RAILROAD COMMISSION OF TEXAS

HEARINGS DIVISION

PROPOSAL FOR DECISION

OIL AND GAS DOCKET NO. 06-0289656

THE APPLICATION OF P. O. & G. OPERATING, INC. FOR A PERMIT TO INJECT FLUID INTO A RESERVOIR PRODUCTIVE OF OIL OR GAS PURSUANT TO STATEWIDE RULE 46 IN THE FOREST HILL SUB-CLKVLE. SD. UNIT, WELL NO 203W, FOREST HILL FIELD, WOOD COUNTY, TEXAS

HEARD BY: Paul Dubois – Technical Examiner
Marshall F. Enquist – Hearings Examiner

APPEARANCES:	**REPRESENTING:**
APPLICANT:	
David Lipp	P. O. & G. Operating, Inc.
Adam Holcomb	
PROTESTANT:	
Duane Fisher	Pro se
Sandi Fisher	Pro se

PROCEDURAL HISTORY

Application Filed:	December 31, 2013
Protest Received:	January 9, 2014
Request for Hearing:	May 28, 2014
Notice of Hearing:	July 1, 2014
Date of Hearing:	August 8, 2014
Transcript Received:	August 19, 2014
Proposal For Decision Issued:	October 27, 2014

STATEMENT OF THE CASE

Pursuant to 16 Tex. Admin Code § 3.46, P. O. & G. Operating, Inc. ("PO&G") is applying for a permit to inject produced saltwater into a reservoir productive of oil or gas in the Forest Hill Sub-Clarksville Sand Unit[1] (Lease No. 04065), Well No. 203W (API No. 42-499-31497), Forest Hill Field, Wood County, Texas.

Notice of the subject application was published in the *Mineola Monitor*, a newspaper of general circulation in Wood County, on December 11, 2013. Notice of the application was sent to the Wood County Clerk, offset operators within ½ mile and the surface owner of the injection tract on December 20, 2013. The application is protested by Duane and Sandi Fisher, who are the surface owners of the tract on which the proposed injection well will be located.

The examiners' recommend the application be approved and the permit issued in accordance with the provisions of the proposed Final Order (attached.)

DISCUSSION OF THE EVIDENCE

Applicant's Evidence

PO&G proposes to convert its existing Well No. 203W to an injection well for the purpose of water-flooding on the 770-acre Forest Hill Sub-Clarksville Sand Unit. POG acquired the lease in 2007. The proposed well will inject saltwater into the Sub-Clarksville Sand Formation. The well was originally drilled in 1986 and completed in the Forest Hill Field, Harris Sand interval. From 1986 to 1995 the well held an injection permit (No. F 07461) under Statewide Rule 46 to inject freshwater, air and oxygen into the subsurface interval from 4,680 feet to 4,720 feet. The injection permit was cancelled on the operator's request (at the time, Lindenmuth & Associates, ETEX). The well was plugged back, recompleted in the shallower Sub-Clarksville Sand, and entered production. The current well completion details are as follows (A wellbore schematic diagram is included as Attachment A[2]):

- Drilled to a total depth of 4,780 feet and plugged back to 4,600 feet;

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1 The pooled unit name, "Forest Hill Sub-Clkvle. Sd." carried in Commission records appears to be a shortened form of "Forest Hill Sub-Clarksville Sand," shortened to accommodate data field length limitations.

2 Applicant's Exh. No. 1, page

- Set 8 5/8-inch surface casing to a depth of 1,012 feet and cemented to the surface with 520 bags of cement;
- Set 5 1/2-inch long string casing to a depth of 4,776 feet and cemented to the surface with 1,000 bags of cement; and,
- Perforated from 4,434 feet to 4,445 feet.

