RAILROAD COMMISSION OF TEXAS
HEARINGS DIVISION

OIL & GAS DOCKET NO. 08-0316308

APPLICATION OF NGL WATER SOLUTIONS PERMIAN, LLC (609265) 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 FOR THE HWY 302 SWD (45197) LEASE, WELL NO. 2, WHEAT FIELD, REEVES COUNTY, TEXAS

PROPOSAL FOR DECISION

HEARD BY: Robert Musick, P.G. - Technical Hearings Examiner
Jennifer N. Cook - Administrative Law Judge

WRITTEN AND REVIEWED BY:

Robert Musick, P.G. - Technical Hearings Examiner
Ezra A. Johnson - Administrative Law Judge
Austin Gaskamp - Technical Hearings Examiner

PROCEDURAL HISTORY:

Application Filed:	July 2, 2018
Notice of Pre-Hearing Issued:	December 19, 2018
Pre-Hearing Conference:	January 11, 2019 and April 30, 2019
Pre-Hearing Transcript Received	May 9, 2018
Hearing Date:	May 10, 2019
Hearing Transcript Received:	May 28, 2019
Close of Record:	May 28, 2019
Proposal for Decision Issued:	October 14, 2019

APPEARANCES:

For Applicant:

NGL Water Solutions Permian, LLC:

George C. Neale (Attorney) – Austin, Texas
Christopher S. Hotchkiss (Attorney) – Austin, Texas
Rick Johnston (Professional Engineer)
Tim Jurco (Vice President)
Joe Vargo (Regulatory Manager)

For Protestant:

PA Prospect, LLC

Mr. Wesley McGuffey (Attorney) – Hance Scarborough, L.L.P.
Jim M. Clark P.E (Engineer)
Jimmy Jones
Barton Jehny

Interested Party:

Republic EES, LLC:

Jay Stewart (Attorney) – Hance Scarborough, L.L.P.

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I. Statement of the Case

NGL Water Solutions Permian, LLC (Operator No. 609265) ("NGL" or "Applicant") filed an application ("Application") for a commercial disposal permit pursuant to Statewide Rule 9,[1] to dispose of oil and gas waste by injection into a formation not productive of oil and gas on the Hwy 302 (45197) Lease ("Lease"), Well No. 2 ("proposed disposal well"), in the Wheat Field (Field No. 96742001), in Reeves County, Texas. NGL requests a permit be issued for the proposed disposal well granting authority to dispose of 50,000 barrels per day ("bpd") at a subsurface depth of 4,500 feet to 7,000 feet, within the Bell Canyon, Cherry Canyon and Brushy Canyon Formations, also known as the Delaware Mountain Group.

After review was deemed administratively complete by the technical staff of the Railroad Commission of Texas ("Commission"), details about NGL's nearby saltwater disposal Well No. 1 on the Hwy 302 Lease ("Well No. 1") began to show signs that it could be causing a potential conduit for the vertical migration of injected fluids to the base of useable-quality groundwater ("BUQW").

The Application is protested by PA Prospect, LLC ("PA Prospect" or "Protestant"), who operates a permitted brine mining well within one-half mile of the proposed disposal well. In addition, Republic EES, LLC, ("Republic") has been identified as an interested party for the case.[2]

Protestant identified several regulatory compliance failures relating to Well No. 1 not reported by Applicant for an unknown period of time prior to the Application's administrative review. Protestant argued that Well No. 1 provides a pre-existing conduit for injected fluids from the proposed disposal well. PA Prospect presented evidence of numerous regulatory compliance and mechanical failures by NGL, as well as evidence of NGL's inaccurate reporting on the status of Well No. 1 to the Commission. In the hearing, NGL admitted that Well No. 1 is a conduit for injected fluid to migrate out of the injection interval.

Based on the evidence presented in the hearing, the Technical Examiner and Administrative Law Judge ("Examiners") recommend denial of NGL's Application. There is substantial evidence in the hearing record showing that corrosion damage to the casing of Well No. 1 for an extended period caused damage to the halite and anhydrite confining strata and created a conduit for fluids to migrate to the BUQW. Unsuccessful attempts by NGL to repair Well No. 1 to remedy the corrosion damage to the casing and to alleviate the Bradenhead pressure[3] demonstrate that the plugging of Well No. 1 cannot adequately prevent migration of injected fluids between the casing and cement or the adjacent formation within the one quarter-mile area of review.

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[1] Statewide Rule (SWR) 9 refers to 16 Tex. Admin. Code § 3.9.

[2] Republic attended the proceedings but did not present argument or evidence in this matter.

[3] Bradenhead pressure is defined as pressure between production casing and surface casing as measured from the well head.

II. Notice and Jurisdiction

NGL's Application for a commercial disposal well was published on June 21, 2018 in the *Pecos Enterprise*. The publication discussed the proposed disposal well, well location, legal authority and notice of public hearing.

On December 19, 2018, the Hearings Division of the Commission sent a Notice of Prehearing Conference ("Notice") via first-class mail to Applicant and affected persons setting a pre-hearing conference date of January 11, 2019.[4] The Notice contains (1) a statement of the time, place, and nature of the pre-hearing conference; (2) a statement of the legal authority and jurisdiction under which the hearing is to be held; (3) a reference to the particular sections of the statutes and rules involved; and (4) a short and plain statement of the matters asserted.[5] The pre-hearing conference was held on January 11, 2019. It is noted that a second pre-hearing conference was held on April 30, 2019, to address outstanding motions and matters preliminary to the hearing on the merits. Applicant and the Protestant appeared and participated at both pre-hearing conferences.

At the pre-hearing conference on April 30, 2019, the parties agreed to commence the hearing on the merits on May 10, 2019. The hearing on the merits was held on May 10, 2019. Applicant and Protestant attended and participated in the hearing on the merits. Republic appeared as an interested party but did not offer argument or evidence on the record. Consequently, all parties received more than 10 days' notice of the hearing and an opportunity for hearing.

III. Applicable Law

Tex. Water Code § 27.031 states:

> PERMIT FROM RAILROAD COMMISSION. No person may continue using a disposal well or begin drilling a disposal well or converting an existing well into a disposal well to dispose of oil and gas waste without first obtaining a permit from the railroad commission.

