



RAILROAD COMMISSION OF TEXAS

HEARINGS DIVISION

OIL AND GAS DOCKET NO. 08-0286383

THE APPLICATION OF SHELL WESTERN E&P TO CONSIDER RECLASSIFYING OIL WELLS TO GAS WELLS FOR VARIOUS LEASES, VARIOUS WELLS, SANDBAR (BONE SPRING) FIELD, LOVING COUNTY, TEXAS

HEARD BY: Paul Dubois – Technical Examiner
Terry Johnson – Legal Examiner

DATE OF HEARING: January 27, 2014

APPEARANCES: **REPRESENTING:**

APPLICANT:

Rick Johnston
George Mullen

Shell Western E&P

EXAMINERS' REPORT AND RECOMMENDATION

STATEMENT OF THE CASE

This is the application of Shell Western E&P (Shell) to reclassify 26 oil wells as gas wells in the Sandbar (Bone Spring) Field, Loving County, Texas. Shell recently acquired the wells from Chesapeake Operating, Inc. (Chesapeake). The application was not protested.

MATTERS OFFICIALLY NOTICED

The examiners take official notice of Commission records in the matter of Oil & Gas Docket No. 08-0275393, the application of Anadarko Petroleum Corporation to amend field rules and to authorize permanent gas well classification for wells in the Sandbar (Bone Spring) Field, Loving County, Texas.

DISCUSSION OF THE EVIDENCE

On June 12, 2012 the Commission issued a Final Order to Oil & Gas Docket No. 08-0275393, the application of Anadarko Petroleum Corporation to amend field rules and to authorize permanent gas well classification for wells in the Sandbar (Bone Spring) Field. Under this order the Commission authorized the permanent classification as gas wells for all wells completed in the field with a gas-oil ratio (GOR) of 3,000:1 cubic feet per barrel and above, effective the date of initial completion.

Shell acquired 26 oil wells in the field from Chesapeake, and Shell now seeks to have these 26 oil wells reclassified as gas wells under the existing field rules established by the Commission in Docket No. 08-0275393. During and after the hearing Shell provided evidence to support 24 of these wells achieving a stabilized completion GOR of 3,000:1 or greater; Shell withdrew the remaining two wells from consideration because sufficient data was not available for these wells. All 26 wells are listed below:

Well	API No.
BRIDWELL 54-1-34 LOV 1H	301-31679
BRIDWELL 54-1-40 LOV 1H	301-31819
BULLHEAD STATE 55-1-44 1H	301-31584
GREAT WHITE STATE 54-1-8 LOV 1H	301-31614
HARDIN-SIMMONS 53-2-8 LOV 1H	301-31811
JOHNSON 54-2-24 LOV 1H	301-31797
JOHNSON 54-2-26 1H	301-31553
JOHNSON 54-2-34 1H	301-31524
JOHNSON 54-2-36 2H	301-31882
JOHNSON 54-2-38 1H	301-31886
JOHNSON 54-2-40 1H	301-31552
JOHNSON 54-2-46 LOV 1H	301-31693
JOHNSON 54-2-48 LOV 1H	301-31608
LINDLEY 54-2-28 1H	301-31585
LINDLEY 54-2-30 1H	301-31570
LINDLEY 54-2-32 LOV 1H	301-31605
LINDLEY STATE 54-2-22 LOV 1H	301-31792
MCCONNELL STATE 55-1-42 LOV 1H	301-31599
ODEL STATE 54-1-6 LOV 1H	301-31833

Well	API No.
REED ESTATE 27 2H (withdrawn)	301-30585
ROCAZOLLER STATE 54-1-12 LOV 1H	301-31645
SLACK BOX 54-2-16 LOV 1H	301-31817
SLACK BOX 54-2-32 1H (withdrawn)	301-31901
TEXACO 35 3H	301-31669
TOM MCKNIGHT 21-2H	301-31754
WALLACE 54-1-42 LOV 1H	301-31805

Shell's representative testified that stability for these wells is indicated by the wells producing hydrocarbons at a maximum rate soon after completion, followed by an expected rate of decline. Ten (10) wells exhibited a GOR less than the 3,000:1 threshold on initial potential testing. Shell indicated that these wells were scattered throughout the field area among wells with higher initial GORs. Production data from these wells suggests that the initial potential testing for these ten (10) wells was not representative of a stabilized production rate and that the wells were still flowing-back introduced stimulation fluids. All of these wells exhibited GORs exceeding 3,000:1 within five months of initial production.

