December 28 , 2004

OIL AND GAS DOCKET NO. 03-0240486

THE APPLICATION OF WALTER OIL & GAS CORPORATION TO CONSIDER PERMANENT GAS WELL CLASSIFICATION FOR THE SMITH-BAILEY LEASE WELL NO. 1, RICH RANCH (YEGUA) FIELD, LIBERTY COUNTY, TEXAS

Heard by: Thomas H. Richter, P.E., Technical Examiner
Hearing Date: October 26, 2004
Appearances: **Representing:**

Tim George, lawyer — Walter Oil & Gas Corporation
Wayman Gore

PROCEDURAL HISTORY

Date of Application:	October 10, 2004
Date of Notice:	October 20, 2004
Date of Hearing:	October 26, 2004
Date of Transcript:	None
Record Closed:	November 30, 2004
PFD Issued:	December 28, 2004

EXAMINER'S REPORT AND PROPOSAL FOR DECISION
STATEMENT OF THE CASE

Walter Oil & Gas requests that the Smith-Bailey Lease Well No. 1 in the Rich Ranch (Yegua) Field be permanently classified as a gas well.

DISCUSSION OF EVIDENCE

The Rich Ranch (Yegua) Field was discovered May 5, 2002 by completion of the Walter Oil & Gas Corp., Smith-Bailey Lease Well No. 1 through perforations from 11,398' to 11,429' subsurface depth. The field is governed by Statewide Rules. The field is classified as Non-Associated - Prorated. Walter Oil & Gas is the only operator in the field with one well.

The Walter Oil & Gas, Smith-Bailey Lease Well No. 1 potentialed at 1,682 MCFD and a calculated absolute open flow of 4,304 MCFD. The gas gravity is 0.702 and the condensate gravity is 47.8EAPI. The initial gas/liquid ratio was 2,562:1. The color of the hydrocarbon liquid was "dark amber". The original static reservoir conditions reported on Commission Form G-1 were 11,961 psig (calculated) and 257EF. A subsequent Form G-1 (retest) was performed July 22, 2004 with a highest flow rate at 1,040 MCFD and a calculated absolute open flow of 2,304 MCFD. The reported gas gravity was 0.702 and the condensate gravity was 51.7EAPI. The gas/liquid ratio was 2,646:1. The bottomhole pressure reported was 11,340 psig. A static Gradient Survey dated May 22, 2003 showed a reservoir pressure of 6,450 psia. A static Gradient Survey dated May 28, 2004 showed a reservoir pressure of 4,641 psia.

Walter Oil & Gas had FESCO perform a complete PVT analysis in May 2002, shortly after the well was completed and put on production and filed the PVT analysis with the completion forms with the Commission. The Commission advised Walter Oil & Gas in August 2004 that gas well classification would be continued for 60 days and then the well would be re-classified as an oil well unless a gas well classification hearing was requested. Walter Oil & Gas elected to present data it believes supports the subject well should be permanently classified as a gas well because the well produces from a retrograde gas condensate reservoir.

Cumulative production from the subject well through July 2004 is 204.3 MMCF of gas and 55,330 barrels of hydrocarbon liquid. The current production level is ± 160 MCFD and ± 33 barrels of hydrocarbon liquid. The current gas-liquid ratio is approximately ± 3,500:1.

The mechanical Constant Composition Expansion (CCE) results show a measured dew point pressure of 4,516 psig at 257EF. However, the reservoir fluid did exist as a single-phase gas at initial reservoir conditions. The current static near well bore reservoir pressure is probably near or at the dew point pressure. Reservoir pressure reduction below the dew point will result in retrograde condensate liquid formation in the reservoir. This is anticipated in a retrograde gas condensate reservoir. The hydrocarbon liquids condense from the gas phase in the formation and are immobile. Compositional analysis indicates the wellstream to be 63.3% methane and 12.779% heptanes plus. The CCE analysis measured the maximum hydrocarbon liquid volume in the two-phase envelope would occupy 48.62% of the hydrocarbon pore volume (HCPV) at 4,201 psig. Further, typical retrograde gas wells have stock-tank liquid gravities that are between 40E and 60E API.

Walter Oil & Gas believes the subject well should be classified as a gas well because at initial conditions the reservoir was in a gas state and because there is a dew point, the well produces as a retrograde gas condensate well.