Tex. Water Code § 27.051(b) states:

> (b) The railroad commission may grant an application for a permit under Subchapter C[6] in whole or part and may issue the permit if it finds:
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> (1) that the use or installation of the injection well is in the public interest;

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[4] *See* Notice of Pre-Hearing Conference issued December 19, 2018.

[5] *See* Tex. Gov't Code §§ 2001.051, .052; 16 Tex. Admin. Code §§ 1.41, 1.42, 1.45, 3.9.

[6] Subchapter C of the Texas Water Code authorizes the Commission to issue permits for injection wells used to dispose of oil and gas waste. *See, e.g.,* Tex. Water Code § 27.031.

(2) that the use or installation of the injection well will not endanger or injure any oil, gas, or other mineral formation;

(3) that, with proper safeguards, both ground and surface fresh water can be adequately protected from pollution; and

(4) that the applicant has made a satisfactory showing of financial responsibility if required by Section 27.073.[7]

Consistent with the Texas Water Code, Statewide Rule 9 (16 Tex. Admin. Code § 3.9 states the following:

> Any person who disposes of saltwater or other oil and gas waste by injection into a porous formation not productive of oil, gas, or geothermal resources shall be responsible for complying with 16 Tex. Admin. Code § 3.9, Texas Water Code, Chapter 27, and Title 3 of the Natural Resources Code. Pursuant to the Texas Water Code § 27.051(b):
>
> The Railroad Commission may grant an application for a permit under Subchapter C in whole or part and may issue the permit if it finds:
>
> (1) that the use or installation of the injection well is in the public interest;
> (2) that the use or installation of the injection well will not endanger or injure any oil, gas, or other mineral formation;
> (3) that, with proper safeguards, both ground and surface fresh water can be adequately protected from pollution; and
> (4) that the applicant has made a satisfactory showing of financial responsibility if required by Section 27.073.

IV. Discussion of the Evidence[8]

A. Applicant's Evidence

1. Application

NGL requests commercial disposal authority pursuant to Statewide Rule 9 to inject oil and gas waste into a porous formation not productive of oil and gas for the proposed

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[7] Section 27.073 of the Texas Water Code authorized the Commission to require financial assurance in order to issue an injection well permit. Statewide Rule 78 does require financial assurance for operators of disposal wells. *See, e.g.,* Tex. Admin. Code § 3.78(a)(6), (d), (g).

[8] The transcript for the pre-hearing conference held on January 11, 2019 or April 30, 2019, is referred to as "PHC Tr. [pg:ln(s)]." and the transcript for the hearing held on May 10, 2019, is referred to as "Hearing Tr. [pg:ln(s)]". Applicant's exhibits are referred to as "PHC NGL Ex. [exhibit no]." or "Hearing NGL Ex. [exhibit no]."; and the protestant's exhibits are referred to as "PHC PA Prospect Ex. [exhibit no]." or "Hearing PA Prospect Ex. [exhibit no]; or "PHC Republic Ex. [exhibit no]." or "Hearing Republic Ex. [exhibit no]."

disposal well, Wheat Field, Reeves County, Texas. The proposed disposal well has not been drilled at the time of the hearing, but a permit to drill (W-1) the well was received by the Commission on June 8, 2018. The drilling permit states the proposed vertical well is designated as API No. 42-389-37245 and is 7000 feet deep.

NGL submitted Commission Form W-14, the Application on July 2, 2018, seeking to dispose of oil and gas waste by injection into a formation not productive of oil and gas under Statewide Rule 9. The Application indicates the proposed injection interval is from 4,500 to 7,000 feet, which correlates to the Bell Canyon, Cherry Canyon, and Brushy Canyon formations, also known as the Delaware Mountain Group. On October 2, 2018, the Application was determined to be administratively complete by the Commission's technical staff, but a protest from PA Prospect was received prior to that time, necessitating a hearing.

NGL seeks authority in the Application to inject a maximum daily volume of 50,000 bpd at a maximum surface injection pressure of 2,250 psig.[9] In response to the Commission's request during the review of the Application, NGL performed an injectivity test on NGL's Well No. 1, which has a similar well design and is located about 1,100 feet distance from the proposed disposal well. The injectivity test results indicate a maximum pump-in rate at 55,000 bpd sustained for approximately 30 minutes.[10]

It should be noted that the Application included a seismicity study within a 100 square mile area of the proposed disposal well. The study indicated that no seismic activity had been recorded in the study area as far back as 1970.[11]

2. *Notice and Protest*

Notice of the Application was provided to operators and adjoining surface owners within a one half-mile radius of the proposed disposal well, which included PA Prospect, LLC, the protestant for the case. Notice was not originally sent to Republic due to NGL's lack of knowledge of a transfer of a portion of the rights of PA Prospect in the acreage surrounding the proposed well site, but NGL corrected the error by providing supplemental notice on February 13, 2019.[12]

NGL made a motion to dismiss Republic as a competitor. Republic argued that the hearing was already scheduled due to PA Prospect's protest. Accordingly, Republic argued that they were not seeking affected party status, but requested to observe the hearing as an interested person instead.[13]

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[9] Hearing NGL Ex. No. 1.

[10] Hearing Tr. Pg. 27, Lns. 21-25.

[11] Hearing NGL Ex. No. 4.

[12] Hearing Tr. Pg. 37, Lns. 1-25; Hearing NGL Ex. No. 10.

[13] Hearing Tr. Pg. 95, Lns. 1-25.

The hearing on the merits was held as noticed on May 10, 2019. At the hearing, Applicant appeared and presented evidence by and through its counsel George Neal. In addition, Rick Johnston and Tim Jurco appeared on behalf of the Applicant to offer sworn expert testimony. Applicant provided 16 exhibits at the hearing and four late-filed exhibits in support of the Application. Protestant appeared and presented evidence by and through its counsel, Wesley P. McGuffey. In addition, James M. Clark appeared on behalf of Protestant to offer sworn expert testimony. Protestant provided 14 exhibits at the hearing. Republic was present but did not offer any evidence or argument for the record.