The current oil proration schedule for the field carries 28 producing wells and the current gas proration schedule carries 29 wells. Shell specifically requests reclassification via a Commission Final Order to facilitate its application for a severance tax reduction under Statewide Rule 101 and Section 201 of the Texas Tax Code. Shell's representative stated that a Commission Final Order is necessary to meet the Texas Comptroller of Public Accounts' requirements for this tax reduction.

In the matter of Docket No. 08-0275393 Anadarko sought to adopt a means of permanently classifying wells as gas wells based on a 3000:1 or greater GOR at completion. permanently classifying wells as gas wells based on a 3000:1 or greater GOR at completion. This approach, justified based on the works of Phillip L. Moses¹ and William D. McCain, Jr.², was adopted at the request of operators in several Eagle Ford Formation and other fields in the state as well as by Anadarko in the Sandbar (Bone Spring) Field.

Reviewing the works of Moses and McCain, the examiners note the cited references predate the recent development of massive fracture stimulation of horizontal wells in tight

¹ Moses, Phillip L., SPE, Core Laboratories, Inc., "Engineering Applications of Phase Behavior of Crude oil and Condensate Systems", Journal of Petroleum Technology, July 1986, pp 715-723. SPE paper 15835.

² McCain, William D., Jr., The Properties of Petroleum Fluids, Second Edition, PennWell Publishing Company, Tulsa, OK. 1990.

shales that generate large volumes of flow-back water (indeed, it would be interesting and helpful to see Moses & McCain's work updated in this regard). Moses does, however, recognize the need for well testing to be conducted once a well has stabilized and before the initial reservoir pressure has decreased. Moses states, "The most important factor in a flow test is stabilization. This includes stable wellhead pressure, stable gas production, and stable liquid production." (Moses, 717). Stability would appear to require recovery of at least some of the introduced stimulation fluids before the original formation fluids can establish a representative production at the wellhead. But, Moses explains, well testing must occur early in the life of the well: "As is the case with oil reservoirs, gas-condensate reservoirs should be sampled early in their life, before significant pressure loss has occurred. Once reservoir pressure has declined below the original dewpoint, it is no longer possible to get samples that represent the original reservoir fluid". (Moses, 718). Thus the examiners recognize the potentially conflicting time demands that (1) the 3,000:1 GOR criteria for classification applies to wells with a 3,000:1 GOR at *completion* (as has been worded in the various Commission Final Orders on these issues), and not some indefinite time in the future after production has commenced; but (2) a certain additional time after well completion (i.e., stimulation) may be needed for a well to be stabilized to allow for a representative test.

FINDINGS OF FACT

1. Notice of this application and hearing was provided to all persons entitled to notice at least ten (10) days prior to the date of the hearing.
2. On June 12, 2012 the Commission issued a Final Order to Oil & Gas Docket No. 08-0275393, authorizing the permanent classification as gas wells for all wells completed in the field with a gas-oil ratio (GOR) of 3,000:1 cubic feet per barrel and above, effective the date of initial completion.
3. Shell Western E&P acquired 26 oil wells in the field from Chesapeake Operating, Inc.
4. Shell demonstrated that 24 of the wells were completed with a stabilized GOR of 3,000:1 or greater.
5. Wells completed in the Sandbar (Bone Spring) Field with a stabilized GOR of 3,000:1 or greater may be permanently classified as gas wells.

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 24 wells on Attachment A meet the requirements of Sandbar (Bone Spring) Field to be permanently classified as gas wells, effective the date of first production.

RECOMMENDATION

The examiners recommend that the wells listed on Attachment A be permanently reclassified as gas wells, effective the date of initial completion.

