



RAILROAD COMMISSION OF TEXAS

HEARINGS DIVISION

OIL AND GAS DOCKET No. 09-0307008

THE APPLICATION OF EAGLE HYDROCARBONS INC. TO ADOPT TEMPORARY FIELD RULES FOR THE SHORT GRASS PRAIRIE (CONG) FIELD, HARDEMAN COUNTY, TEXAS

HEARD BY: Karl Caldwell – Technical Examiner
Kristi M. Reeve – Administrative Law Judge

HEARING DATE: January 29, 2018
RECORD CLOSED: February 8, 2018
CONFERENCE DATE: March 20, 2018

APPEARANCES: **REPRESENTING:**
APPLICANT: Eagle Hydrocarbons Inc.

Joe Sanders
Eric D. Gill, P.E.

EXAMINERS' REPORT AND RECOMMENDATION

STATEMENT OF THE CASE

Eagle Hydrocarbons Inc. ("Eagle" or "Applicant") requests to adopt temporary field rules for a period of twenty-four (24) months for the Short Grass Prairie (Cong) Field, Hardeman County, Texas. The previous temporary field rules for the Short Grass Prairie (Cong) Field have expired. Notice of the application was provided to all operators in the field, as well as the Trustee of the Mollie Evans Heirs Trust and the Welborn Family Trust.

DISCUSSION OF THE EVIDENCE

Eagle requests to adopt the following temporary field rules for the Short Grass Prairie (Cong) Field:

- 1) Field Interval:

That the field be defined as that certain correlative interval and its stratigraphic equivalent from 7,298' to 7,530' as shown on the log of the Sidwell Oil & Gas, Inc. – Wilson Trust Lease, Well No. 1 (API No. 42-197-30341), Section 2, HE&WT RR Co. Survey, A-1513, Hardeman County, Texas.

- 2) Spacing:
 - a) 467' lease line spacing for vertical wells;
 - b) 467'/100' lease line spacing for horizontal wells;
 - c) 660' between well spacing for both horizontal and vertical wells;
 - d) Take Point Rule incorporating distances in 2(b) above, including provisions that the 100' minimum distance applies to any property line in a non-perpendicular distance from the orientation of the drainhole and the 467' minimum distance applies to any property line in a perpendicular distance from the orientation of the drainhole;
 - e) 50' Box Rule; and
 - f) Off Lease Penetration Point Rule.
- 3) Density/Proration Unit Rule:
 - a) 160-acre standard drilling and proration units with a 40-acre tolerance provision for both vertical and horizontal wells;
 - b) Special formula to determine the maximum acreage that may be assigned to a horizontal gas well as follows:

$A = (L \times 0.15) + 160$ acres, where A= calculated area assignable, if available, to a horizontal drainhole well for proration purposes rounded upward to the next whole number evenly divisible by 40 acres; and L = the horizontal displacement of the well measured in feet between the first take point and the last take point within the designated interval provided that L is at least 100'.
 - c) No maximum diagonal limitation for proration units;
 - d) No requirement to file proration unit plats for individual wells in the field but allows operators to file such plats if they so desire;

- 4) Adopt a two-allocation formula based on 95% acreage and 5% per well;
- 5) Suspend the allocation formula for the field; and
- 6) Adopt these rules as temporary field rules for a period of 24 months.

At the hearing, the Applicant withdrew the request to adopt proposed temporary field rules (2)(e) and (2)(f) above, as the proposed rules are already included in Statewide Rule 86. The Applicant also withdrew the request to adopt item (5) above. Eric Gill, P.E., reservoir engineer for Eagle testified that the proposed temporary field rules are necessary to protect Eagle's correlative rights and for the prevention of waste.

The Atoka Formation consists of a mix of conglomerates, sandstones, and silts deposited in a fluvial-deltaic environment during the Lower Pennsylvanian. The source of the clastic material is the Wichita uplift to the north in Oklahoma. In Hardeman County, Texas, the Atoka sediments become better sorted and more quartz-rich to the south where vertical Atoka wells can produce up to 195 MBO. The Atoka interval is a low permeability reservoir with producing porosity typically in the 12-15% range and permeability in the 0.01 to 2.5 md range. Channel-like sandstone packages within the Atoka interval can be up to 70-feet thick. Reservoir heterogeneity, combined with lower permeability, causes production from vertical wells to be highly irregular and makes horizontal drilling and multi-stage hydraulic fracture stimulation necessary. Production from vertical wells has occurred over a large portion of Hardeman County. The best vertical producing vertical wells have been completed in the southern portion of Hardeman County. Some Atoka production has also occurred to the east in Wilbarger County. The initial horizontal well development has been near the Texas-Oklahoma border. The most prolific Atoka sands typically occur in the lower portion of the Atoka interval.