3. Permitted Injection Well No. 1

NGL's Well No. 1 is within 1,100 feet and within the one-quarter mile review area for the proposed disposal well.[15] At the time of the hearing, Well No. 1 was shut-in due to Bradenhead pressure issues. Rick Johnston, consulting engineer for NGL and designated expert in the field of petroleum engineering, testified that NGL shut-in the well and initiated a workover on the well to alleviate the Bradenhead pressure.[16] The workover's objective was to address abnormal pressure on the tubing by casing annulus and Bradenhead. Mr. Johnston further testified that NGL pulled the tubing out, set a bridge plug immediately above the permanent packer, and tried to pressure test the casing.[17] The pressure test failed.[18] Further evaluation was performed by setting packers at various depths while moving the bridge plug to test segments of the casing.[19] Results of the testing established holes.[20]

Mr. Johnston testified that when the Application was filed, it was known that Well No. 1 was experiencing problems and that a workover rig had been sent to the well location in May 2018 to address and attempt to eliminate the Bradenhead pressure.[21] Mr. Johnston also testified that during the workover, they tried to remedy the Bradenhead pressure by bleeding off the pressure, but it had some flow of saltwater:

> They closed the valve in, and the pressure built back up. That's an indication that you probably don't have confinement of the injected fluids. Something is happening on the outside of the production casing to allow flow that will put pressure on the surface casing outside of the production casing.[22]

Mr. Johnston testified that Bradenhead pressure is usually associated with some sort of cement job failure or an adjacent injection well's effect on a well with no cement

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[15] Hearing Tr. Pg. 21, Lns. 15-25.

[16] Hearing Tr. Pg. 21, Lns. 1-25.

[17] Hearing Tr. Pg. 61, Lns. 1-25.

[18] *Id.*

[19] Hearing Tr. Pg. 86, Lns. 9-20.

[20] *Id.*

[21] Hearing Tr. Pg. 61, Lns. 1-25.

[22] Hearing Tr. Pg. 59, Lns. 12-25.

and the pressure makes it to the surface.[23] "[T]o have pressure and the pressure to build back up, in my mind, we have some connection of the Bradenhead to the injection interval."[24] Mr. Johnston further stated that the workover efforts revealed the existence of holes in the well casing both "down deep" and "shallower up around the 1700-1800-foot range."[25] In addition, Well No. 1 failed a mechanical integrity test.[26] Mr. Johnston ascribed these problems with the well casing to corrosion.[27]

Mr. Johnston asserted that the problems with Well No. 1 would not have been an issue with the administrative review of the Application. Issues with the Well No. 1 would be separate issues not related to the proposed disposal well and should not affect the permitting of the proposed disposal well under the Application.[28] NGL agreed to a special condition in the proposed disposal well Permit that requires repairing or plugging the Well No. 1 to remove the potential conduit.[29]

4. Geology and Resource Development

In the hearing, Mr. Johnston testified about the geology around Well No. 1 by using a density neutron log to support his conclusions. Using the density neutron log, he identified the log's signature that matched the casing shoe depth and asserted that the top of the halite (sodium chloride, commonly known as rock salt or salt) and anhydrite (calcium sulfate) formation was about 2,270 feet MD (measured depth).[30] Mr. Johnston claims that borehole caliper readings in the anhydrite section of the formation differentiate halite stringers from anhydrite sections. Anhydrite is less soluble than halite, therefore the washouts on the Density Neutron log caliper reading should correlate to halite, not anhydrite.[31]

Mr. Johnston indicated that the Delaware Mountain Group top appears around 4,290 feet.[32] He contended that, entering the Delaware Mountain Group, an increase in density/porosity can be observed on the density neutron log. He noted that shallower, in the halite and the anhydrite formation, you have no porosity and appears solid by the signature:

> If it's salts its solid, crystal and salt, no porosity, no permeability. If it's the anhydrite it's just solid; calcium sulfate, no permeability, no porosity. It's just

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[23] Hearing Tr. Pg. 60, Lns. 13-18.

[24] Hearing Tr. Pg. 60, Lns. 21-25.

[25] Hearing Tr. Pg. 86, Lns. 14-25.

[26] Hearing Tr. Pg. 61, Lns. 18-20.

[27] *Id.*

[28] Hearing Tr. Pg. 198, Lns. 1-25.

[29] Hearing Tr. Pg. 64, Lns. 10-25.

[30] Hearing Tr. Pg. 30, Lns. 14-25.

[31] Hearing Tr. Pg. 31, Lns. 1-25.

[32] Hearing Tr. Pg. 32, Lns. 17-25.

> crystalline and then the top of our proposed disposal interval in the pending application is at 4,500 feet, and then as you page forward you can see the porosity development that's the target of the proposed disposal.[33]

5. *Protection of Useable Quality Water Aquifers*

A letter dated June 29, 2018, from the Commission's Groundwater Advisory Unit, estimates the BUQW is at 1,450 feet,[34] which correlates to the base of the Rustler formation.[35] Commission Form W-14, lists planned surface casing for the proposed disposal well to be set at 1,700 feet, which is deeper than the BUQW and protective of fresh groundwater.

Mr. Johnston indicated that NGL plans on accomplishing compliance with Statewide Rule 9 by running a 10 3/4-inch surface casing to 1,700 feet and cementing the casing back to the surface.[36] In addition to the surface casing, Mr. Johnston testified that NGL plans on running a 7 5/8-inch production casing in Well No. 1 to 7,000 feet with a DV tool at 4,500 feet and running cement up to 2,000 feet from the DV tool, which will be protective of the halite and anhydrite formation at 2,270 feet.[37]

6. *Permit Special Conditions*

Mr. Johnston testified that NGL recognized that Well No. 1 is a "problem well" that is a conduit.[38] "[W]hen I say 'a problem well,' it can act as a conduit to let our injected fluids in the No. 2 escape the interval."[39] NGL plans to drill and cement the casing associated with the proposed disposal well to prevent the migration of injected fluids out of the injection interval and be compliant with Statewide Rule 9.[40] Mr. Johnston further asserted that the disposal well permit can be issued with a special condition requiring that Well No. 1 be repaired to eliminate the Bradenhead pressure; or the well be plugged if it is not able to return to active injection:

> We request that the permit be issued with a condition that requires . . . Bradenhead pressure either repaired or the well plugged to the satisfaction of the district office. . . .[41]

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[33] Hearing Tr. Pg. 33, Lns. 1-10.