Respectfully submitted,



Paul Dubois
Technical Examiner



Terry Johnson
Legal Examiner

ATTACHMENT A

WELLS TO BE PERMANENTLY RECLASSIFIED AS GAS WELLS
EFFECTIVE ON THE DATE OF INITIAL COMPLETION

Well	API No.
BRIDWELL 54-1-34 LOV 1H	301-31679
BRIDWELL 54-1-40 LOV 1H	301-31819
BULLHEAD STATE 55-1-44 1H	301-31584
GREAT WHITE STATE 54-1-8 LOV 1H	301-31614
HARDIN-SIMMONS 53-2-8 LOV 1H	301-31811
JOHNSON 54-2-24 LOV 1H	301-31797
JOHNSON 54-2-26 1H	301-31553
JOHNSON 54-2-34 1H	301-31524
JOHNSON 54-2-36 2H	301-31882
JOHNSON 54-2-38 1H	301-31886
JOHNSON 54-2-40 1H	301-31552
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LINDLEY 54-2-30 1H	301-31570
LINDLEY 54-2-32 LOV 1H	301-31605
LINDLEY STATE 54-2-22 LOV 1H	301-31792
MCCONNELL STATE 55-1-42 LOV 1H	301-31599
ODEL STATE 54-1-6 LOV 1H	301-31833
ROCAZOLLER STATE 54-1-12 LOV 1H	301-31645
SLACK BOX 54-2-16 LOV 1H	301-31817
TEXACO 35 3H	301-31669
TOM MCKNIGHT 21-2H	301-31754
WALLACE 54-1-42 LOV 1H	301-31805



RAILROAD COMMISSION OF TEXAS

HEARINGS DIVISION

OIL AND GAS DOCKET NO. 03-0287228

THE APPLICATION OF UNIT PETROLEUM COMPANY TO AMEND FIELD RULES FOR THE JAZZ (WILCOX DEEP) FIELD, HARDIN, POLK AND TYLER COUNTIES, TEXAS

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

DATE OF HEARING: March 12, 2014

APPEARANCES: **REPRESENTING:**

APPLICANT:

Frank J. Muser

Unit Petroleum Company

EXAMINERS' REPORT AND RECOMMENDATION

STATEMENT OF THE CASE

Unit Petroleum Company (Unit) requests that field rules for the Jazz (Wilcox Deep) Field be amended. The current field rules were adopted on June 10, 2008 (Docket No. 03-0255497). Unit seeks to amend the field rules to add current language to facilitate field development with horizontal wells; specifically, Unit seeks to adopt the same rules as the Jazz (Magic) Field (Docket No. 03-0283392) except for the correlative interval. This application was not protested and the examiner recommends that the field rules for the Jazz (Wilcox Deep) Field be amended as proposed by Unit Petroleum Company.

DISCUSSION OF EVIDENCE

The Jazz (Wilcox Deep) Field was formed in 2006 with the consolidation of the Jazz (Wilcox 10500) Field, the Pavey Kirby (Wilcox 10350) Field, the Triple Creek (Wilcox 10900) Field and the Triple Creek (Wilcox 12900) Field as a non-associated gas field. The current gas proration schedule carries 26 active producing wells. Unit Petroleum is the only operator in the field. The correlative interval is from 10,300 feet to 13,200 feet in Unit's BP C 1 well (API No. 373-31041). There are numerous productive sand intervals throughout the 2,900-foot thick correlative interval.

The Jazz (Wilcox Deep) Field is underlain by the Jazz (Magic) Field. Following Unit's application for a new field discovery the Commission established field rules for the Jazz (Magic) Field (Docket No. 03-0283392) on November 6, 2013. Except for the correlative interval, Unit seeks to adopt the horizontal provisions of the Jazz (Magic) Field for the Jazz (Wilcox Deep) Field. The proposed field rules for the Jazz (Wilcox Deep) Field are as follows:

1. Designation of the field as the correlative interval from 10,300 feet to 13,200 feet as shown on the log of the Unit Petroleum Company, BP C, Well No. 1 (API No. 373-31041);
2. 467'-660' well spacing with special provisions for "take points", 100' lease line spacing for the first and last take points, no minimum between well spacing limitation for horizontal drainhole wells and vertical wells or horizontal drainhole wells that are parallel or sub-parallel and do not overlap more than 500 feet, a 50' "box" rule and "off-lease" penetration point for horizontal drainhole wells;
3. 40 acre gas units with a special provision for the additional acreage assignment to horizontal drainhole wells based on the formula $A = (L \times 0.15) + 40$;
4. Allocation based on 95% acres and 5% per well with AOF status;
5. Special provisions for "stacked laterals" in horizontal drainhole wells.