Eagle intends to drill horizontal wells in the Short Grass Prairie (Cong) Field. Eagle plans to complete the horizontal wells in 28 to 30 stages, utilizing 2.5 MM lb. or more of sand (proppant). The Atoka X4 and X5 intervals are Eagle's target intervals within the Atoka. The X4 and X5 intervals are located in the lower portion of the Atoka Formation. There is a shale layer that varies in thickness across the Short Grass Prairie (Cong) Field that separates the Atoka X4 and X5 sands. In some areas of the field, the Atoka X5 sand may not be present, while in other areas of the field the X5 interval may be the target pay interval. Eagle proposes to adopt a multi-factor allocation formula for the Short Grass Prairie (Cong) Field, based on 95% acreage and 5% per well. Eagle is also requesting to adopt a dual lease line spacing rule for horizontal wells of 467'-100' to allow first and last take points to be closer to lease lines which will add additional drainhole length per horizontal well to recover additional reserves and prevent waste in the field.

There are currently 5 wells in the Short Grass Prairie (Cong) Field. The Zip 74-1H (API No. 42-197-31685) is the best well completed in the field to-date in terms of production. This well had an IP of 683 BO, and the EUR is 173, 694 BO. The length of the drainhole is 3,541 feet and the well was completed in 17 frac stages with 54,959 bbl of frac fluid pumped with 1,352,902 lb. of proppant pumped.

Eagle performed drainage calculations to estimate the drainage area for the Zip 74-1 well. If all production is from the Atoka X5 sand, the drainage area is estimated to be 333.5 ac. If production is equally draining both the Atoka X4 and X5 sands, then the drainage area is estimated to be 269.1 ac. The Applicant believes that the most likely scenario is that the X5 interval is contributing the vast majority of the oil in the Zip 74-1. The X5 interval is thicker and cleaner than the X4 interval. The entire length of the drainhole of the Zip 74-1 well is believed to be located very near to, or in the X5 interval. In addition, possible embedment of the proppant pumped into the shale interval between the X4 and X5 sands may limit the propped fractures' ability to effectively connect the X4 interval to the Zip 74-1 wellbore given the lateral located in the X5 interval.

The BBBB (CONGL). Field is an Atoka field in Hardeman County, located approximately 10 to 11 miles from the Short Grass Prairie (Cong) Field. The Neal 2-1 well is a vertical well completed in the BBBB (CONGL). Field. The pressure depletion from the Neal 2-1 well is likely being felt nearly a mile away based on pressure data. The Applicant estimates that the Neal 2-1 vertical well is draining approximately 160 acres based on the volumetric data used in the drainage calculation. Eagle proposes to adopt 160-acre standard drilling and proration units with a 40-acre tolerance provision for both vertical and horizontal wells in the Short Grass Prairie (Cong) Field, and a special formula to determine the maximum acreage that may be assigned to a horizontal gas well of $A = (L \times 0.15) + 160$ acres. In the proposed formula A is the calculated area assignable, if available, to a horizontal drainhole well for proration purposes rounded upward to the next whole number evenly divisible by 40 acres; and L is the horizontal displacement of the well measured in feet between the first take point and the last take point within the designated interval provided that L is at least 100 feet.

Eagle agreed on the record, that, pursuant to the provisions of Texas Government Code §2001.144(a)(4)(A), this Final Order shall be final and effective on the date a Master Order relating to this Final Order is signed.

FINDINGS OF FACT

1. Notice of the application was provided to all operators in the field, as well as the Trustee of the Mollie Evans Heirs Trust and the Welborn Family Trust at least ten days' prior to the date of hearing. There were no protests to the application.