For conversion to injection service, PO&G proposes the following completion and operational parameters:

- Set 2 7/8-inch injection tubing on a packer at a depth of 4,400 feet;
- Inject up to a maximum of 800 barrels of saltwater per day, with an estimated average daily injection rate of 500 barrels per day (BPD);
- Inject at a maximum surface injection pressure of 1,100 per square inch gauge (psig);
- Injected fluids limited to saltwater produced on PO&G's Forest Hill Sub-Clarksville SD Unit;[3] and,
- POG will lay a new flow line from the injection pump (located 920 feet to the southwest) to the wellhead.[4]

The Commission's Groundwater Advisory Unit (GAU) has determined that the base of usable quality groundwater (BUQW) is at a depth of 950 feet, corresponding to the base of the Wilcox Formation. The base of underground sources of drinking water is at a depth of 1,000 feet.

The Forest Hill Field was discovered in 1950 and has been in production since that time. The Sub-Clarksville Formation has a sand lithology and the reservoir trap is a faulted monocline. The reservoir has a solution gas primary drive mechanism. The average pay thickness is 10 feet and the average horizontal permeability is 400 millidarcies. The average porosity is 25 percent, and the current bottom hole pressure is 1,160 psig.

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[3] Tr. pg. 14, lns. 5-8.

[4] Applicant's Exh. No. 3.

A nearby well log[5], located about 1,600 feet southwest of the Well No. 203W, identifies the Sub-Clarksville Sand interval from about 4,450 feet to 4,485 feet. On the log, the spontaneous potential curve clearly indicates the sand reservoir set apart from the overlying and underlying shale intervals. Above the injection interval, the confining shale appears to be somewhat inconsistent until a depth of about 4,300 feet, above which the shale is continuous for several hundred feet.

PO&G identified 13 wellbores within a one-quarter mile area of review around the Well No. 203W. Adam Holcomb, PO&G's petroleum engineer, reviewed the available records and testified that the two plugged wells were plugged properly.[6] Mr. Holcomb stated that ten (10) of the wells were producing.

In addition to these 12 wellbores, PO&G identified one wellbore, the B. F. Phillips Weems Lease, Well No. 1 (Weems Well No. 1),[7] which lacked any completion or plugging information. Weems Well No. 1 is located 670 feet northeast of the Well No. 203W on the Commission's geographic information system (GIS), but the location was not identified with an API number, and no other records could be found. PO&G conducted pressure front calculations on Weems Well No. 1 to ascertain whether this wellbore may act as a conduit for the migration of injected fluids out of the injection interval and into the BUQW. These calculations indicated that after 50 years of injection, the calculated pressure front at Well No. 1 is still 212 pounds per square inch (psi) below what is needed to raise saltwater to the BUQW. The pressure front calculations were performed, signed and sealed for PO&G by A. C. Golden, P. E.

Protestants' Evidence

The application was protested by Duane and Sandi Fisher, the surface owners of the tract on which Well No. 203W is located. The Fishers have owned the 62-acre property for five or six years. They do not live on the property, but they do keep livestock on it. Mr. Fisher is concerned about the potential for damage to his land, surface water and groundwater. He has found PO&G to be unresponsive to issues he has brought to their attention, and he believes PO&G has improperly handled oil and gas waste on his

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5 Drilled as the E. M. Reeves Well No. 1 (API No. 42-499-80407), now carried on schedule as the P. O. & G. Forest Hill No. 101.

6 Tr. pg. 21, lns. 4-10.

7 Applicant's exhibit no. 1 contained two maps identifying this well. The well plat (exh. no. 1, pg. 4) identified it as a dry hole about 1,150 feet northeast of the No. 302 well, and adjacent to the symbol was the name "B. F. Phillips Weems." The 1/4-mile plat (exh. no. 1, pg. 7), from the Commission's online GIS system, identified it about 670 feet northeast of Well No. 203W.

property and nearby tracts. Mr. Fisher's phone calls to the Commission's Kilgore district office did result in PO&G taking action on certain issues. Mr. Fisher provided photographs as evidence of the physical condition associated with PO&G's activities on various features of his property and adjacent land.