Unit also requests that proration unit plats not be required for individual wells, but that Form P-15 be filed to designate the number of acres to be assigned to each well with no maximum diagonal limitation.

Unit is proposing to develop the field with horizontal drainhole wells and requests Temporary Field Rules to promote the efficient and effective development of the remaining hydrocarbons. Unit proposes 467'-660' well spacing with special provisions for "take points", 100' lease line spacing for the first and last take points, no minimum between well spacing limitation for horizontal drainhole wells and vertical wells or horizontal drainhole wells that are parallel or sub-parallel and do not overlap more than 500 feet, a 50' "box" rule and "off-lease" penetration point for horizontal drainhole wells.

Unit requests that a field rule be adopted which includes language relevant to the measurement of distances to lease lines for horizontal drainhole wells. Unit's proposed rule specifies that, for purposes of lease line spacing, the nearest "take point" in a horizontal well be used. This take-point could be a perforation in a horizontal well that is

cased and cemented, an external casing packer in a cased well, or any open-hole section in an uncased well.

Unit proposes a tolerance “box rule” for horizontal drainhole wells that would allow drainholes to deviate 50 feet from either side of their permitted track without the necessity of obtaining a Statewide Rule 37 exception. As drilled wells for which all points are located within the “box” would be considered in compliance with their drilling permits.

In some cases, it is beneficial to penetrate the reservoir off lease, while still having “take points” no closer to lease lines than allowed under the field rules. Unit requests that Field Rules for the subject field provide for an “off-lease” penetration point. Statewide Rule 86 requires that the penetration point of a horizontal drainhole be on the lease. In this field, a well generally requires approximately 600 feet of horizontal displacement to make the 90 degree turn from vertical to horizontal. If the penetration point is required to be on the lease, then the first point of production would be about 600 feet from the lease line. The proposed rule will allow approximately 500 feet of additional producing drainhole, resulting in the recovery of additional oil and gas reserves. The Commission has adopted similar rules allowing offsite penetration points in other fields, after the operator has given notice to the mineral owners of the off-lease tract on which the penetration point is to be located and received no protest.

The Jazz (Wilcox Deep) Field is located in the East Texas Basin and the Wilcox formation is correlative across the entire area. The Wilcox formation is a low permeability sandstone reservoir that requires fracture stimulation and has a solution gas drive as the primary drive mechanism. Unit is requesting that the first and last take points of a lateral be as close as 100' to lease lines. The Wilcox reservoir has oriented fractures and most of the drainage is along the fracture orientation with little contribution from the matrix in a perpendicular direction. A wellbore can be presumed to be drilled to encounter the maximum number of fractures and, therefore, be perpendicular to the fracture direction. The end points of such a lateral will not drain over 100' from the matrix in a direction perpendicular to fracture direction. The 100' leaseline spacing for the first and last take points will result in the additional recovery of reserves.

Unit requests 40 acre gas units with a special provision for the additional acreage assignment to horizontal drainhole wells based on the formula $A = (L \times 0.15) + 40$. Unit believes that horizontal drainhole wells will drain up to 640 acres and the proposed formula is similar to the one used in other tight formation fields. For purposes of the assignment of additional acreage pursuant to the formula above, it is proposed that the distance between the first and last take points in a horizontal drainhole well be used.

Unit also requests that a Field Rule be adopted to accommodate the drilling of stacked lateral horizontal drainhole wells. The gross thickness of the field interval is almost 3,000 feet. Unit believes that several separate laterals may be necessary to effectively

develop the reservoir with horizontal drainhole wells. The rule would allow stacked horizontal laterals within the field correlative interval that are drilled from different surface locations to be considered a single well for regulatory purposes.

