6, 2015. The hearing was called to order on November 18, 2015, appearances were taken, then the matter was continued until January 4, 2016, at the parties' request.

Facility Design and Operation

The Campbell Lease Well No. 1 (API No. 42-389-33953) was originally drilled (permit no. 770506) by Primexx to be a vertical well completed in the Wolfbone (Trend Area) Field at a depth of 11,000 feet. The well is located on a 672-acre tract of land about 10.4 miles southwest of Lindsay, Reeves County, Texas (about 14 miles southwest of the City of Pecos).

The current wellbore schematic (Primexx Exh. No. 8) indicate the original wellbore was drilled to a total depth of 11,059 feet, but the wellbore became obstructed at a depth of 8,852 feet and was plugged-off. The wellbore was then sidetracked to a depth of 10,854 feet, which also became obstructed at 8,020 feet. Upon abandoning the wellbore, Primexx plugged back the well to 7,780 feet and applied for Commission authority to convert the well to injection service.

Prior to abandonment, the Campbell Lease Well No. 1 wellbore was completed as follows:

- Surface casing (9 5/8-inch) was set to a depth of 2,445 feet. A multi-stage tool was used to set cement behind the casing, and a cement top-off brought the cement to the surface.

- Production casing (7-inch) was set to a depth of 7,787 feet. A multi-stage tool was used to set cement behind the casing and circulated to the surface.

To convert the well to injection service, Primex proposes to complete and operate the well as follows:

- Set cast iron bridge plugs, each topped with 20 feet of cement, in the wellbore at depths of 7,600 feet and 6,100 feet, which is above the sidetrack.

- Perforate the production casing in the Delaware Formation disposal interval from about 4,751 feet to 6,007 feet.

- Set injection tubing (3 ½-inch) with a packer at a depth of 4,651 feet;
- The maximum daily injection volume will be 10,000 bwpd and the estimated average daily injection volume will be 5,000 bwpd;
- The maximum surface injection pressure will be 2,375 pounds per square inch gauge ("psig") and the average surface injection pressure will be 1,000 psig;
- Injected waste will be limited to produced salt water and non-hazardous oil and gas waste exempt from regulation under the Resource Conservation and Recovery Act.

Surface facility design details were not described at the hearing. The standard permit conditions for a commercial disposal facility include provisions for surface facility design and operation.

Groundwater, Geology and Hydrocarbon Resources

A review of water well records identified eight water wells within a one-mile radius of the proposed disposal wells. The depth of the water wells ranged from 150 feet to 2,365 feet. The Commission's Groundwater Advisory Unit (GAU) indicates the interval from the ground surface to a depth of 1,600 feet and the Rustler Formation, which is estimated to occur from 2,050 feet to 2,400 feet must be protected. The base of usable quality groundwater ("BUQW") occurs at a depth of 2,400 feet and must be protected. The base of the underground sources of drinking water ("USDW") is estimated to occur at 2,425 feet.

The freshwater and disposal intervals are separated by about 2,200 feet of anhydrite, which is sufficiently impermeable to seal the top of the disposal interval. The GAU concludes that, if otherwise compliant with Commission rules and guidance, drilling and using this disposal well and injecting oil and gas waste into the subsurface stratum will not endanger freshwater strata in the area.

The Delaware Formation is not productive of hydrocarbons in this area; in fact, it is relied upon for the underground disposal of oil and gas waste in Reeves County. The proposed disposal interval has a gross thickness of about 1,250 feet, about one-third of which is sufficiently porous and permeable for disposal operations. The average porosity is about 12 percent, and some sand intervals have up to 30 percent porosity.

There is significant production from the Wolfbone (Trend Area) Field, which occurs at a depth of about 9,800 feet, about 3,800 feet below the base of the proposed disposal interval. Shale units within the Avalon and Bone Springs Formation, which occur between the Delaware Formation and the Wolfbone (Trend Area) Field, are sufficient to prevent harm to the underlying hydrocarbon resources.

