



RAILROAD COMMISSION OF TEXAS

HEARINGS DIVISION

OIL AND GAS DOCKET NO. 01-0278062

THE APPLICATION OF DAN A. HUGHES COMPANY, L.P. FOR THE ADOPTION OF
FIELD RULES FOR THE PEARSALL (BUDA, S.) FIELD, FRIO AND ZAVALA
COUNTIES, TEXAS

HEARD BY: Brian K. Fancher, P.G. - Technical Examiner
Terry Johnson - Legal Examiner

HEARING DATE: September 21, 2012

APPEARANCES:

REPRESENTING:

APPLICANT:

Michael McElroy
James McBeath

Dan A. Hughes Company, L.P.

OBSERVER:

Ed Mainka

BlackBrush O &G, LLC

EXAMINERS' REPORT AND RECOMMENDATION

STATEMENT OF THE CASE

Dan A. Hughes Company, L.P. ("Hughes") requests that Field Rules for the Pearsall (Buda, S.) Field be adopted. Hughes requests the following Field Rules:

1. Designation of the field as the correlative interval from 6,996 feet to 7,130 feet, as shown on the Den-Nu-GR for the Dan A. Hughes Company, Heitz 304 Lease, Well No. 1H (API No. 42-507-32828), located in Zavala County, Texas;
2. 467'-660' well spacing and no minimum between well spacing limitation between horizontal drainhole wells and vertical wells. Special provisions for horizontal well spacing based on "take points", no minimum between well spacing for horizontal wells that are parallel or subparallel and do not overlap more than 500', a 50 foot "box" rule and an "off-lease" penetration point for horizontal drainhole wells;
3. 160-acre proration units with 40-acre tolerance, and 80-acre optional units. An

exception to Statewide Rule 86, with respect of assignment of additional acreage to horizontal wells, based on the following formula:

$A = (L \times 0.08126) + 160$ acres, where A is the acreage assignable to the well and L is the horizontal drainhole distance measured in feet between the first take point and last take point;

4. Allocation based on 100% acreage.

The application is unopposed and the examiners recommend that Field Rules for the Pearsall (Buda, S.) Field be adopted, as proposed by Dan A. Hughes Company, L.P.

DISCUSSION OF THE EVIDENCE

The Pearsall (Buda, S.) Field was discovered in August 1967 at an average depth of 6,000 feet. The field is classified as an oil field and operates under Statewide Rules. The September 2012 oil proration schedule indicates there are two operators in the subject field, BlackBrush O&G, LLC and Carrizo Exploration, Inc. There are two wells on schedule with one well actively producing oil. Cumulative production from the field through July 2012 is 119 thousand barrels of oil ("MBO") and 384.7 million cubic feet of natural gas ("MMCFG"). Hughes currently has four horizontal wells drilled in the subject field that are awaiting for their respective completion forms to be reviewed by Commission staff. Hughes testified the initial production rates for these four wells range from 165 to 351 BO per day, with 150 to 665 MCFG per day.

Hughes is proposing to drill horizontal infill wells and requests Field Rules to promote the efficient and effective development of the remaining hydrocarbons. Hughes requests 467'-660' well spacing and no minimum between well spacing limitation between horizontal drainhole wells and vertical wells with special provisions for "take points", 100' lease line spacing for the first and last take points, a 50 foot "box" rule and "off-lease" penetration point for horizontal drainhole wells. Hughes requests for no minimum between well spacing for horizontal wells that are parallel or subparallel and do not overlap more than 500'. Similar rules have been adopted in other tight reservoirs, including the Hawkville (Austin Chalk, Hawkville (Eagleford Shale), Speary (Edwards), Carthage (Cotton Valley), and Waskom (Cotton Valley) Fields.

In support of its position, Hughes submitted a structure map for the top of the Buda formation ("Buda") in the area surrounding the Hughes, Heitz Lease in Zavala County. The structure map indicates the Buda is continuous throughout the region and that the strike plane¹ is from northeast to southwest. The top of the Buda gradually dips to the south-southeast and contains an anomalous structural high in southwest Frio County.

¹ Strike is the horizontal alignment of a formation at an angle ninety degrees to dip.

At the hearing, Hughes submitted two stratigraphic cross-sections (A-A' and B-B') that traverse west to east and north to south, respectively. Cross-section A-A' trends parallel to strike and cross-section B-B' trends perpendicular to strike. Datum for each cross-section is the top of the Austin Chalk formation. Additionally, each cross-section indicates correlative structural deviations for the underlying Eagle Ford Shale, Buda, and Del Rio formations. A-A' indicates that each of these formations increase in thickness to the west and decrease in thickness to the east. B-B' indicates that faulting is present near the eastern boundary of the county line distinguishing Zavala and Dimmit Counties. Hughes testified that it seeks to drill horizontal wells near faults occurring through the Buda, as these well types are not stimulated with hydrofrac completion methods. Instead, horizontal wells are drilled to target naturally occurring fractures in the Buda as a consequence of faulting.

There is currently no defined correlative interval for the field. Hughes requests that the subject field be defined as the correlative interval from 6,996 feet to 7,130 feet, as shown on the Den-Nu-GR for the Dan A. Hughes Company, Heitz 304 Lease, Well No. 1H (API No. 42-507-32828), located in Zavala County, Texas. The correlative interval includes the entire Buda. The Buda is stratigraphically overlain by the Eagle Ford Shale formation and underlain by the Del Rio formation. Hughes testified the average porosity and permeability in the Buda is approximately three percent and 0.1 to 0.2 millidarcies, respectively.