Unit proposes that proration unit plats not be required for individual wells, but that Form P-15 be filed to designate the number of acres to be assigned to each well with no maximum diagonal limitation. Unit requests allocation based on 95% acres and 5% per well and that the allocation formula be suspended, as there is a 100% market demand for all of the gas produced from the field.

FINDINGS OF FACT

1. Notice of this hearing was provided to all persons entitled to notice at least ten (10) days prior to the date of the hearing and no protests were received.
2. The current gas proration field carries 26 active producing wells in the non-associated field.
3. The correlative interval from 10,300 feet to 13,200 feet as shown on the log of the Unit Petroleum Company, BP C, Well No. 1 (API No. 373-31041), Polk County, Texas, should be designated as the Jazz (Wilcox Deep) Field.
4. Field Rules providing for 467'-660' well spacing with special provisions for "take points", 100' lease line spacing for the first and last take points, no minimum between well spacing limitation for horizontal drainhole wells and vertical wells or horizontal drainhole wells that are parallel or sub-parallel and do not overlap more than 500 feet, a 50' "box" rule and "off-lease" penetration point for horizontal drainhole wells will provide consistency in developing the field and will allow greater flexibility in selecting future drilling locations.
5. A spacing rule which utilizes "take-points" in a horizontal well for determination of distances to lease lines will prevent waste and will not harm correlative rights.
 - a. A take-point in a horizontal drainhole well in this field may be a perforation in a horizontal well that is cased and cemented, an external casing packer in a cased well, or any open-hole section in an uncased portion of the wellbore.
 - b. Adoption of the proposed rule will allow the horizontal drainhole length on a lease to be maximized.

- c. For purposes of assignment of additional acreage pursuant to the special formula, the distance between the first and last take points in a horizontal drainhole well should be used.
6. The proposed 50' "box" rule is necessary to allow operators reasonable minor deviations from the wellbore track that has been permitted.
7. Allowing an "off-lease" penetration point will result in maximum producing drainhole length, thereby increasing ultimate recovery from horizontal drainhole wells. To protect correlative rights, prior notice and opportunity to object should be given to the mineral owners of "off-lease" surface locations.
8. A 100' leaseline spacing for the first and last take points will result in an additional recovery of reserves.
 - a. The Wilcox formation is a low permeability sandstone reservoir that requires fracture stimulation.
 - b. The Wilcox reservoir has oriented fractures and most of the drainage is along the fracture orientation with little contribution from the matrix in a perpendicular direction.
 - c. A wellbore can be presumed to be drilled to encounter the maximum number of fractures and, therefore, be perpendicular to the fracture direction.
 - d. The end points of such a lateral will not drain over 100' from the matrix in a direction perpendicular to fracture direction.
9. Adoption of 40 acre gas units with a special provision for the additional acreage assignment to horizontal drainhole wells based on the formula $A = (L \times 0.15) + 40$ is appropriate for the field.
 - a. Horizontal drainhole wells will drain up to 640 acres and the proposed formula is similar to the one used in other tight formation fields.
 - b. For purposes of the assignment of additional acreage pursuant to the formula above, the distance between the first and last take points in a horizontal drainhole well should be used.
10. The proposed "stacked lateral" rule will allow stacked horizontal laterals within the Wilcox correlative interval that are drilled from different surface locations to be considered a single well for regulatory purposes, which will

facilitate the additional recovery of reserves.

12. Allocation based on 95% acres and 5% per well is a reasonable formula which will satisfy state statutes and protect correlative rights of mineral owners in the field.
13. Suspension of the allocation formula is appropriate, as there is a 100% market demand for all of the gas produced from the field.
14. The filing of Form P-15 to designate the number of acres to be assigned to each well for proration purposes with no proration unit plats and no maximum diagonal limitation will eliminate unnecessary paperwork.

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. Amending the Field Rules for the Jazz (Wilcox Deep) Field will prevent waste, protect correlative rights and promote the orderly development of the field.

EXAMINERS' RECOMMENDATION

Based on the above findings of fact and conclusions of law, the examiners recommend that the Commission amend the Field Rules for the Jazz (Wilcox Deep) Field, as requested by Unit Petroleum Company.

Respectfully submitted,



Paul Dubois
Technical Examiner



Marshall Enquist
Hearings Examiner