

**THE APPLICATION OF CABOT OIL & GAS CORPORATION TO ADOPT TEMPORARY FIELD RULES FOR THE EAGLEVILLE (EAGLE FORD SOUR) FIELD, FRIO COUNTY, TEXAS**

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**HEARD BY:** Richard D. Atkins, P.E. - Technical Examiner

**DATE OF HEARING:** August 19, 2010

**APPEARANCES:**

**REPRESENTING:**

**APPLICANT:**

Dale E. Miller

Cabot Oil & Gas Corporation

**OBSERVER:**

Jason Clayton

CML Exploration LLC

**EXAMINER'S REPORT AND RECOMMENDATION**

**STATEMENT OF THE CASE**

Cabot Oil & Gas Corporation ("Cabot") requests that temporary Field Rules be adopted for the Eagleville (Eagle Ford Sour) Field. The proposed rules are summarized as follows:

1. Designation of the field as the correlative interval from 7,680 feet to 7,836 feet as shown on the log of the Cabot Oil & Gas Corporation - Patrick West Lease, Well No. 1 (API No. 42-163-33403);
2. 330' lease line spacing for the perpendicular distance along a horizontal drainhole, 100' lease line spacing for the first and last take points and no between well spacing with special provisions for "take points", off-lease penetration point and a "box rule" for a horizontal drainhole well;
3. 80 acre oil units with 40 acre tolerance and no filing of individual well proration unit plats;
4. Allocation based on 100% acreage with a top allowable of 800 BOPD and no casinghead gas limitation for oil wells.

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Cabot also proposes 100 foot "No Perf Zones" (NPZ's) for any unleased or unpooled interior tracts that would require a Statewide Rule 37 exception based on the 330 foot perpendicular lease line spacing. The examiner recommended 330 foot NPZ's to coincide with the 330 foot lease line spacing for the perpendicular distance along a horizontal drainhole. Cabot did not consider this recommendation to be adverse.

The application was unopposed and the examiner recommends that the Field Rules proposed by Cabot be adopted on a temporary basis for the Eagleville (Eagle Ford Sour) Field, subject to review in 18 months.

### **DISCUSSION OF EVIDENCE**

The Eagleville (Eagle Ford Sour) Field was discovered in March 2010 upon the completion of the Patrick West Lease, Well No. 1, a horizontal well drilled by Cabot. The well potentialized flowing for 229 BOPD, 110 MCFGPD and 987 BWPD. The well has a 5,649 ppm H<sub>2</sub>S concentration with a 500 ppm radius of exposure of 95 feet and 100 ppm radius of exposure of 209 feet. The cumulative production from the well through June 2010 is 12,751 BO and 4,212 MCFG. Cabot has several additional horizontal wells in the field which are in various stages of permitting, drilling or completion.

It is requested that the field be defined as the correlative interval from 7,680 feet to 7,836 feet as shown on the log of the Cabot Oil & Gas Corporation - Patrick West Lease, Well No. 1 (API No. 42-163-33403), Section 14, BS&F/ EJ Colbath Survey, Abstract 1428, Frio County, Texas. The interval includes the entire Eagle Ford formation and is continuous across the area.

The Eagle Ford formation occurs at an average depth of 7,700 feet and has very low permeability, in the range of microdarcies. This type of rock must be developed with horizontal wells that have multi-stage hydraulic fracture stimulations. Wells may have up to a 5,000 foot lateral and require up to 30 stages of fracture stimulation. Cabot is still working to improve drilling and completion methods in this reservoir.

The open hole logs on the discovery well showed an average porosity of 9.4%, an average water saturation of 28% and a net pay thickness of 115 feet. Using an estimated 15% decline rate and a recovery factor of 5%, Cabot calculated the recoverable oil underlying 80 acres to be 191.7 MBO, which results in a drainage area of approximately 85 acres. Cabot believes that 80 acre density is appropriate for the Eagleville (Eagle Ford Sour) Field.

Cabot is proposing to drill additional horizontal wells and requests horizontal rules in order to promote the efficient and effective development of the remaining hydrocarbons. Cabot requests a spacing rule that requires 330' lease line spacing for the perpendicular distance along a horizontal drainhole, 100' lease line spacing for the first and last take

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points and no between well spacing with special provisions for “take points”, off-lease penetration point and a “box rule” for a horizontal drainhole well. The proposed spacing is necessary to allow drilling of horizontal wells which may have to be placed very near each other in some cases to achieve optimal fracture treatment results. The nearest Eagle Ford oil field is the Eagleville (Eagle Ford) Field, which also operates under the proposed spacing and density rules.

Cabot also requests that a field rule be adopted which includes language relevant to the measurement of distances to lease lines for horizontal drainhole wells. Cabot’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, if a horizontal well is cased and cemented, an external casing packer in a cased well, or any open-hole section in an uncased well. Similar rules have been adopted in other tight reservoirs, including the Barnett Shale and many Cotton Valley Sand fields.

The proposed rule would allow operators to drill horizontal wells with penetration points, as defined by Rule 86, at distances closer than 330 feet to a lease line, as long as no take-point is closer than 100 feet to any lease line. Horizontal drainhole length on a lease is then maximized, resulting in the additional recovery of oil. 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 well be used.