Hughes requests that a field rule be adopted which includes language that provides dual lease line spacing for horizontal drainhole wells. Hughes's proposed rule specifies that for purposes of lease line spacing, the nearest "take point" in a horizontal well be used for the first and last take point. 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. Hughes requests that first and last take points be no closer than 100' from the nearest lease line. Hughes testified that 100' take points are appropriate for the subject field due to the low porosity and permeability values.

Hughes testified it seeks to incorporate Hughes submitted a Circumferential Borehole Image log for its Heitz Lease, Well No. 1H, completed in the subject field. This log suggests that the natural fracture strike plane trends within a narrow corridor essentially parallel to structural strike for the Buda. The orientation of the maximum stress appears to be uniform across the Buda and horizontal wells in the field are drilled generally northwest-southeast to more effectively encounter naturally occurring fractures in the Buda.

Hughes proposes a tolerance "box rule" for horizontal drainhole wells that would allow drainholes to deviate fifty 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.

Hughes seeks to include 160 acre proration units for vertical wells completed in the subject field. Hughes submitted a drainage area calculation for the Virtex Operating Co., McWilliam Heir A 1 Well, a

vertical completion in the nearby Doering Ranch (Georgetown) Field. The Doering Ranch (Georgetown) Field is a consolidated field that includes the former Doering Ranch (Buda) and Calvert (Buda) Fields. Based upon 69.5 feet thickness, 4% porosity, 65% water saturation, 15% recovery factor the calculated original oil in place is 766,667 stock tank barrels (“STB”) with an estimated ultimate recovery of 115,000 STB. These values calculate an estimated drainage area of 152.3 acres.

Hughes seeks an exception to Statewide Rule 86, with respect to the allocation of acreage to horizontal wells. Hughes proposed that allocation of horizontal wells be based on the following formula:

$A = (L \times 0.08126) + 160$ acres, where A is the acreage assignable to the well and L is the horizontal drainhole distance measured in feet between the first take point and last take point.

Hughes testified its proposed formula is appropriate. Hughes submitted a tabulation of oil test rates for five vertical wells and four horizontal wells completed in the Buda. Hughes testified that the average rate for a vertical well test is 76.3 BOPD while the average rate for a horizontal well test is 266.5 BOPD. That is, the horizontal well initial oil rates are approximately 3.5 times greater than that of vertical wells. For a horizontal well that includes a 4,500 foot lateral, the proposed formula results in 525 acres, or 3.3 times greater acreage than the 160-acre base proration unit.

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. Hughes 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 the subject 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 300 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. For purposes of the assignment of additional acreage pursuant to Statewide Rule 86, it is proposed that the distance between the first and last take-point in a horizontal drainhole well be used.

Based on the physical evidence it submitted to support its application, Hughes testified it believes that the field rules it requests will not cause waste and thereby promote conservation of hydrocarbons in the subject field.

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. The Pearsall (Buda, S.) Field was discovered in August 1967 at an average depth of 6,000 feet.
3. The Pearsall (Buda, S.) Field is classified as an oil field and operates under Statewide Rules.
4. Dan A. Hughes Company, L.P. ("Hughes") requests that special Field Rules for the Pearsall (Buda, S.) Field be adopted.
5. Hughes seeks Field Rules that provide for a designated correlative field interval, 467'-660' well spacing and no minimum between well spacing limitation between horizontal drainhole wells and vertical wells. Special provisions for horizontal well spacing based on "take points", no minimum between well spacing for horizontal wells that are parallel or subparallel and do not overlap more than 500', a 50 foot "box" rule and an "off-lease" penetration point for horizontal drainhole wells.
6. Hughes seeks Field Rules that provide for 160-acre proration units with 40-acre tolerance, and 80-acre optional units. An exception to Statewide Rule 86, with respect of assignment of additional acreage to horizontal wells, based on the following formula:
$$A = (L \times 0.08126) + 160 \text{ acres, where } A \text{ is the acreage assignable to the well and } L \text{ is the horizontal drainhole distance measured in feet between the first take point and last take point.}$$
7. The Pearsall (Buda, S.) Field should be defined as the correlative interval from 6,996 feet to 7,130 feet, as shown on the Den-Nu-GR for the Dan A. Hughes Company, Heitz 304 Lease, Well No. 1H (API No. 42-507-32828), located in Zavala County, Texas. This correlative interval includes the entire Buda formation.
8. The Pearsall (Buda, S.) Field is actively being developed with horizontal drainhole wells.
9. 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.
10. A take-point in a horizontal 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.

11. The proposed 50 foot "box" rule is necessary to allow operators reasonable minor deviations from the wellbore track that has been permitted.
12. 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.
13. A 100' leaseline spacing for the first and last take points will result in an additional recovery of reserves.
 - a. A Circumferential Borehole Image log for the Hughes, Heitz Lease, Well No. 1H indicates that the natural fracture strike plane trends within a narrow corridor essentially parallel to structural strike for the Buda formation.
 - b. The orientation of the maximum stress appears to be uniform in the Buda formation.
 - c. The very low permeability of the formations limits the effective drainage in the northwest-southeast direction of individual stages.

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. Adopting Field Rules for the Pearsall (Buda, S.) Field is necessary to prevent waste, protect correlative rights, and promote development of the field.

EXAMINERS' RECOMMENDATION

Based on the above findings of fact and conclusions of law, the examiners recommend that the Commission adopt Field Rules for the Pearsall (Buda, S.) Field, as requested by Dan A. Hughes Company, L.P.

Respectfully submitted,


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