



# RAILROAD COMMISSION OF TEXAS

## OFFICE OF GENERAL COUNSEL

OIL AND GAS DOCKET NO. 02-0253102

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THE APPLICATION OF BRIGHAM OIL & GAS, L.P. TO CONSIDER PERMANENT GAS WELL CLASSIFICATION FOR THE SARTWELLE WELL NO. 4 IN THE APPLING DEEP (FRIO) FIELD, JACKSON COUNTY, TEXAS

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Heard by: Donna K. Chandler, Technical Examiner

Hearing Date: January 14, 2008

Appearances:

Representing:

John Fontenot

Brigham Oil & Gas, L.P.

### EXAMINER'S REPORT AND RECOMMENDATION

#### STATEMENT OF THE CASE

Brigham Oil & Gas, L.P. requests that its Sartwelle No. 4 in the Appling Deep (Frio) Field be permanently classified as a gas well. The application is unopposed and the examiner recommends approval.

#### DISCUSSION OF EVIDENCE

The Sartwelle No. 4 was completed in March 2006 in the Appling Deep (Frio) Field, with perforations between 9,890 feet and 9,906 feet. On initial test, the well produced at a maximum rate of 1,227 MCFD with a gas-liquid ratio of 3,156 cubic feet per barrel. In June 2007, the perforations sanded up and Brigham set a bridge plug at 9,880. The well was reperfored from 9,870 to 9,876 feet. There are two other gas wells currently carried in this non-associated gas field.

The data submitted on Form G-5 for the well did not meet Commission criteria for administrative classification as a gas well. Brigham had also submitted PVT analysis but the Commission declined to administratively classify the well as a gas well.

The PVT analysis was performed on a fluid sample taken from the well on April 3, 2006. The sample was taken from the original perforations, but Brigham submitted data to show that the gas produced from the current perforations is coming from the same interval as the original perforations. The sample was recombined at a reservoir

temperature of 228°F and reservoir pressure of 8,222 psia. The recombined fluid was evaluated during a Constant Composition Expansion at pressures ranging from 10,000 psi down to 500 psi. The reservoir fluid is single phase gas until the reservoir pressure reaches 7,372 psia, the retrograde dew point pressure.

The PVT analysis confirms that the well produced from a retrograde condensate reservoir. The well stream contained 8.4 mole% heptanes plus and 79.4 mole% methane. Typical retrograde gases contain less than 12.5 mole% heptanes plus and at least 70 mole% methane according to published literature.

Brigham believes the well should be classified as a gas well because the volume of liquid in the reservoir below 7,372 psia is not mobile and will not be recovered as liquid. The PVT analysis shows that the maximum percentage of hydrocarbon pore space occupied by retrograde liquid would be 31%, when the reservoir pressure reached 4,500 psia. Published literature indicates that liquid hydrocarbons in a reservoir are essentially immobile until saturations of up to 35% are reached.

Statewide Rule 79 defines a gas well as "...A well which produces hydrocarbon liquids, a part of which is formed by a condensation from a gas phase and a part of which is crude petroleum oil, shall be classified as a gas well unless there is produced one barrel or more of crude petroleum oil per 100,000 cubic feet of natural gas; and that the term "crude petroleum oil" shall not be construed to mean any liquid hydrocarbon mixture or portion thereof which is not in the liquid phase in the reservoir, removed from the reservoir in such liquid phase, and obtained at the surface as such." Brigham believes that because the liquid hydrocarbons in this reservoir are immobile, the liquid produced at the surface does not meet the definition of "crude petroleum oil". Instead, the produced liquid is a product of condensation and should not be used as a basis for classification of the well as an oil well.

The well has never been assigned an allowable and has produced over 400 MMCF of gas. Brigham requests that all overproduction be cancelled.

#### **FINDINGS OF FACT**

1. Notice of this hearing was given to all affected persons at least ten days prior to the date of hearing. No protests were received.
2. The Sartwelle No. 4 was completed in March 2006, with perforations between 9,890 and 9,906 feet in the Appling Deep (Frio) Field. There are two other gas wells in this non-associated field.
3. PVT data indicate that the Sartwelle No. 4 produces from a retrograde condensate gas reservoir with a dew point pressure of 7,372 psia.

4. The PVT analysis for the Sartwelle No. 4 indicates that the maximum percentage of hydrocarbon pore space occupied by retrograde liquid is 31% when the pressure in the reservoir reaches 4,500 psia. This small volume of liquid is not mobile and will not be produced at the surface as a liquid.
5. Liquid hydrocarbons produced at the surface from this reservoir are the product of condensation and should not be classified as crude petroleum oil.
6. Because the liquids produced from the well are not crude petroleum oil, the subject well should be classified as a gas well.
7. The well was overproduced approximately 400 MMCF as of December 1, 2007.

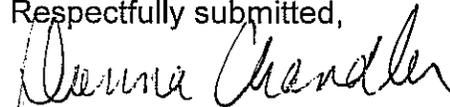
**CONCLUSIONS OF LAW**

1. Proper notice of this hearing was issued.
2. All things have been accomplished or have occurred to give the Commission jurisdiction in this matter.
3. The Brigham Oil & Gas, L.P. - Sartwelle No. 4 (226753) in the Appling Deep (Frio) Field, Jackson County, Texas is a gas well based on the definition of a gas well pursuant to Statewide Rule 79 (a) (11) (C).
4. Cancellation of overproduction for the subject well will not harm correlative rights or cause waste.

**RECOMMENDATION**

Based on the above findings and conclusions of law, the examiner recommends that the Brigham Oil & Gas, L.P. - Sartwelle No. 4 (226753) in the Appling Deep (Frio) Field be permanently classified as a gas well and that all overproduction for the well be canceled.

Respectfully submitted,



Donna K. Chandler  
Technical Examiner