Seismicity

A review of the records of the U. S. Geologic Survey identified one seismic event 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 March 24, 2015. Since Primexx filed the application, however, a second seismic event occurred in the area. Details of the two events are summarized as follows:

- A magnitude (M) 2.7 event occurred on January 15, 2012. The event was estimated to occur at a depth of 5 kilometers (km) (about 16,420 feet) and the hypocenter was estimated to be 0.5 miles south of the proposed disposal well location.

- A magnitude (M) 2.7 event occurred on April 17, 2015. The event was estimated to occur at a depth of 5 kilometers (km) and the hypocenter was estimated to be 2.6 miles northwest of the proposed disposal well location.

In addition, four other seismic events are documented in Reeves County, including a 1975 M4.8 event about 27 miles to the northwest, and 4 M2.7 to M3.3 events about 20 miles to the east that occurred in 2014 and 2015. Several other events were located in Pecos County to the east. For all of the identified seismic events the estimated depths of initial rupture (5 km) are based on limited regional seismograph observation data. The event hypocenter (location of initial rupture projected onto the ground surface) locations are also estimated and may be accurate to within about 3 miles (5 km).

Primexx provided 3-D seismic data as evidence to show that 10,000 feet of unfaulted rock formations separate the disposal interval from the estimated rupture depths of the known seismic events. The initial ruptures likely occurred in the crystalline basement rocks at depths of more than 13,000 feet. The 3-D data shows that the seals on top of and below the disposal zone are not faulted. Seismic coherency data of the overlying Lamar anhydrite and the underlying Wolfcamp Shale Formations also suggest the absence of faulting through these intervals in the area.

Examiner Dubois asked Primexx's witnesses whether or not Commission Staff made any additional requests for information from Primexx based on the known seismicity in the area. Mr. Nelson of Primexx, and Mr. Miller, whose consulting firm prepared the application, both stated that to their knowledge no additional information was requested by the Commission staff.[1]

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[1] Tr. 125 - 126.

Area of Review

The subject well is the only wellbore that penetrates the disposal interval within the one-quarter mile Area of Review. As stated, the subject well has surface casing set at a depth of 2,445 feet and production casing set to 7,787 feet. Both casing strings are cemented to the ground surface.

Two other wellbores, both operated by Primexx, are within or close to one half mile of the proposed disposal well. Those two wellbores are horizontal wells completed in the Wolfbone (Trend Area) Field. The surface locations of the two wells are about one mile north of the subject well, and therefore do not penetrate the disposal interval within one mile of the proposed disposal well.

Public Interest and Need for Additional Disposal Capacity

Primexx identified 9 existing commercial disposal wells within a 10-mile radius of the proposed disposal well. Also within the 10-mile radius Primexx identified 5 disposal wells that have been permitted but not yet drilled. All but one of the 14 commercial disposal wells are located along State Highway 17, which runs from Pecos in the northeast to Sargosa in the south. All 14 of these wells are permitted to inject into the Delaware Formation, and all 14 of these wells were permitted between 2011 and 2014.[2]

Primexx contends there is a continued need for additional disposal well capacity in Reeves County. The number of approved drilling permits in Reeves County has increased from 38 in 2009 to 629 in 2014, although in 2015 the number of approved drilling permits declined to 365. Since 2011 the number of producing oil wells in the county has doubled from 808 to 1,621), but the number of injection wells has increased only about 24 percent (from 139 to 172 wells), which suggests that the available disposal capacity has not kept pace with demand.[3] In addition to the well's use for commercial disposal, Primexx also intends to use it for disposal of its own produced waste.

Financial Assurance

Primexx has an active Organization Report (Form P-5, Operator No. 677852). Primexx has filed with the Commission a $250,000 letter of credit for financial assurance. Primexx's Form P-5 expires on May 31, 2017.

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2 Primexx Exh. No. 13.