Generally, as an operating company, Mr. Fisher believes that PO&G is young and inexperienced. PO&G operates five wells in the Forest Hill Sub-Clarksville Unit on his property. According to Fisher, within that unit, PO&G's Well No 78 has not been functional for as long as he has been the surface owner. He has complained to PO&G and the Kilgore District about inadequate fences around wells, resulting, on one occasion, in oil adhering to the legs of his bull.

Mr. Fisher stated that PO&G often covers small surface spills with sand, and PO&G has spread oil-contaminated soil on his pasture as a means of disposal. There are three ponds, two of which are spring-fed, on his property. The ponds are from about 400 to 600 feet from Well No. 203W. Surface water runoff from the area directly surrounding the well flows towards these ponds. He recalled a surface spill of oil from a tank battery east of Well No. 203W, the cleanup of which took several weeks. Based on his experiences with PO&G, Mr. Fisher stated, "It's just I have no confidence in PO&G that they can handle this situation."[8]

Mr. Fisher also stated that in 1980 he owned property in Oklahoma, and the water well on that property became unusable following the commencement of saltwater injection nearby. He is concerned that adequate safeguards are not in place to protect the groundwater underlying the subject tract. Mr. Fisher further stated that he intends to collect and analyze surface water samples from his ponds if PO&G's application is approved.

EXAMINERS' OPINION

PO&G has applied for a permit to inject saltwater into the subsurface, pursuant to Statewide Rule 46, for the purpose of waterflooding the Sub-Clarksville Sand Formation in the Forest Hills Field. The Commission may issue a permit if it finds that, "the injection will not endanger oil, gas, or geothermal resources or cause the pollution of freshwater strata unproductive of oil, gas, or geothermal resources."[9] Based on the evidence presented at the hearing, the examiners conclude that the conversion and operation Well No. 203W as a waterflood injection well will not endanger oil, gas, or geothermal resources or cause the pollution of freshwater strata unproductive of oil, gas, or geothermal resources.

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8 Tr. pg. 46, lns 10-11.

9 16 Tex. Admin. Code § 3.46 (a).

The proposed well is cased and cemented in a manner to protect usable quality groundwater, the base of which occurs at a depth of 950 feet. Prior to injection service, PO&G will be required to conduct mechanical integrity tests on the well to ensure casing integrity. In addition, PO&G has agreed to remove the existing flow line to the well. The salt water tank battery and injection pump will be connected to the wellhead with a new flow line. The new flow line will run from the tank battery and injection pump (located 920 feet to the southwest of Well No. 203W) to the wellhead.[10] The tank battery and injection pump are not located on the Fisher's property.

The well log of a nearby well indicates that the Sub-Clarksville Sand Formation injection interval is overlain and underlain by significant shale stratum that will restrict the vertical migration of injected fluids out of the injection zone. A review of nearby wellbores, however, indicates one wellbore of concern as a potential conduit of injected fluid migration to shallow freshwater zones. The Weems Well No. 1 is located about 670 feet northeast of the proposed well. PO&G conducted pressure front calculations on Weems Well No. 1 to ascertain whether this wellbore may act as a conduit for the migration of injected fluids out of the injection interval and into the BUQW. These calculations indicated that after 50 years of injection, the calculated pressure front at Weems Well No. 1 is still 212 psi below what is needed to raise saltwater to the BUQW. The pressure front calculations were performed, signed and sealed for a Texas Registered Professional Engineer. The examiners have reviewed these calculations. The examiners conclude that the proposed well will not generate a hydraulic head sufficient to harm the shallow freshwater zones.

Commission records indicate PO&G has an active Form P-5 and has made a satisfactory showing of financial responsibility required by Section 27.073 of the Texas Water Code by securing a blanket financial assurance bond in the amount of $250,000. Mr. Fisher raised a number of concerns about PO&G as an operator.