EXAMINER'S OPINION

The examiner recommends the application be denied because it does not meet the requirements pursuant to Statewide Rule 79 as the applicant failed to prove by the preponderance of evidence that the

hydrocarbon liquid in the reservoir is immobile and not produced at the surface.

The Texas Administrative Code, Title 16, Part 1, Chapter 3, Rule §3.69 Definitions Subsection (11)(C) and 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*** (emphasis added), and ***obtained at the surface*** (emphasis added) as such."

The statute requires for a well with a gas-hydrocarbon liquid ratio of less that 100,000:1, a series of tests must be passed to be classified as a gas well. For prima facie gas well classification, the Commission uses the data from Form G-5 (Gas Well Classification Report) for a well and compares it to Commission Guidelines. The key guideline parameters are:

* Gas-liquid hydrocarbon ratio of at least 12,500:1

* API gravity of the liquid hydrocarbon of at least 50 degrees

* On the ASTM Distillation Test of the liquid:

  Initial Boiling Temperature must be less than 120EF

  At 80% recovery, the boiling temperature must not exceed 520EF

  The end point must not exceed 720EF with at least 95% recovery

The subject well's ASTM test (May 10, 2002) failed three of the parameters.[1]

A review of the monthly production since May 2002, shows the highest GOR the well had was 8,849:1. The overall GOR is 3,692:1.

To be classified as a gas well the following three requirements must <u>all</u> be met:

* At original reservoir conditions, must be in a gas phase;

* There must be a measured dew point (condensation point), wherein the hydrocarbon liquid begins to form in the reservoir; and

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[1] The ASTM Test was performed by FESCO Ltd.

* The liquid hydrocarbon that forms in the reservoir must be immobile in the reservoir and not produced at the surface.

The subject well at original reservoir conditions was 100% in a gas phase. The well does have a measured dew point and is therefore producing from a retrograde gas condensate reservoir.

However, the well does not meet the last requirement, i.e. the liquid hydrocarbon that forms in the reservoir is immovable and not produced at the surface. Published expert reservoir engineering literature authorities have addressed the research of retrograde gas-condensate fluid properties. The compositional analysis of the of the reservoir "fluid" (gas and liquid) in the subject well indicates a "rich retrograde gas condensate". Typical methane composition is not less than 70% and the subject well is 63.3%. [2] Typical Heptanes Plus is no greater than 8% and the subject well is 12.779%. Well stream analysis shows that the ethane through N-butane represent over 18% of the well stream composition.

The CCE analysis measured the maximum hydrocarbon liquid volume in the two-phase envelope would occupy 48.62% of the hydrocarbon pore volume (HCPV) at 4,201 psig. Any liquid hydrocarbon in a reservoir is essentially immobile until it reaches a saturation of at least 10 to 20%.[3] It is recognized that these are typical assumptions, however, even the most liberal research states that the upper limit for a very rich retrograde gas is 35%.[4] The CCE shows upon obtaining the saturation pressure 4516 psig, the percent of HCPV at 4467 psig (only a 49 psi decrease) dramatically increases from 0 to 35.4% and continues to increase to 48.62% at only 4,201 psig and never drops below 39% to an abandonment pressure of 1,170 psig. There is no data to support that this volume of condensate in the reservoir is not only mobile but is being produced at the surface.

Retrograde gas-condensate reservoirs are unique and the geological and reservoir/chemical characteristics must be understood to differentiate this reservoir from a volatile oil reservoir. Reservoir temperature is essential in the classification of the type of reservoir i.e. volatile oil or retrograde gas condensate. A fluid composition might be classified as a volatile oil in one reservoir and a gas condensate in a deeper and hotter reservoir. If the reservoir temperature lies between the critical temperature and the cricondentherm of the reservoir fluid, the reservoir is classified as a retrograde gas-condensate reservoir. If the initial reservoir pressure is above the upper dew point pressure, the hydrocarbon system exists as a single phase (vapor) in the reservoir. As the reservoir pressure declines isothermally (constant

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[2] The Practical Aspects of Reservoir Simulation Modeling, Robert C, Mac Donald, May 13-14, 1996.

[3] Contributions in Petroleum Geology & Engineering "Hydrocarbon Phase Behavior", by Tarek Ahmed:"... In most gas condensate reservoirs, the condensed liquid seldom exceeds more that 10% of the pore volume".

Applied Petroleum Reservoir Engineering, Second Edition, by B.C. Craft and M.F. Hawkins "... Laboratory experiments have shown that with most rocks the oil phase is essentially immobile until it builds up to a saturation in the range of 10 to 20% of the pore space. Because the liquid saturations for most retrograde fluids seldom exceed 10%, this is a reasonable assumption for most retrograde condensate reservoirs."