[34] Hearing Tr. Pg. 20, Lns. 21-25.

[35] Hearing NGL Ex. No. 2.

[36] Hearing Tr. Pg. 21, Lns. 1-25; Hearing NGL Ex. No. 1.

[37] *Id.*

[38] Hearing Tr. Pg. 199, Lns. 2-7.

[39] Hearing Tr. Pg. 64, Lns. 15-25.

[40] Hearing Tr. Pg. 64-65, Lns. 1-25.

[41] Hearing Tr. Pg. 22, Lns. 1-25.

Mr. Johnston testified that the intent of the squeeze work that will be scheduled will address the channel behind the pipe; or between the two strings of casing; or on the outside of the original set of pipe.[42] Mr. Johnston further argued that it is not uncommon for a permit provision to require to re-enter and re-plug a well.[43] Moreover, Mr. Johnston asserted that the proposed disposal well was determined to be administratively complete and would be issued if it were not for the protest.[44]

7. Nearest Production Wells

NGL indicated in the hearing that WPX Energy Permian, LLC ("WPX") has horizontal laterals that pass underneath the one-half mile area of review but have no penetration of the disposal interval. WPX is not a protestant to the Application. Mr. Johnston testified that the WPX laterals are separated vertically from the disposal interval by approximately 1,000 feet:

> They [WPX] have a handful of horizontal laterals that are up to the northwest. While those laterals run through the half-mile circle these are wells that are horizontal wells that are landed well below the disposal interval. They don't have a vertical penetration of the disposal interval within the half mile. [45]

In addition, PA Prospect has a brine mining well within the one half-mile area of review, but Mr. Johnston suggested that these should not be considered penetrations of the disposal interval:

> PA Prospect operates a brine mining well . . . and then you can see the NGL Highway 302 No. 1 [Well No. 1]. So, the only penetration of the disposal interval within a half a mile is the other NGL Highway 302 No. 1 Well [Well No. 1].[46]

8. Rule Requirements

NGL provided Commission records showing their active P-5 status required by Statewide Rule 80, along with a financial assurance amount of $50,000 required by Statewide Rule 78. [47]

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[42] Hearing Tr. Pg. 66, Lns. 1-25.

[43] Hearing Tr. Pg. 64, Lns. 17-25.

[44] Hearing Tr. Pg. 34, Ln. 19—Pg. 35, Ln. 2

[45] Hearing Tr. Pg. 23, Lns. 1-25.

[46] *Id.*

[47] Hearing NGL Ex. No. 11.

NGL asserts that the proper safeguards have been put in place and will not endanger oil and gas or mineral formations associated with the injection interval. Mr. Johnston claims that the proposed disposal well complies with Statewide Rule 9.[48]

Mr. Johnston testified as to industry need for the proposed well, noting that such need would increase if Well No. 1 was plugged:

> And certainly, depending on how the workover goes on the No. 1 Well, if things go badly and they have to plug the well, clearly, they are going to need this well to replace it.[49]

Tim Jurco, vice president for NGL and designated expert for NGL on water disposal, also testified as to industry need. He asserted that demand for disposal wells in the area demonstrates a public interest in the installation of the proposed disposal well.[50] Documented evidence of this industry need included a contractual agreement for NGL to provide at least 35,000 barrels of water per day capacity to RKI Exploration and Production, LLC.[51] In addition, Mr. Jurco's testimony was supplemented by an affidavit which indicates a need for the proposed disposal well.[52]

B. Protestant's Evidence

The Application to permit the proposed disposal well is protested by PA Prospect, LLC. PA Prospect indicated that they operate a brine mining well within one-half mile of the proposed Well No. 2,[53] and disagree that the Application is sound .[54] Protestant further indicates that the information in the Application is false due to NGL's failure to produce critical documents to the Commission in this case.[55] Protestant also claims that the Application does not meet the permitting requirements of Rule 9 due to the conduit associated with Well No. 1, located within a quarter-mile of the proposed disposal well.[56]

1. NGL Well No. 1

Jim Clark, a consulting engineer for PA Prospect and designated expert in the field of petroleum engineering, testified that Well No. 1 was drilled in 2014 and is severely damaged by corrosion.[57] The severe corrosion in the annular area would not be expected

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[48] Hearing Tr. Pg. 44, Lns. 1-25.

[49] *Id.*

[50] Hearing NGL Ex. No. 15.

[51] Hearing Tr. Pg. 49-50, Lns. 1-25.

[52] Hearing Tr. Pg. 47, Lns. 1-25.

[53] Hearing Tr. Pg. 180, Lns. 23-25.

[54] Hearing Tr. Pg. 16, Lns. 7-25.

[55] *Id.*

[56] Hearing Tr. Pg. 16, Lns. 17-24; Hearing Tr. Pg. 126, Lns. 14-25.

[57] Hearing Tr. Pg. 127, Lns. 1-25.

with a wellbore that is only for four years old.[58] Mr. Clark testified that the well should not be subject to corrosion because not only is it above the packer, it is in an area of the wellbore that should have contained corrosion-inhibiting, treated water.[59]

2. *Well Annulus Pressure*

Mr. Clark testified that corrosion and holes in the tubing and casing resulted in Bradenhead pressure exceeding 1,000 pounds per square inch, gauge ("psig"). On April 22, 2018, NGL pressure tested Well No. 1, and determined that tubing pressure was 1,150 psig; casinghead pressure was 1,100 psig; and Bradenhead pressure was 1,000 psig. The pressure tests performed by NGL documented that communication developed between the well's production casing and tubing, as well as Bradenhead pressure.[60]

Mr. Clark testified that pressure clearly developed on the Bradenhead on the production casing and tubing annulus at least by April 22, 2018, and probably before.[61] This would mean that NGL violated Statewide Rule 3.17, which requires,

> Whenever pressure develops between any two strings of casing, the district office shall be notified immediately. . . . Any well showing pressure on the Bradenhead . . . the well shall be killed, and pump pressure applied through the tubing head. Should pressure gauge on the Bradenhead reflect the applied pressure the casing shall be condemned, and a new production or oil string shall be run and cemented.[62]

3. *Well No. 1 Injection Test*

Bradenhead pressure was discovered on Well No. 1 on or before April 22, 2018. On April 26, 2018, an injectivity test was performed which documented a maximum pressure during the test of 2,290 psig.[63] Well No. 1 was shut-in on April 29, 2018, about 3 days after the injectivity test and about 7 days after discovery of the Bradenhead pressure. Mr. Clark argued that Mr. Johnston's testimony indicated that it was not prudent to continue to operate the well and conduct a maximum capacity injectivity test with Bradenhead pressure.

