



RAILROAD COMMISSION OF TEXAS

HEARINGS DIVISION

OIL AND GAS DOCKET NO. 08-0295961

THE APPLICATION OF EOG RESOURCES, INC. TO AMEND FIELD RULES FOR THE SAND BAR (BONE SPRING) FIELD, WARD, WINKLER, CULBERSON, REEVES AND LOVING COUNTIES, TEXAS

HEARD BY: Richard Eyster, P.G. - Technical Examiner
John Dodson - Legal Examiner

HEARING DATE: May 14, 2015

APPEARANCES:

REPRESENTING:

APPLICANT:

H. Philip Whitworth
Rick Johnston
Wendy Dalton
Robert Humphreys
Brian Levea
Matthew Garrison

EOG Resources, Inc.

EXAMINERS' REPORT AND RECOMMENDATION

STATEMENT OF THE CASE

Field Rules for the Sandbar (Bone Spring) Field were most recently amended in Final Order No. 08-0287582, effective July 8, 2014. The current Field Rules in effect for the field are summarized as follows:

1. Designation of the field as the correlative interval from 8,007 feet to 11,067 feet as shown on the log of the Anadarko E&P Onshore LLC - Sandbar 54-2-39 Lease, Well No. 1 (API No. 42-301-31431);
2. 467'-0' lease line spacing with special provisions for "take points", 200' lease line spacing for the first and last take points, 50' "box" rule and "off-lease" penetration point for horizontal drainhole wells;

3. 320 acre units with optional 40 acre density, a table for the assignment of additional acreage to horizontal drainhole wells and the filing of Form P-15 without proration unit plats;
4. Allocation based on 95% acreage and 5% per well;
5. Special provisions for an exception to Statewide Rule 13(b)(5)(a), which requires producing a flowing oil well through tubing;
6. Special provisions for an exception to Statewide Rule 51(a), which requires 10 days for the filing of paperwork related to the completing of oil wells;
7. Stacked lateral rule.

The field also has a special provision that wells with a gas-oil ratio of 3,000 cubic feet per barrel or higher be permanently classified as gas wells, effective the date of first production for each well.

EOG Resources, Inc. ("EOG") requests that the special field rules be amended as follows:

1. Amend the lease line spacing rule for both vertical and horizontal oil and gas wells from 467' to 330', No change to the 0 feet between well spacing rule for vertical and horizontal oil and gas wells;
2. Amend Rule 2(b) to provide that no take point in any horizontal drainhole well may be nearer than 200' in a non-perpendicular distance from the orientation of the drainhole to any property line, lease line or subdivision line;
3. Amend the optional density rule for both oil and gas wells from optional 40 acre units to optional 20 acre drilling and proration units;
4. Amend the allocation formula for both oil wells and gas wells from 95% acreage and 5% per well to 50% acreage and 50% per well.

In addition, EOG requested that any overproduction in the field be canceled.

The application is unopposed and the Examiners recommend that the field rules for the Sandbar (Bone Spring) Field in Ward, Winkler, Culberson, Reeves, and Loving Counties, Texas be amended, and the overproduction be canceled as proposed by EOG.

DISCUSSION OF EVIDENCE

The Sandbar (Bone Spring) Field was discovered on September 15, 2010 at an average depth of 8,900 feet. The field is classified as associated-100% AOF. The field

operates under field rules that provide for 467'- 0' well spacing and 320 acre units with optional 40 acre density. There are currently 81 producing oil wells and 57 producing gas wells listed on the oil and gas proration schedules. Cumulative production from the field through December 2014 is 11,646,450 BBLs of oil and condensate and 95,762.21 MMCF of casinghead and gas well gas.

The subject field is being developed with horizontal drainhole wells that are drilled in Ward, Winkler, Culberson, Reeves and Loving Counties, Texas as well as in Lea County, New Mexico. These wells are generally drilled in an orientation that is perpendicular to the direction of the maximum stress in the reservoir rock with effective drainage occurring parallel with the maximum stress and perpendicular to the orientation of these drainholes but with less effective drainage in non-perpendicular distances from the drainhole orientation.

The field interval is over 3,000' thick and consists of alternating sands and shales with extremely tight rock properties that are confirmed by the Commission's tight gas designation for the Sandbar (Bone Spring) formation. This order found that the geometric mean of the field's permeability for the area tested was 0.00126 millidarcies.

Even with these tight rock properties, operators have successfully completed horizontal wells in the field capable of producing several thousand BOPD. Several of the wells were drilled in very close proximity to each other with less acreage available to be assigned for allowable purposes. EOG seeks to change the allocation formula to 50% per well and 50% acreage to increase the allowable for these wells on lesser acreage and to avoid unnecessary shut-ins for production in excess of allowable.