[4] The Properties of Petroleum Fluids, Second Edition, by William D. McCain, Jr. "... An initial producing gas-oil ratio of 3300 to 5000 scf/STB indicates a very rich retrograde gas, one which will condense sufficient liquid to fill 35 percent or more of the reservoir volume. Even this quantity of liquid seldom will flow and normally cannot be produced."

temperature) because of production depletion to the dew point pressure or "saturation" pressure, liquids begin to condense out of the gas into the formation. As the pressure is further decreased, instead of expanding (if a gas) or vaporizing (if a liquid) as would be expected, the hydrocarbon mixture tends to condense even more. The retrograde condensation process continues with decreasing pressure until the liquid drop-out reaches its maximum. At this point, some of the liquid which formed may vaporize.[5]

Subsequent to the hearing, the examiner requested additional data concerning the remaining recoverable reserves for the subject well and hence the reservoir as the current producing rate is only ± 160 MCFD and ± 33 BOPD. The data indicates the remaining recoverable reserves to be only 64 MMCF for a total recovery of 267 MMCF. For an oil well producing at this depth, the allowable would be 237 BOPD and a gas limit of 474 MCF of casinghead gas. The subject well is producing substantially below these maximums.

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 Rich Ranch (Yegua) Field was discovered May 5, 2002 by completion of the Walter Oil & Gas Corp., Smith-Bailey Lease Well No. 1 through perforations from 11,398' to 11,429' subsurface depth.

    a. The field is governed by Statewide Rules.

    b. The field is classified as Non-Associated - Prorated.

    c. Walter Oil & Gas is the only operator in the field with one well.

3. The Smith-Bailey Lease Well No. 1 potentialed at 1,682 MCFD and a calculated absolute open flow of 4,304 MCFD. The gas gravity is 0.702 and the condensate gravity is 47.8EAPI. The initial gas/liquid ratio was 2,562:1. The color of the hydrocarbon liquid was "dark amber". The original static reservoir conditions reported on Commission Form G-1 were 11,961 psig (calculated) and 257EF.

    a. A Retest Form G-1, July 22, 2004, showed flow rate at 1,040 MCFD and a calculated absolute open flow of 2,304 MCFD. The condensate gravity was 51.7EAPI. The initial gas/liquid ratio was 2,646:1. The bottomhole pressure reported was 11,340 psig.

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[5] If the reservoir temperature is near the critical temperature, when the dew point pressure is reached, there will be a rapid liquid build-up (condensation) and subsequently a dramatic increase in the GOR. It should be noted that the composition and mole percent of the hydrocarbons in the reservoir changes significantly with depleting reservoir pressure.

b. A static Gradient Survey dated May 22, 2003 showed a reservoir pressure of 6,450 psia. A static Gradient Survey dated May 28, 2004 showed a reservoir pressure of 4,641 psia.

c. The mechanical Constant Composition Expansion (CCE) results show a measured dew point pressure of 4,516 psig at 257EF.

d. The reservoir fluid existed as single-phase gas at initial reservoir conditions.

e. Compositional analysis indicates the wellstream to be 63.3% methane and 12.779% heptanes plus.

4. The Walter Oil & Gas Corp., Smith-Bailey Lease Well No. 1 should be classified as an oil well.

a. Any hydrocarbon liquids that condense from the gas phase in the formation are mobile in the reservoir and are produced at the surface.

b. The CCE analysis measured the maximum hydrocarbon liquid volume in the two-phase envelope will occupy 48.62% of the hydrocarbon pore volume (HCPV) at 4,201 psig.

c. The current reservoir pressure is at/near or below the dew point pressure.

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 Walter Oil & Gas, Smith-Bailey Lease Well No. 1 in the Rich Ranch (Yegua) Field does not meet the requirements for gas well/field classification pursuant to Statewide Rule No. 79(a)(11)(C) and 16 Tex. Admin. Code §3.79.

RECOMMENDATION

Based on the above findings and conclusions of law, the examiner recommends that the application of Walter Oil & Gas, Smith-Bailey Lease Well No. 1 in the Rich Ranch (Yegua) Field be permanently classified as a gas well be denied.

Respectfully submitted,

Thomas H. Richter, P.E.
Technical Examiner
Office of General Counsel