2. Eagle requests to adopt temporary field rules for a period of twenty-four (24) months for the Short Grass Prairie (Cong) Field, Hardeman County, Texas. Eagle requests to adopt the following temporary field rules for the Short Grass Prairie (Cong) Field:
 - a) A field interval defined as the correlative interval and its stratigraphic equivalent from 7,298' to 7,530' as shown on the log of the Sidwell Oil & Gas, Inc. – Wilson Trust Lease, Well No. 1 (API No. 42-197-30341), Section 2, HE&WT RR Co. Survey, A-1513, Hardeman County, Texas.
 - b) Well spacing of 467' lease line spacing for vertical wells, 467'/100' lease line spacing for horizontal wells, 660' between well spacing for both horizontal and vertical wells, with a take point rule including provisions that the 100' minimum distance applies to any property line in a non-perpendicular distance from the orientation of the drainhole and the 467' minimum distance applies to any property line in a perpendicular distance from the orientation of the drainhole.
 - c) A density rule of 160-acre standard drilling and proration units with a 40-acre tolerance provision for both vertical and horizontal wells, and a special formula to determine the maximum acreage that may be assigned to a horizontal gas well of $A = (L \times 0.15) + 160$ acres, where A is the calculated area assignable, if available, to a horizontal drainhole well for proration purposes rounded upward to the next whole number evenly divisible by 40 acres; and L is the horizontal displacement of the well measured in feet between the first take point and the last take point within the designated interval provided that L is at least 100'. There is no maximum diagonal.
 - d) Adopt a multi-factor allocation formula for the Short Grass Prairie (Cong) Field, based on 95% acreage and 5% per well.
3. At the hearing, the Applicant withdrew the request to adopt a 50-foot box rule and an off-lease penetration point rule as the proposed rules are already included in Statewide Rule 86. The applicant also withdrew the request to suspend the allocation formula.
4. The Atoka interval is a low permeability reservoir with producing porosity typically in the 12-15% range and permeability in the 0.01 to 2.5 md range.
 - a. Channel-like sandstone packages within the Atoka interval can be up to 70-feet thick.

- b. Reservoir heterogeneity, combined with lower permeability, causes production from vertical wells to be highly irregular and makes horizontal drilling and multi-stage hydraulic fracture stimulation necessary.
5. The most prolific Atoka sands typically occur in the lower portion of the Atoka interval.
- a. Eagle intends to drill horizontal wells in the Short Grass Prairie (Cong) Field.
 - b. The Atoka X4 and X5 intervals are Eagle's target intervals within the Atoka, located in the lower portion of the Atoka Formation.
 - c. There is a shale layer that varies in thickness across the Short Grass Prairie (Cong) Field that separates the Atoka X4 and X5 sands.
 - d. In some areas of the field the Atoka X5 sand may not be present, while in other areas of the field the X5 interval may be the target pay interval.
6. There are currently 5 wells in the Short Grass Prairie (Cong) Field. The Zip 74-1H (API No. 42-197-31685) is the best well completed in the field to-date.
- a. Eagle performed drainage calculations to estimate the drainage area for the Zip 74-1 well.
 - b. If all production is from the Atoka X5 sand, the drainage area is estimated to be 333.5 ac.
 - c. If production is equally draining both the Atoka X4 and X5 sands, then the drainage area is estimated to be 269.1 ac.
 - d. The X5 interval is likely contributing the vast majority of the oil in the Zip 74-1.
 - i. The X5 interval is thicker and cleaner than the X4 interval.
 - ii. The entire length of the drainhole of the Zip 74-1 well is believed to be located very near to, or in the X5 interval.

- iii. Possible embedment of the proppant pumped into the shale interval between the X4 and X5 sands limits the ability of the propped fracture to effectively connect the X4 interval to the Zip 74-1 wellbore given the lateral located deeper in the field interval.
7. The BBBB (CONGL). Field is an Atoka field in Hardeman County, located approximately 10 to 11 miles from the Short Grass Prairie (Cong) Field.
 - a. The Neal 2-1 well is a vertical well completed in the BBBB (CONGL). Field.
 - b. The pressure depletion from the Neal 2-1 well is being felt nearly a mile away based on pressure data.
 - c. The Applicant estimates that the Neal 2-1 vertical well is draining approximately 160 acres based on the volumetric data used in the drainage calculation.
8. Eagle agreed on the record, that, pursuant to the provisions of Texas Government Code §2001.144(a)(4)(A), this Final Order shall be final and effective on the date a Master Order relating to this Final Order is signed.

CONCLUSIONS OF LAW

1. 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. Adopting temporary field rules will prevent waste and protect correlative rights.
4. Pursuant to §2001.144(a)(4)(A), of the Texas Government Code, and the consent of the Applicant, this Final Order is final and effective when a Master Order relating to this Final Order is signed on March 20, 2018.

EXAMINERS' RECOMMENDATION

Based on the above findings of fact and conclusions of law, the Examiners recommend that the Commission approve the application to adopt temporary field rules for the Short Grass Prairie (Cong) Field for a period of 24 months as requested by Eagle.

Respectfully submitted,



Karl Caldwell
Technical Examiner



Kristi M. Reeve
Administrative Law Judge