Mr. Clark also testified that Bradenhead pressure indicates that fluid is escaping from the permitted interval.[64] The injectivity test that was performed on Well No. 1 could not prove maximum injectivity capability because some of this injected fluid was going outside of the permitted injection interval through holes in the casing. Therefore, Mr. Clark

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[58] *Id.*

[59] Hearing Tr. Pg. 158, Lns. 1-25.

[60] Hearing Tr. Pg. 80, Lns. 1-8.

[61] Hearing Tr. Pg. 134, Lns. 1-6.

[62] 16 Tex. Admin. Code §3.17; Hearing Tr. Pg. 134, Lns. 18-25.

[63] Hearing Tr. Pg. 134, Lns. 2-5.

[64] Hearing Tr. Pg. 134, Lns. 11-12.

thought it unlikely that the injectivity test supports a valid 50,000-bpd maximum injection rate.[65]

4. Well No. 1 Workover

In response to the Bradenhead pressure documented on April 22, 2018, by the pressure test of Well No. 1, NGL performed a workover in May 2018.[66] Mr. Clark testified that the workover resulted in NGL detecting a hole in the (4 ½ inch) tubing and two holes in the (7 5/8 inch) casing, with the first hole located between 1,838 and 2,033 feet and the second hole located between 4,827 and 4,860 feet.[67] Another "shallow" hole was found in a tubing collar at about 1,867 feet.[68] Mr. Clark stated his opinion that these holes are the likely source of the premature corrosion of the casing for Well No. 1:

> There was a hole in the tubing probably starting internally, worked its way externally, and then you've got flow in that annular area of your injection fluids and that's causing corrosion of that annular area . . . .You've got your saltwater injection now going basically where it's not supposed to go in this annular area, and that's what's causing the corrosion.[69]

5. Well No. 1 Cement Squeezes

Two cement squeezes were performed during the workover noted above to try to plug the holes in the casing. The first squeeze was to cement the deep hole in the well casing between 4,827 and 4,860 feet and the second squeeze was for the shallow hole between 1,838 and 2,033 feet in the casing.

During the first cement squeeze, NGL pumped about 250 barrels of mud down the tubing, expecting to circulate the mud from the bridge plug to the surface through the annular space between the tubing and casing. The workover report indicates that circulation to the surface did not occur, which appears to indicate the mud was exiting through one of the holes in the tubulars.[70]

The second cement squeeze used 85 barrels of cement to fill the well's annular space, but the workover report indicates it should have been only 18 barrels, which suggest that a large void was filled or partially filled.[71] Mr. Clark testified that the workover report indicates that the cement was circulated to surface which contradicts another entry

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[65] Hearing Tr. Pg. 139, Lns. 1-25.

[66] Hearing PA Prospect Ex. No. 10.

[67] Hearing Tr. Pg. 141, Lns. 1-25; Pg. 166, Lns. 1-25.

[68] Hearing Tr. Pg. 142, Lns. 8-25; Hearing PA Prospect Ex. No. 10.

[69] Hearing Tr. Pg. 144, Lns. 21-25.

[70] Hearing Tr. Pg. 162, Lns. 1-25.

[71] Hearing Tr. Pg.159, Lns. 1-21, Pg.163, Lns. 4-25

in the workover log that indicates it was not circulated to surface.[72] Mr. Clark testified that the workover report indicates the shallow holes in the casing did not hold pressure after the cement squeeze attempts.[73] After it was shown that the "shallow" squeeze did not hold pressure, there was no additional testing of the deeper squeeze.[74]

6. *Regulatory Requirements*

Mr. Clark further testified that NGL did not comply with Well No. 1's permit standard conditions, specifically Standard Conditions Nos. 2(b), 3, and 6 summarized below: [75]

- Permit Standard Condition 2(b) requires NGL to notify the Commission's District Office no less than 48 hours prior to beginning any workover or remedial operations. The Protestants claim NGL failed to perform the notification required by their Permit;

- Permit Standard Condition Nos. 3, requires the wellhead to have a pressure observation valve on the tubing to monitor the annulus of the well.[76] The Protestants claim NGL failed to have a pressure observation valve on the tubing required by their Permit;

- Permit Standard Condition No. 6, requires NGL to file the appropriate forms within 30 days after completion, conversion to disposal or any workover that changes the well completion. Mr. Clark claim that NGL failed to provide the Commission with updated forms as required by their Permit after the workover in May 2018. Mr. Clark testified that a Form W-2 was not filed timely to show the completion status of the Well and therefore the Commission did not have the information for the Application filed on July 2, 2018 to perform an adequate application review within the one-quarter mile review area. In addition, an updated Form W-2 was eventually updated on April 27, 2019. Mr. Clark testified that the updated Form W-2 omitted information about the acid fracture, cement squeeze, and cast-iron bridge plug. In addition, Mr. Clark claims that NGL also omitted information in their Form W-15 (Cement Report) which was signed on April 26, 2019 and attached to the W-2. He contends there is a discrepancy with the cement squeezes in the Form W-15, which indicates that cement was circulated to surface on May 18, 2018, which Mr. Clark asserts did not occur based on the workover report.[77]

PA Prospect claimed that NGL's failure to comply with the permit standard conditions for Well No. 1 affected the Application because the updated Commission Form

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[72] Hearing Tr. Pg.159, Lns. 1-21, Hearing Tr. Pg.166, Lns. 10-18

[73] Hearing Tr. Pg. 141, Lns. 10-12.

[74] Hearing Tr. Pg. 159-160, Lns. 1-25.

[75] Hearing Tr. Pg. 127-128, Lns. 1-25.

[76] Hearing Tr. Pg. 127, Lns. 12-25.