As was mentioned at the hearing, the examiners note that the matter at hand is an injection well application pursuant to Statewide Rule 46. With regard to this application, the Applicant has met its burden of proof as required by the Rule. Mr. Fisher does raise questions about PO&G's competency as an operator. In this regard, Mr. Fisher has been in contact with Commission staff from the Kilgore District Office, and District personnel have been on the lease and his property. PO&G acknowledges that District Office staff were present and involved in resolving a recent spill on the lease. The parties both acknowledge that the Kilgore District staff are familiar with the lease and the condition of it.

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[10] Applicant's Exh. No. 3.

On review of the application and hearing record, the examiners note that the Commission's GIS system identifies the Gaither Petroleum Tract 21 Lease (Lease No. 15039) Well No. 36 being about 100 feet north of Well No. 203W. On review of archived completion records for this well, it appears that the well is actually located about 700 feet to the east, off of the Fisher's property, and was mis-spotted on the GIS system.

FINDINGS OF FACT

1. P. O. & G. Operating, Inc. ("PO&G") is applying for a permit to inject produced saltwater into a reservoir productive of oil or gas in the Forest Hill Sub-Clarksville Sand Unit (Lease No. 04065), Well No. 203W (API No. 42-499-31497), Forest Hill Field, Wood County, Texas.

2. Notice of the subject application was published in the *Mineola Monitor*, a newspaper of general circulation in Wood County, on December 11, 2013.

3. On December 20, 2013, notice of the application was sent to the Wood County Clerk, offset operators within ½ mile of Well No. 203W, and the surface owner of the injection tract.

4. The application is protested by Duane and Sandi Fisher, who are the surface owners of the tract on which the proposed injection well will be located.

5. PO&G proposes to convert its existing Well No. 203W to an injection well.

6. The well was drilled to a total depth of 4,780 feet and is currently completed as follows:

   a. Plugged back to 4,600 feet;

   b. 8 5/8-inch surface casing set to a depth fo 1,012 feet and cemented to the surface with 520 bags of cement;

   c. 5 1/2-inch long string casing set to a depth of 4,776 feet and cemented to the surface with 1,000 bags of cement; and,

   d. Perforated from 4,434 feet to 4,445 feet.

7. For conversion to injection service, PO&G proposes the following completion and operational parameters:

   a. Set 2 7/8-inch injection tubing on a packer at a depth of 4,400 feet;

b. Inject up to a maximum of 800 barrels of saltwater per day, with an estimated average daily injection rate of 500 BPD;

c. Inject at a maximum surface injection pressure of 1,100 psig;

d. Injected fluids limited to saltwater produced on PO&G's Forest Hill Sub-Clarksville SD Unit; and

e. PO&G will lay a new flow line from the injection pump (located 920 feet to the southwest) to the wellhead.

8. The BUQW is at a depth of 950 feet, corresponding to the base of the Wilcox Formation.

9. The Forest Hill Field was discovered in 1950 and has been in production since that time:

a. The Sub-Clarksville Formation has a sand lithology and the reservoir trap is a faulted monocline.

b. The reservoir has a solution gas primary drive mechanism.

c. The average pay thickness is 10 feet and the average horizontal permeability is 400 millidarcies.

d. The average porosity is 25 percent, and the current bottom hole pressure is 1,160 psig.

10. A nearby well log indicates the sand reservoir is set apart from the overlying and underlying shale intervals.

11. The Weems Well No. 1 is located 670 feet northeast of the Well No. 203W.

a. No completion or plugging information was identified for the Weems Well No. 1.

b. Pressure front calculations on the Weems Well No. 1 indicated that after 50 years of injection, the calculated pressure front at the Weems Well No. 1 is still 212 psi below what is needed to raise saltwater to the BUQW.

c. The pressure front calculations were performed, signed and sealed for PO&G by A. C. Golden, P. E.

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. All notice requirements have been satisfied. 16 Tex. Admin. Code § 3.46 (c).