3 Primexx Exh. Nos. 15 & 16.

PROTESTANTS' EVIDENCE

David Shifflett represented D & K Farms, which he and his wife Kay own and operate. D & K Farms is an adjoining surface owner to the proposed disposal tract. Mr. Shifflett did not offer evidence or provide a direct case. He did participate in the hearing by questioning Primexx's witnesses and giving opening and closing statements. Mr. Shifflett expressed particular concern with his desire to ensure the safety of the groundwater at D & K Farms. He viewed the potential for injection-induced seismic activity and increased disposal capacity to be a potential threat to groundwater safety in the area. Specifically, he expressed concern that seismic activity could damage his water well. However, he offered no factual or technical evidence to support his concerns. In addition, Mr. Shifflett questioned the industry's need for additional disposal capacity when the current capacity was only 25 percent utilized, according to Primexx's own evidence.[4]

EXAMINERS' ANALYSIS

The evidence in the record demonstrates Primex has met its burden of proof and that the proposed Campbell Lease disposal well application meets the requirements of Chapter 27 of the Texas Water Code and Statewide Rule 9. 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. The Examiners will also attend to the evidence of seismic events in the area.

Public Interest

Primexx provided evidence and testimony that the proposed disposal well is in the public interest as there is a continuing need for increased disposal capacity in the area. Specifically, Primexx observes that the number of commercial disposal wells has not kept pace with the number of drilling permits or completions over the last few years. The Protestants offered no evidence, except to note on Primexx's own exhibits that excess disposal capacity exists in the area. The Examiners are aware that permitted capacity and utilized capacity can differ widely, but the Commission has not adopted a specific point of departure to ascertain when additional capacity may or may not be needed. Nonetheless, Primexx offered evidence to support its position, and Mr. Shifflett did not. Therefore, the Examiners conclude the evidence in the record indicates the subject well is in the public interest pursuant to Texas Water Code § 27.051(b)(1).

Endanger or Injure Any Oil, Gas, or Other Mineral Formation

There is continued development of hydrocarbon resources in the Wolfcamp Formation in the area of the proposed disposal well. There is no nearby production from

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[4] Primexx Exh. No. 14.

the Delware or shallower formations. The disposal interval and the Wolfcamp Formation are separated by about 3,800 feet of strata, which include shale intervals within the Avalon and Bone Springs Formations. Currently there are no wells within a one-mile radius of the proposed disposal well that penetrate the disposal interval. Because the Delaware Formation is used extensively for disposal in Reeves County, any future Wolfcamp Formation production well in the area would be required to be fully cased and cemented through the Delaware Formation disposal interval. The Protestants presented no concerns with regard to the potential for harm to oil, gas or other mineral formations. The evidence in the record demonstrates the proposed disposal well will not endanger or injure any oil, gas, or other mineral formation pursuant to Texas Water Code § 27.051(b)(2).

Prevent Pollution of Ground and Surface Fresh Water

The evidence in the record demonstrates that, with proper safeguards, both ground and surface fresh water can be adequately protected from pollution pursuant to Texas Water Code § 27.051(b)(3). Primexx proposes to convert an existing wellbore to injection service, and the existing wellbore contains two fully-cemented casing strings through the USDW. In addition, the disposal interval is directly overlain by 2,200 feet of anhydrite strata that will form an impermeable boundary preventing the vertical migration of injected fluids outside of the disposal interval. As a commercial disposal well, the proposed permit will include a set of standard conditions to prevent a surface release of waste fluids. The Examiners conclude the proposed disposal well meets all technical and legal requirements to ensure protection of fresh water resources.

Demonstrate Financial Responsibility

Primexx has an active Organization Report (Form P-5, Operator No. 677852). Primexx has filed with the Commission a $250,000 letter of credit for financial assurance. The evidence in the record demonstrates the applicant has made a satisfactory showing of financial responsibility as required by Texas Water Code § 27.073 pursuant to Texas Water Code § 27.051(b)(4).

Seismicity

The undisputed evidence in the record demonstrates that seismic activity has been observed within a 100-square mile area centered around the proposed disposal well location, the first event occurring on January 15, 2012 and the second on April 17, 2015. Primexx also showed there is some seismic activity in the area beyond 100 square miles, especially to the east. The locations of the seismic events are not accurately known because of inherent limitations of the regional seismograph network used to detect them.

