



RAILROAD COMMISSION OF TEXAS

HEARINGS DIVISION

OIL AND GAS DOCKET NO. 08-0282091

THE APPLICATION OF CIMAREX ENERGY CO. TO CONSIDER A NEW FIELD DESIGNATION AND TO ADOPT TEMPORARY FIELD RULES FOR THE PROPOSED DERBY (BONE SPRING) FIELD, CULBERSON COUNTY, TEXAS

HEARD BY: Richard D. Atkins, P.E. - Technical Examiner
Marshall F. Enquist - Legal Examiner

DATE OF HEARING: May 23, 2013

APPEARANCES: REPRESENTING:

APPLICANT:

Michael E. McElroy Cimarex Energy Co.
Michael DeShazer
Dave Rittersbacher

EXAMINERS' REPORT AND RECOMMENDATION

STATEMENT OF THE CASE

Cimarex Energy Co. ("Cimarex") requests that a new field designation called the Derby (Bone Spring) Field (ID No. 24366 100) be approved for its Donerail 8 Fee Lease, Well No. 1H. Cimarex proposes that the following Temporary Field Rules be adopted for the new field:

1. Designation of the field as the correlative interval from 5,678 feet to 8,684 feet as shown on the log of the Cimarex Energy Co. - Donerail 8 Fee Lease, Well No. 1H (API No. 42-109-32507);
2. 467'-933' well spacing, 200' lease line spacing for the first and last take points in horizontal drainhole wells, 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 with special provisions for "take points", a 50' "box" rule and "off-lease" penetration point for horizontal drainhole wells;

3. 320 acre units with optional 80 acre density and a special provision for the additional acreage assignment to horizontal drainhole wells based on the formula $A = (L \times 0.15) + 320$;
4. Allocation based on 95% acres and 5% per well with a Top Oil Allowable based on 9 barrels per acre;
5. Permanent gas well classification for all wells producing at a gas-oil ratio of 3,000 cubic feet per barrel and above.

Cimarex 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.

The application is unopposed and the examiners recommend approval of the new field designation and adoption of Temporary Field Rules for the Derby (Bone Spring) Field, subject to review in 18 months, as requested by Cimarex.

DISCUSSION OF EVIDENCE

Cimarex completed its Donerail 8 Fee Lease, Well No. 1H, in March 2013 with perforations in the Bone Spring formation between 7,920 feet (MD) and 12,176 feet (MD). On initial test, the well produced flowing at a maximum rate of 443 BOPD, 2,122 MCFGPD and 1,491 BWPD with a gas-oil ratio of 4,790 cubic feet per barrel. Currently, Cimarex is the only operator in the new field.

A new field designation should be approved for the Donerail 8 Fee Lease, Well No. 1H, as there is no comparable production within a 2.5 mile radius of the discovery well. The proposed field is the first Bone Spring field in the area and the eight producing horizontal drainhole wells within the 2.5 mile radius produce from the deeper Wolfcamp formation. The closest comparable field is the Sandbar (Bone Spring) Field in Loving County, Texas. Cimarex requests that the correlative interval from 5,678 feet to 8,684 feet as shown on the log of the Cimarex Energy Co. - Donerail 8 Fee Lease, Well No. 1H (API No. 42-109-32507), Section 8, Block 59, T-2-S, T&P RR Co. Survey, A-6931, Culberson County, Texas, be designated as the Derby (Bone Spring) Field. The correlative interval includes the entire Bone Spring formation.

Cimarex 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. Cimarex proposes 467'-933' well spacing, 200' lease line spacing for the first and last take points in horizontal drainhole wells, 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 with special

provisions for "take points", a 50' "box" rule and "off-lease" penetration point for horizontal drainhole wells. Similar Field Rules have been adopted in other tight reservoirs, including the Eagle Ford, Wolfcamp, Cotton Valley, Bone Springs and Barnett Shale formations.

Cimarex requests that a field rule be adopted which includes language relevant to the measurement of distances to lease lines for horizontal drainhole wells. Cimarex'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.

Cimarex 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. Cimarex 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 400 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 Derby (Bone Spring) Field is located in the Delaware Basin and the Bone Spring formation is correlative across the entire area. The Bone Spring formation is a low permeability sandstone reservoir that requires fracture stimulation and has a solution gas drive as the primary drive mechanism. Cimarex is requesting that the first and last take points of a lateral be as close as 200' to lease lines. The Bone Spring 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 200' from the matrix in a direction perpendicular to fracture direction. The 200' leaseline spacing for the first and last take points will result in the additional recovery of reserves.

Cimarex requests 320 acre units with optional 80 acre density and a special provision for the additional acreage assignment to horizontal drainhole wells based on the formula $A = (L \times 0.15) + 320$. Cimarex believes that horizontal drainhole wells will drain up

to 640 acres and the proposed formula is similar to the one used in other tight Bone Spring 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.

Cimarex 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. Cimarex proposes allocation based on 95% acres and 5% per well with a Top Oil Allowable based on 9 barrels per acre.