3. The conversion and operation Well No. 203W as a water flood injection well will not endanger oil, gas, or geothermal resources or cause the pollution of freshwater strata unproductive of oil, gas, or geothermal resources. 16 Tex. Admin. Code § 3.46(a).

4. P. O. & G. Operating, Inc., has made a satisfactory showing of financial responsibility. Texas Water Code § 27.073.

EXAMINERS' RECOMMENDATION

Based on the above findings of fact and conclusions of law, the examiners recommend that the Commission approve the application, as set out in the attached Final Order.

Respectfully submitted,

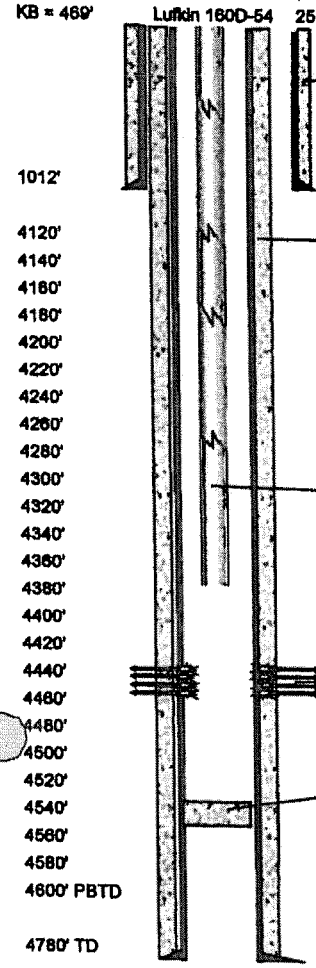
Paul Dubois
Technical Examiner

Marshall Enquist
Hearings Examiner

Forest Hill #203

Pumping

API #	Lease ID	Permit #	County	KB	GL	Current production	Sec N/S	Sec E/W	Survey
12-499-31497	04065		Wood	469'					Stark, J.
	Pumping Unit	Motor	State	TD	PBTD	Initial production	Lease N/S	Lease E/W	
KB = 469'	Lufkin 160D-54	25 HP	TX	4780'	4600'	4 BOPD TSTM 4 BWPD	780 E	1110 N	



Surface Casing: 1012' 8 5/8"
TOC: Surface
In 12 1/4" hole

Production Casing: 4776' 5 1/2"
TOC: Surface
In 7 7/8" hole

Tubing: 4325' (1995)

Perfs: 4434'-4445'

Plug back TD: 4600'

Perforations

Top	Bottom	SPF	Stimulation	OPEN?
4434'	4445'			YES

Casing

Depth	Size	Wgt (#)	Grade	Description
1012	8 5/8"	24		
4776	5 1/2"	17		

Cement

Casing	Sacks	TOC	Description
8 5/8"	520	Surface	
5 1/2"	1000	Surface	

Tubing

Description	Size	Length	Top	Bot
Tubing	2 3/8"			4325'

Rods

Description	Size	Length	Top	Bot

Pumping Unit (2012)	Lufkin 160D-170-64	25 HP
	Stroke: 54"	? SPM
	Timer:	
	Missing bolt on sampson post leg	

Job Type	Date	Summary
Drill	9/19/1986	Drilled to TD of 4780'
Perforate		4690-4708
Permit	11/15/1994	Permit #429808 issued to Greenwich Oil Corp.; targeting the Forest Hill field.
Plug back	3/1/1995	CIBP and 20' of cement set at 4620'. TOC = 4600'
Perforate		4434' to 4445'
Initial production	3/31/1995	9.2 bopd; 0 water; 0 gas. Pumping.
Re-activate	9/22/2007	Put back on production by PO&G Operating. Initial production 4 bopd, 4 bwpd, 0 gas
Motor replacement	7/9/2009	Installed a repaired 25hp motor on Lufkin C160D pumping unit.
Pump Change	8/15/2012	Change pump.

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PFD ATTACHMENT A