[77] Hearing Tr. Pg. 165-166, Lns. 1-25. PA Prospect Ex. Nos. 11 and 12.

W-2 dated April 27, 2019, for Well No. 1 was not available for part of the Commission's administrative application review.[78] PA Prospect argued further that the failure to provide this information to the Commission led to a failure to consider the existence of a conduit documented by the workover report within the Application's area of review.[79] "[I]f the Administrative Staff had been aware of the problems with Well No. 1, I don't think [the Application] would have made it up to the Hearings Division," according to Mr. Clark. [80]

In addition to the compliance failures discussed above, Mr. Clark claimed that the H-10 report for Well No. 1 also shows errors. He testified that the H-10 report shows the maximum injection pressure to be 1,300 psig for April 2018, but NGL ran an injectivity test in April 2018 with a documented maximum pressure during that test of 2, 290 psig.[81] Also, in April 2018, they reported zero (0) psig for the annulus pressure between tubing and casing on the H-10 report, but information from the pressure test conducted on April 22, 2018, shows a psig of 1,050 on the surface casing annulus during testing.[82]

Protestant contended that the relevance of NGL's compliance failures with the permit's standard conditions affect PA Prospect as an operator of the adjoining brine mining well that produces saturated brine for use in oil and gas drilling operations.[83] Mr. Clark testified that PA Prospect is reliant on the permit's standard conditions to protect their well's brine zone.[84]

7. Potential Conduit

Mr. Clark testified that Well No. 1 intersects a halite and anhydrite formation from 1,870 feet to the base at 4,214 feet deep, the same interval PA Prospect is mining.[85] As noted above, injection fluid exited the well through a hole in the (7 5/8 inch) casing into the halite and anhydrite formation somewhere between 1,838 and 2,033 feet.[86] The halite and anhydrite go into solution, which causes unintentional solution mining in the same interval that PA Prospect is mining with their brine mining operation.[87]

Mr. Clark maintained in this testimony that fluids exiting the casing likely leached some salt and anhydrite of an undetermined volume around the wellbore. Mr. Clark stated his opinion that the dissolution cavern possibly created by the casing failure of Well No.

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[78] Hearing Tr. Pg. 129, Lns. 8-25.

[79] *Id.*

[80] Hearing Tr. Pg. 178, Lns. 1-25.

[81] Hearing Tr. Pg. 136, Lns. 1-6.

[82] Hearing Tr. Pg. 136, Lns. 15-20.

[83] Hearing Tr. Pg. 180, Lns. 1-5.

[84] Hearing Tr. Pg. 129, Lns. 1-7.

[85] Hearing Tr. Pg. 149, Lns. 8-17.

[86] Hearing Tr. Pg. 150, Lns. 1-25.

[87] Hearing Tr. Pg. 151, Lns. 1-25.

1 is too large to properly repair.[88] Given the previous failed attempts to repair or mitigate the problems with Well No. 1, Mr. Clark stated his belief that plugging the well will not eliminate the conduit.[89] He also noted that NGL essentially conceded that Well No. 1 is a likely conduit within one quarter mile of the proposed well if the admitted problems with the casing cannot be repaired or rendered safe.[90]

Moreover, Mr. Clark pointed to the fact that there is still Bradenhead pressure on Well No. 1 and therefore some degree of communication exists between the surface and the injection interval.[91] Additionally, there is no confirmation that the corrosion holes in the casing of Well No. 1 and the dissolution of the halite and anhydrite formation have been fixed by the workover cement squeezes, etc.[92]

8. Proposed disposal well Concerns

Mr. Clark testified that NGL's proposed disposal well will utilize the same well design as NGL utilized for Well No. 1, with no significant changes to well specifications.[93] The primary change to the proposed well design is a 5.5-inch tubing for the new well compared to the 4.5-inch tubing for Well No. 1. Mr. Clark explained the increase in the tubing diameter will result in a higher injection rate for the proposed disposal well.[94]

Mr. Clark maintained that Protestant has the same concerns for the Subject Well as they do for Well No. 1, which is the potential communication between the two injection wells through the injection interval. Mr. Clark argues that Well No. 1 remains a conduit for injection fluids to migrate outside of their injection interval. He notes that holes in the casing of Well No. 1 may potentially act as a perforation outside of the permitted injection interval, similar to an unplugged dry hole.[95]

Lastly, Mr. Clark testified that the injection test performed on Well No. 1, which is a similar well design, does not support a 50,000-bpd maximum injection rate. Since the injectivity test was performed while Well No. 1 had Bradenhead pressure, Mr. Clark argued that the documented corrosion holes adjacent to the halite and anhydrite formation essentially resulted in brine dissolution and the expansion of the injection interval beyond the permitted interval, thus not proving anything about injectivity capability.[96]

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[88] Hearing Tr. Pg. 152, Lns. 1-25.

[89] *Id.*

[90] Hearing Tr. Pg. 178, Lns. 1-7.

[91] Hearing Tr. Pg. 175, Lns. 1-25.

[92] Hearing Tr. Pg. 164, Lns. 1-25.

[93] Hearing Tr. Pg. 184, Lns. 11-21.

[94] *Id.*

[95] Hearing Tr. Pg. 184-187, Lns. 1-25.

[96] Hearing Tr. Pg. 139, Lns. 1-25.

V. Examiners' Analysis of the Evidence

NGL did not meet its burden to show that the proposed disposal well's Application meets the requirements of Chapter 27 of the Texas Water Code and Statewide Rule 46. The Examiners conclude the Commission may deny NGL's Application because the requirements of the Texas Water Code § 27(b)(1)-(3) have not been met. The Examiners recommend the Commission deny the Application for the proposed disposal well.

A. Public Interest

Evidence presented by Protestant demonstrates that Well No. 1 is a conduit within the one-quarter mile area of review that will allow injection fluids to migrate outside of their injection interval. In addition, unsuccessful attempts by NGL to repair the casing and alleviate Bradenhead pressure in Well No. 1 show a substantial likelihood that plugging the well cannot adequately prevent such migration. Given the substantial risk of groundwater contamination resulting from the use or installation of the proposed disposal well, approval of the Application would not be in the public interest.[97]

B. Protection of Mineral Formations

PA Prospect demonstrated that their brine mining operation could be directly harmed by injected fluids escaping the proposed interval by way of a potential conduit outside the production casing of the Well No. 1, which exists within one-quarter mile of the proposed disposal well.