Cimarex additionally requests that all wells demonstrating a gas-oil ratio of 3,000 cubic feet per barrel and above in the Derby (Bone Spring) Field be permanently classified as gas wells, effective the date of first production for each well. There is no defined gas cap in the field and well logs of the tight Bone Spring formation cannot determine if a well will produce gas or oil or if the well will produce commercial quantities of hydrocarbons. The majority of the wells are classified as gas wells. Cimarex submitted a mathematically recombined C7+ wellstream analysis for a well operated by Cimarex. The analysis included the producing gas-oil ratio at the test date, heptanes-plus mole percent and API gravity. The gas-oil ratio for the subject well was 3,414 cubic feet per barrel. Current Commission policy allows for any well that exhibits a heptanes-plus mole % of 12.5% or less to be classified as a permanent gas well. This is supported by research published in William D. McCain, *The Properties of Petroleum Fluids*, and by Phillip L Moses, *Engineering Applications of Phase Behavior of Crude Oil and Condensate Systems*. The mol% heptanes-plus in the subject sample analyzed was 12.5%. For a gas-oil ratio on initial test of less than 3,000 cubic feet per barrel, most of the wells would have more than 12.5 mol% heptanes-plus and would be classified as an oil well. For a gas-oil ratio on initial test of 3,000 cubic feet per barrel and above, most of the wells would have 12.5 mol% or less heptanes-plus and would be classified as a gas well. Any additional wells completed in the field are expected to exhibit similar fluid characteristics, since they produce from a retrograde condensate gas reservoir. Additional mathematically recombined heptanes-plus wellstream analyses are unnecessary for classification of wells as permanent gas wells.

FINDINGS OF FACT

1. Notice of this hearing was given to all persons entitled to notice at least ten days prior to the date of hearing.
2. Cimarex Energy Co. ("Cimarex") completed its Donerail 8 Fee Lease, Well No. 1H, in March 2013 with perforations in the Bone Spring formation between 7,920 feet (MD) and 12,176 feet (MD).

- a. On initial test, the well produced flowing at a maximum rate of 443 BOPD, 2,122 MCFGPD and 1,491 BWPD with a gas-oil ratio of 4,790 cubic feet per barrel.
 - b. Currently, Cimarex is the only operator in the new field.
 - c. The Donerail 8 Fee Lease, Well No. 1H, is entitled to a new field designation, as there is no comparable production within a 2.5 mile radius of the discovery well.
 - d. The Derby (Bone Spring) Field is actively being developed with horizontal drainhole wells.
3. The correlative interval from 5,678 feet to 8,684 feet as shown on the log of the Cimarex Energy Co. - Donerail 8 Fee Lease, Well No. 1H (API No. 42-109-32507), Section 8, Block 59, T-2-S, T&P RR Co. Survey, A-6931, Culberson County, Texas, should be designated as the Derby (Bone Spring) Field. The correlative interval includes the entire Bone Spring formation.
4. Temporary Field Rules providing for 467'-933' well spacing, 200' lease line spacing for the first and last take points in horizontal drainhole wells, 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 with special provisions for "take points", 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 200' leaseline spacing for the first and last take points will result in an additional recovery of reserves.
 - a. The Bone Spring formation is a low permeability sandstone reservoir that requires fracture stimulation.
 - b. The Bone Spring 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 200' from the matrix in a direction perpendicular to fracture direction.
9. Adoption of 320 acre units with optional 80 acre density and a special provision for the additional acreage assignment to horizontal drainhole wells based on the formula $A = (L \times 0.15) + 320$ 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 Bone Spring formation fields.
 - b. Similar spacing and base density Field Rules have already been adopted in the closest comparable field, the Sandbar (Bone Spring) Field in Loving County, Texas.
10. Similar Field Rules have been adopted in other tight reservoirs, including the Eagle Ford, Wolfcamp, Cotton Valley, Bone Springs and Barnett Shale formations.

11. The filing of Form P-15 to designate the number of acres to be assigned to each well for proration purposes with no proration plats will eliminate unnecessary paperwork.
12. Allocation based on 95% acres and 5% per well with a Top Oil Allowable based on 9 barrels per acre is a reasonable formula which will protect correlative rights and meet statutory requirements.
13. All wells completed with a gas-oil ratio of 3,000 cubic feet per barrel and above in the Derby (Bone Spring) Field should be permanently classified as gas wells because they produce from a retrograde condensate gas reservoir.
 - a. There is a mathematically recombined heptanes+ wellstream analysis for one well in the field.
 - b. The mol% heptanes+ in the sample analyzed was 12.5%.
 - c. For a gas-oil ratio on initial test of less than 3,000 cubic feet per barrel, most of the wells would have more than 12.5 mol% heptanes-plus and would be classified as an oil well.
 - d. For a gas-oil ratio on initial test of 3,000 cubic feet per barrel and above, most of the wells would have 12.5 mol% or less heptanes-plus and would be classified as a gas well.
 - e. Any additional wells completed in the field are expected to exhibit similar fluid characteristics.
 - f. Additional mathematically recombined heptanes-plus wellstream analyses are unnecessary for classification of wells as permanent 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. Approval of the requested new field designation and adoption of Temporary Field Rules for the Derby (Bone Spring) Field will prevent waste, protect correlative rights and promote the orderly development of the field.

4. All wells completed with a gas-oil ratio of 3,000 cubic feet per barrel and above in the Derby (Bone Spring) Field, Culberson County, Texas, are gas wells, effective the date of first production, based on the definition of a gas well pursuant to Statewide Rule 79.

RECOMMENDATION

Based on the above findings of fact and conclusions of law, the examiners recommend that the Commission approve the new field designation and adopt Temporary Field Rules for the proposed Derby (Bone Spring) Field, subject to review in 18 months, as requested by Cimarex Energy Co.

Respectfully submitted,



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