EOG presented the results of a drainage study performed to test the impact of closely drilled horizontal wells in the field to each other. EOG drilled, completed and initiated production on three wells that were 300' apart at the same time and at the same depth interval on its Gemini Lease. These wells produced at rates from 1120 BOPD to 1530 BOPD with no adverse impact observed on any well. The interior well, the well most likely to be affected, performed as well as the exterior wells. EOG also drilled, completed and began production at the same time and the same depth interval on four wells 300' apart on its Excelsior Lease with similar results showing no adverse impact occurring as a result of this close spacing. This data confirmed the benefits from drilling wells spaced as close as 300' apart and the need for higher allowables to prevent shutting in wells for over production because of less acreage available for assignment.

Railroad Commission records reflect that only 1 vertical well has been drilled and completed in the subject field. This well is the Shell Western/Chesapeake Lindley 54-2-30 No. 1H which was originally a horizontal well in the Bone Spring but recompleted as a vertical well in the field. Volumetric calculations demonstrate that this well will drain some 16.2 acres as a gas well and 22.7 acres as an oil well, which supports the adoption of the optional 20 acre density rule being requested by EOG. Additionally, other operators in this field are drilling wells 300-330' apart which, coupled with the pilot drainage study EOG performed on its Excelsior and Gemini leases, show that the optional 20 acre density rule is necessary to efficiently produce the reserves from areas of the field.

There is significant Commission precedent for the 330' lease line spacing rule requested by EOG for this unconventional reservoir. For example, the Commission has previously adopted such a 330' rule for the Spraberry (Trend Area) Field, the Wolfbone (Trend Area) Field, the Carthage (Haynesville Shale) Field, the Newark, E. (Barnett Shale) Field, the Eagleville (Eagle Ford-1) Field, the Eagleville (Eagleville 2) Field, the Hawkville (Eagleford Shale) Field, the Dewitt (Eagleford) Field and the Briscoe Ranch (Eagleford) Field. In addition, the Commission's recommended lease line spacing rule for 20 acre units is 330'.

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 Sandbar (Bone Spring) Field was discovered in September 2010 at an average depth of 8,900 feet.
 - a. There are currently 81 producing oil wells and 57 producing gas wells in the subject field.
 - b. The field is actively being developed with horizontal drainhole wells that are drilled perpendicular to the orientation of the natural stress of the reservoir rock.
 - c. The effective drainage from these horizontal wells is in a perpendicular direction from the orientation of the horizontal drainhole with less effective drainage in non-perpendicular distances.
 - d. Cumulative production through December 2014 is 11,646,450 BBLs of oil and condensate and 95,762.21 MMCF of gas.
3. The field interval consists of alternating sand and shales with extremely tight rock properties.
 - a. The tight gas designation for the field indicated a geometric mean permeability for the area tested of 0.00126 millidarcies.
 - b. Operators are successfully developing leases with wells drilled as close as 300' apart.
4. Wells may be drilled 300' apart with no impact on each other.
 - a. Well tests on two different leases involving three wells on one lease and four wells on the other lease confirmed this result.

- b. These wells produced at rates from 1120 BOPD to 1130 BOPD without adverse impact.
5. The allocation formula of 50% acreage and 50% per well is necessary to prevent closely spaced wells with high producing rates and less assignable acreage from being shut in for producing in excess of small allowables resulting from the current 95% acreage allocation.
6. Optional 20 acre oil and gas drilling and proration units are appropriate for the field.
 - a. The only vertical well in the field has drained approximately 20 acres.
 - b. Well tests and actual development by operators in the field are consistent with 20 acre density in parts of the field.
7. A 330' lease line spacing rule is appropriate for proper development of the field.
 - a. Several wells have produced at high rates as close as 300' apart without impacting each other.
 - b. The Commission's recommended lease line spacing rule for 20 acre units is 330'.
 - c. A 330' lease line rule has been adopted in numerous other unconventional reservoirs, including the Wolfbone (Trend Area) Field that is in the area of the subject field.
8. Continued suspension of the allocation formula is appropriate, as there is a 100% market demand for all of the gas produced from the field.
9. A request for cancellation of overproduction in the field was made during the hearing.

CONCLUSIONS OF LAW

1. Proper notice was issued as required by all applicable statutes and regulatory codes.
2. All things have occurred and been accomplished to give the Commission jurisdiction in this matter.

3. Amending the field rules for the Sandbar (Bone Spring) Field will prevent waste and will promote 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 Sandbar (Bone Spring) Field as requested by EOG Resources, Inc. and approve the request for cancellation of all overproduction.

Respectfully submitted



Richard Eyster
Technical Examiner



John Dodson
Legal Examiner