NGL did not meet its burden to prove that its proposed disposal well will not endanger or injure any oil, gas, or other mineral formation. Instead, NGL relied on the Application to be contingent on a Permit special condition that the well be plugged before the proposed disposal well be brought online. NGL seeks a special condition in the proposed disposal well permit to address the Bradenhead pressure associated with Well No. 1 and eliminate the conduit. The Examiners conclude that the requested special condition in the proposed disposal well permit will not prevent the migration of injected fluids out of the proposed injections interval. Failure of the casing for Well No. 1 likely caused the dissolution of the salt formation external to the casing and created a channel behind the casing, thus resulting in a breach of the salt and anhydrite confining layer above the injection interval.

The Delaware Mountain Group Formations, that is, the disposal formations indicated by the Application are regularly utilized for the disposal of produced fluids and oil and gas waste in the area. The Formations have demonstrated the capability to receive disposed fluids at the volume and surface pressures requested by NGL, but the record in this docket indicates that the testing was faulty. NGL performed its pump-in injectivity test on the nearby Well No. 1 at the proposed rate and pressure to document their injection capability for their proposed disposal well. A workover conducted on Well No. 1 documented at least one hole in the tubing and two holes in the production casing, which

[97] Texas Water Code § 27.051 (b)(1).

allowed fluids to exit the casing and impact adjacent strata during the injectivity test. Therefore, the injectivity test was performed with fluids exiting the production casing through corrosion holes in areas outside the proposed injection interval. The Examiners conclude the injectivity test was not evidence of as to whether the proposed injection interval has the capability of accepting the requested volume of 50,000 bbls per day.

NGL failed to prove that the acknowledged "problem well" can be repaired to prevent the upward migration or injected fluids into the mined formations of PA Prospect. Accordingly, NGL further failed to prove that the proposed disposal operation will not endanger or injure any, oil, gas or other mineral formation pursuant to Texas Water Code § 27.051 (b)(2).

C. Protection of Ground and Surface Fresh Water

NGL did not meet its burden to prove that oil and gas waste would be confined to the injection interval and not pollute ground or surface water.

The wellbore of Well No. 1 penetrates the disposal interval and is located within one-quarter mile radius of the proposed disposal well. Well No. 1 was drilled in 2014 and has numerous mechanical and regulatory issues. This well has been worked over several times and has not had been remedied to prevent being or becoming a potential conduit for migrating fluids to the BUQW.

NGL's evidence does not demonstrate that both ground and surface are adequately protected from pollution pursuant to Texas Water Code § 27.051 (b)(3).

D. Well Plugging and Special Permit Condition

The Examiners are not convinced that 1) Special permit conditions to the Application are permissible and 2) that simply plugging the Well No.1 will remedy the issues brought by PA Prospect.

NGL acknowledges that the Well No. 1 has numerous mechanical integrity issues and several unsuccessful workovers. At the time of hearing, following closing statements and responses, NGL presented evidence to show that the well will likely be plugged, necessitating new disposal capacity on the same lease. NGL further requested that the issues with Well No. 1 be severed from the Application of the proposed disposal well.

The mechanical integrity issues plaguing Well No. 1 cannot be overlooked in the matter of the Application. This compromised well is a potential conduit for injected fluids located within one mile of the proposed disposal well. Evidence of recurring Bradenhead pressure on Well No. 1 demonstrates a likelihood that a conduit between the surface and the injection interval has formed behind the original production casing of this well. The failed squeeze jobs are evidence that plugging the well-bore will not prevent upward migration of injected fluids due the fact the mechanical issues with the well are "behind the pipe." Due to this, special permit conditions relating to plugging Well No. 1 will not prevent the migration of fluids to BUQW or to ground surface.

VI. Findings of Fact and Conclusions of Law

The Examiners recommend that the Commission adopt the following Findings of Fact and Conclusions of Law:

FINDINGS OF FACT

1. The following findings concern the procedural history for the Docket:

   a. NGL Water Solutions Permian, LLC (Operator No. 609265) ("NGL" or "Applicant") filed an application ("Application") for a commercial disposal permit pursuant to Statewide Rule 9, to dispose of oil and gas waste by injection into a formation not productive of oil and gas pursuant to 16 Tex. Admin. Code § 3.9, in Reeves County, Texas.
   b. NGL's Application for a commercial disposal well was published on June 21, 2018, in the Pecos Enterprise. The publication discussed the proposed disposal well, well location, legal authority, notice of public hearing, etc.
   c. A letter dated June 29, 2018, from the Commission's Groundwater Advisory Unit, estimates the BUQW is at 1,450 feet, which correlates to the base of the Rustler formation.
   d. On July 2, 2018, the Application (Commission Form W-14) for the proposed disposal well was submitted to the Commission for review and consideration.
   e. On October 2, 2018, the Application was determined to be administratively complete by the Commission's technical staff.
   f. A protest was received on the Application from PA Prospect. The Commission's technical staff sent a memo dated November 5, 2018 to Docket Services of the Hearings Division. The memo indicates NGL requested a hearing for the Application.
   g. On December 19, 2018, the Hearings Division of the Commission sent a Notice of Pre-hearing Conference ("Notice") via first-class mail to Applicant and affected persons setting a pre-hearing conference date of January 11, 2019. The Notice contained (1) a statement of the time, place, and nature of the pre-hearing conference; (2) a statement of the legal authority and jurisdiction under which the hearing is to be held; (3) a reference to the particular sections of the statutes and rules involved; and (4) a short and plain statement of the matters asserted.
   h. NGL identified a new potentially affected party, Republic EES, LLC ("Republic") within one-half mile of the proposed disposal well and notice was not originally sent to Republic. Notice was provided to Republic on February 13, 2019.
   i. The pre-hearing conference was held on January 11, 2019, and a second pre-hearing conference was held on April 30, 2019. The second conference was scheduled to address matters preliminary to the hearing on the merits.
   j. At the April 30, 2019 pre-hearing conference, Republic indicated that they are not seeking affected party status. The parties agreed to commence the hearing on the merits on May 10, 2019.
   k. The hearing on the merits was held on May 10, 2019.