In addition, there is no dispute that there are 9 existing disposal wells within a 10-mile radius of the propose disposal well, and that these 9 disposal wells were permitted

since 2011. These wells are mostly located east of the proposed disposal well. Thus the evidence indicates the co-location of injection activity and seismic activity.

On November 17, 2014, amendments to Statewide Rule 9 took effect affirming the Commission's authority to consider of seismicity when permitting disposal wells in Texas. As a part of these amendments, Statewide Rule 9(3)(B)[5] requires applicants to search the records of the U. S. Geological Survey ("USGS") to identify historical seismic events within a 100-square mile area (9.08 kilometer radius) around a proposed well location, and to submit this information as part of the application. Primexx did this analysis and identified the January 15, 2012 M2.7 event. The April 17, 2015 event, also M2.7, was identified by Primexx at the hearing.

Statewide Rule 9(3)(C)[6] reaffirms the Commission's authority to require the applicant to submit additional technical data and analysis...

> *...to demonstrate that fluids will be confined if the well is to be located in an area where conditions exist that may increase the risk that fluids will not be confined to the injection interval. Such conditions may include, but are not limited to, complex geology, proximity of the basement rock to the injection interval, transmissive faults, and/or a history of seismic events in the area as demonstrated by information available from the USGS.*

The evidence in the record indicates that Commission Staff did not require any additional information from Primexx with regard to this application. Further, the Examiners note that the transmittal memo from Commission Staff referring the application to the Hearings Division (Primexx Exh. No. 6) did not request the Commission to consider any specific facts or proposed permit conditions apart from those typically considered for commercial disposal wells. Although the Commission has authority to consider seismicity in permitting decisions, the Examiners are unaware of any further policy or guidance on how such evidence is considered. Nonetheless, the Examiners weigh significantly the fact that Commission Staff did not recommend the Commission consider additional permit conditions on this topic.

Further, Primexx offered testimony and evidence demonstrating the absence of faulting in the area, and the disposal interval is isolated from the crystalline basement rock where the seismic events are believed to have originated. The Protestants did not contribute to the body of evidence in this regard. In this case, the evidentiary record does not establish a potential mechanical connection between the injection interval and the area of initial rupture. Therefore, it is difficult to relate the existing injection activities with the

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[5] 16 Tex. Admin. Code § 3.9(3)(B).

[6] 16 Tex. Admin. Code § 3.9(3)(C) *(Emphasis added)*.

recent historical seismic activity. However, the Examiners caution that the evidence is limited; it is not possible to definitively conclude that a causal relationship between injection and seismicity does not exist, and, indeed, it may be possible to one day link injection and seismic activity in this area.

The Examiners conclude there is no evidentiary basis at this time for denying Primexx's application. The Examiners do note, however, that Statewide Rule 9(6)(A)(vi)[7] affirms the Commission's authority to modify, suspend or terminate a disposal permit if " injection is likely to be or determined to be contributing to seismic activity."

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. Primexx published notice of the original hearing date in the *Pecos Enterprise* on September 15, September 22, September 29, and October 6, 2015. The hearing was called to order on November 18, 2015, appearances were taken, then the matter was continued until January 4, 2016.

2. Notice of the application was published in the *Pecos Enterprise*, a newspaper of general circulation in Reeves, Ward and Loving Counties, Texas, on March 20, 2015. On March 25, 2015, Primexx notified the owner of the surface tract, owners of adjacent surface tracts, the Reeves County Clerk, and operators of wells within one-half mile of the proposed disposal well of the application. Primexx is the only operator of wells within a one-half mile radius of the proposed disposal well.

3. The Campbell Lease Well No. 1 (API No. 42-389-33953) was drilled in January 2014.

    a. Drilled to a total depth of 11,059 feet and abandoned after the original wellbore and a sidetrack became obstructed;

    b. Surface casing (9 5/8-inch) was set at a depth of 2,445 feet and cemented to the surface;

    c. Production casing (7-inch) was set to a depth of 7,787 feet and cemented to the surface;

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7 16 Tex. Admin. Code § 3.9(6)(A)(vi).

4. The proposed disposal well will be completed and operated as follows:

   a. Cast-iron bridge plugs will be set at depths of 7,600 feet and 6,100 feet, and each plug will be topped with 20 feet of cement.

   b. The long-string casing will be perforated for injection in the disposal interval from about 4,751 feet to 6,007 feet, into the Delaware Formation;

   c. Injection tubing (3 ½-inch) will be set with a packer at a depth of 4,651 feet;

   d. The maximum daily injection volume will be 10,000 barrels of water per day ("bwpd") and the estimated average daily injection volume will be 5,000 bwpd;

   e. The maximum surface injection pressure will be 2,375 pounds per square inch gauge ("psig") and the average surface injection pressure will be 1,000 psig;

   f. Injected waste will be limited to produced salt water and non-hazardous oil and gas waste exempt from regulation under the Resource Conservation and Recovery Act.

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

   a. The number of approved drilling permits in Reeves County has increased from 38 in 2009 to 629 in 2014, although in 2015 the number of approved drilling permits declined to 365.

   b. Since 2011 the number of producing oil wells in the county has doubled from 808 to 1,621.

   c. Since 2011 the number of injection wells has increased only about 24 percent (from 139 to 172 wells)

   d. The increase in available disposal capacity has not kept pace with demand.

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

   a. The Delaware Formation is not productive in this area.

b. The nearest production is in the Wolfcamp Formation, Wolfbone (Trend Area) Field.

c. The injection interval is separated from the Wolfbone (Trend Area) Field by the Avalon and Bone Springs Formations.

7. With proper safeguards, both ground and surface fresh water can be adequately protected from pollution.

a. The base of usable quality groundwater ("BUQW") occurs at a depth of 2,400 feet, and the base of the underground sources of drinking water ("USDW") is 2,425 feet.

b. The well is completed with 2,445 feet of surface casing and 7,787 feet of production casing, both of which are cemented to the surface.

c. There are no wells within the one-quarter mile area of review.

d. 2,200 feet of impermeable anhydrite directly overlies the injection interval.

8. The applicant has made a satisfactory showing of financial responsibility as required by Section 27.073.

a. Primexx has an active Organization Report (Form P-5, Operator No. 679304), and has filed a $250,000 letter of credit for financial assurance.

CONCLUSIONS OF LAW

1. Resolution of the subject application is a matter committed to the jurisdiction of the Railroad Commission of Texas. Tex. Nat. Res. Code § 81.051

2. Findings of fact may be based only on the evidence and on matters that are officially noticed. T ex. Gov't Code § 2001.141 (b).

3. All notice requirements have been satisfied. 16 Tex. Admin. Code § 3.9

4. The use or installation of the proposed disposal well is in the public interest. Texas Water Code § 27.051(b)(1).

5. The use or installation of the proposed disposal wells will not endanger or injure any oil, gas, or other mineral formation. Texas Water Code § 27.051(b)(2).

6. With proper safeguards, both ground and surface fresh water can be adequately protected from pollution. Texas Water Code § 27.051(b)(3).

7. Primexx Operating Corporation has made a satisfactory showing of financial responsibility. Texas Water Code § 27.051(b)(4).

8. Primexx Operating Corporation has met its burden of proof and its application satisfies the requirements of Chapter 27 of the Texas Water Code and the Railroad Commission's Statewide Rule 9.

RECOMMENDATION

Based on the above findings of fact and conclusions of law, the Examiners recommend the Commission enter an order granting the application of Primexx Operating Corporation for a commercial permit to dispose of oil and gas waste by injection into the Delaware Formation, a porous formation not productive of oil or gas, for the Campbell Lease, Well No. 1, in the Wolfbone (Trend Area) Field, Reeves County, Texas.

Respectfully submitted,

Paul Dubois
Technical Examiner

Ryan Lammert
Administrative Law Judge