2. The Application is protested by PA Prospect who operates a permitted brine mining well within the one-half mile of the proposed disposal well.

3. NGL seeks to drill and complete the proposed disposal well in the Wheat Field (Field No. 96742001). The HWY 302 Lease is located 17.3 miles Northwest of Pecos, Texas. The permit to drill (W-1) the well was received by the Commission on June 8, 2018.

4. The proposed disposal well has the following proposed design:

    a. The drilling permit states the proposed vertical well is designated as API No. 42-389-37245 and is 7,000 feet deep.
    b. The proposed injection interval is from 4,500 to 7,000 feet, which correlates to the Bell Canyon, Cherry Canyon, and Brushy Canyon formations, also known as the Delaware Mountain Group.
    c. The planned surface casing is planned to be 1,700 feet deep, which is deeper than the BUQW and protective of fresh groundwater.
    d. NGL plans on running a 7-5/8-inch production casing to 7,000 feet deep with a DV tool at 4,500 feet. Cement will run from the 4,500 feet deep at the DV tool up to 2,000 feet, which will address issues with the halite and anhydrite section at 2,270 feet.

5. NGL seeks authority in the Application to inject a maximum daily volume of 50,000 bpd at a maximum surface injection pressure of 2,250 psig.

6. The Applicant failed to disclose in the Application the Bradenhead pressure concerns for Well No. 1 and potential conduit that is located within 1,100 feet of the proposed disposal well.

    a. NGL conducted a pressure tested on April 22, 2018 for Well No. 1 and determined that tubing pressure was 1,150 psig, casinghead pressure was 1,100 psig, and Bradenhead pressure was 1,000 psig.
    b. NGL failed to notify the District Office about the Bradenhead pressure on Well No. 1 in accordance with Statewide Rule 3.17 and the Permit Standard Condition 2(b).
    c. NGL conducted a workover in May 2018 on Well No. 1 and detected a hole in the tubing (4 ½ inch) and two holes in the casing (7 5/8 inch). The workover's objective was to address pressure on the tubing within the casing annulus and Bradenhead.
    d. NGL conducted cement squeezes during the workover to try to plug the holes in tubing and casing. An upper squeeze was shown not to hold pressure and a bottom squeeze was never tested to determine if it would hold pressure.
    e. Bradenhead pressure continued after the workover cement squeezes. No confirmation was provided in the hearing that dissolution of the halite and anhydrite formation behind the casing were addressed by the workover cement squeezes to eliminate the conduit.

7. The results of the injectivity test included in the Application are invalid for the purpose of establishing the maximum volume that can be injected into the injection interval for the propose SWD Well.

8. NGL seeks a special condition in the proposed SWD permit to address the Bradenhead pressure associated with Well No. 1 and eliminate the conduit. However, a special condition in the proposed SWD permit will not address the potential conduit associated with the dissolution of the salt formation external to the well casing causing a channel behind the casing, thus resulting in a breach of the salt and anhydrite confining layer above the injection interval.

9. WPX Energy Permian, LLC ("WPX") has horizontal wells with the horizontal drainhole passing underneath the proposed disposal well within the one-half mile area of review. WPX did not protest the Application. The well's drainhole laterals do not penetrate the disposal interval and are separated vertically from the disposal interval by approximately 1,000 feet and are not impacting the proposed disposal well.

10. Failed attempts to repair the compromised casing and alleviate Bradenhead pressure demonstrate that Well No. 1 cannot be repaired or plugged in such a way as to prevent the migration of injected fluids outside of the injection interval.

11. Accordingly, there is a substantial likelihood that oil and gas waste injected into the proposed disposal well will not be confined to the injection interval due to the existence of a conduit within one-quarter mile of the proposed disposal well.

    a. Location of the proposed disposal well within one-quarter mile of a conduit for the migration of injected fluids is not in the public interest.
    b. Location of the proposed disposal well within one-quarter mile of a conduit for the migration of injected fluids is substantially likely to endanger or injure oil, gas, or other mineral formations. Protestant's brine mining operation is subject to direct harm by injected fluids escaping the proposed interval by way of a conduit outside the production casing of the Well No. 1.
    c. There is a substantial likelihood that ground and surface water would not be adequately protected from pollution pursuant to Texas Water Code § 27.051 (b)(3) if the proposed disposal well is drilled within one-quarter mile of a conduit for the migration of injected fluids.

12. NGL has an active Commission Organization Report (Form P-5, Operator No. 609265), on file with $ 50,000 as financial assurance required by Statewide Rule 78.

CONCLUSIONS OF LAW

1. Resolution of the Application is a matter committed to the jurisdiction of the Commission. Tex. Nat. Res. Code § 81.051.

2. All notice requirements have been satisfied. 16 Tex. Admin. Code § 3.46.

3. NGL has made a satisfactory showing of financial responsibility. Texas Water Code § 27.051(b)(4).

4. The Application does not satisfy the remaining requirements of Chapter 27 of the Texas Water Code and Statewide Rule 46.

    a. The use or installation of the proposed disposal well is not in the public interest. Texas Water Code § 27.051 (b)(1).
    b. The use or installation of the injection well will endanger or injure oil, gas and other mineral formations. Texas Water Code § 27.051 (b)(2); *see also* 16 Tex. Admin. Code § 3.46(d)(1)(E).
    c. Ground and surface fresh water cannot be adequately protected from pollution through use of proper safeguards. Texas Water Code § 27.051 (b)(3); *see also* 16 Tex. Admin. Code § 3.46(d)(1)(B).

VII. Examiners' Recommendation

Based on the evidence presented at the hearing, Examiners recommend denial of the Application of NGL Water Solutions Permian, LLC for a commercial permit to dispose of oil and gas waste by injection into the Cherry Canyon, Brushy Canyon and Bell Canyon Formations, porous formations not productive of oil and gas for the HWY 302 Lease, proposed disposal well, in the Wheat Field, Reeves County, Texas.

Respectfully,

Robert Musick, P.G.
Technical Examiner

Austin Gaskamp
Technical Examiner

Ezra A. Johnson
Administrative Law Judge