Cabot proposes a 10% tolerance “box rule” for horizontal drainhole wells that would allow drainholes to deviate 33 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. Cabot 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 800 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 800 feet from the lease line. Since there is a requested 100' lease line spacing for the first and last take points, the proposed rule will allow approximately 700 feet of additional producing drainhole, resulting in the recovery of additional oil and gas reserves. Similar rules allowing offsite penetration points have been adopted in other fields, after notice to the mineral owners of the off-lease tract on which the penetration point is to be located and if no protest is received.

The Eagle Ford formation is unique in that it contains an oil zone on top of a gas zone. Since the permeability is less than a microdarcy, Cabot believes that there is no migration of fluids in the reservoir and wells only produce fluids that are contacted by the fracture treatment. As a result, the recovery factor is the same for both oil and gas wells.

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Since many wells in the Eagle Ford trend have high initial potentials of over 1,000 BOPD and there is no migration of reservoir fluids, Cabot requests an 800 BOPD allowable and that the daily casinghead gas limitation for oil wells be eliminated. A similar rule has been adopted in other fields with horizontal wells, specifically, the Newark, East (Barnett Shale) and Eagleville (Eagle Ford) Fields.

Allocation based on 100% acreage is appropriate given that the interval is not lenticular. Additionally, Cabot 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. Cabot also requests that all over-production in the field be canceled.

### **FINDINGS OF FACT**

1. Notice of this hearing was provided to all persons entitled to notice.
2. The Eagleville (Eagle Ford Sour) Field was discovered in March 2010 upon completion of the Patrick West Lease, Well No. 1, a horizontal well drilled by Cabot. The well potentialized flowing for 229 BOPD, 110 MCFGPD and 987 BWPD.
3. The Eagleville (Eagle Ford Sour) Field should be defined as the correlative interval from 7,680 feet to 7,836 feet as shown on the log of the Cabot Oil & Gas Corporation - Patrick West Lease, Well No. 1. The interval includes the entire Eagle Ford formation and is continuous across the area.
4. Adoption of an 80 acre density rule for the Eagleville (Eagle Ford Sour) Field on a temporary basis is appropriate.
  - a. Using an estimated 15% decline rate and a recovery factor of 5%, Cabot calculated the recoverable oil underlying 80 acres to be 191.7 MBO, which results in a drainage area of approximately 85 acres.
  - b. The nearest Eagle Ford oil field is the Eagleville (Eagle Ford) Field, which also operates under the proposed density rule.
  - c. Lower permeability and porosity of the Eagle Ford formation will reduce the ultimate recovery and drainage area of the wells.
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.

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- a. The Eagle Ford Formation is a tight formation and is not commercially productive unless fracture-stimulated.
  - b. A take-point in a horizontal well in this field may be a perforation, if a horizontal well is cased and cemented, an external casing packer in a cased well, or any open-hole section in an uncased portion of the wellbore.
  - c. Adoption of the proposed rule would allow operators to drill horizontal wells with penetration points, as defined by Rule 86, at distances closer than 330 feet to a lease line, as long as no take-point is closer than 100 feet to any lease line.
  - d. Adoption of the proposed rule will allow the horizontal drainhole length on a lease to be maximized.
6. Field Rules that provide for 330' lease line spacing for the perpendicular distance along a horizontal drainhole, 100' lease line spacing for the first and last take points and no between well spacing with special provisions for "take points", an off-lease penetration point and a "box rule" for horizontal wells will provide consistency in developing the field and will allow greater flexibility in selecting future drilling locations.
  7. The proposed 33 foot "box rule" is necessary to allow operators reasonable minor deviations from the wellbore track that has been permitted.
  8. Allowing an off-lease penetration point will result in maximum producing drainhole length, thereby increasing ultimate recovery from horizontal drainhole wells. The proposed rule will allow approximately an additional 700 feet of producing drainhole. To protect correlative rights, prior notice and opportunity to object should be given to the mineral owners of offsite surface locations.
  9. For purposes of assignment of additional acreage pursuant to Statewide Rule 86, the distance between the first and last take-point in a horizontal well should be used.
  10. Since the recovery factor is the same for both oil and gas wells, the field should be classified as associate-prorated with no casinghead gas limitation for oil wells.
  11. The field has a 5,649 ppm H<sub>2</sub>S concentration and should be regulated pursuant to Statewide Rule 36.

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12. Since many wells in the Eagle Ford trend have high initial potentials of over 1,000 BOPD and there is no migration of reservoir fluids, an 800 BOPD allowable is appropriate for the field.
13. Allocation based on 100% acreage is a reasonable formula which will protect correlative rights of mineral owners in the field. Elimination of the requirement to file individual well proration unit plats will reduce 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. Adoption of the proposed Field Rules on a temporary basis for the Eagleville (Eagle Ford Sour) Field is necessary to prevent waste, protect correlative rights and promote development of the field.
4. Cancellation of all overproduction in the Eagleville (Eagle Ford Sour) Field will not cause waste and will not harm correlative rights.

### **RECOMMENDATION**

Based on the above findings of fact and conclusions of law, the examiner recommends that the Commission adopt the Field Rules proposed by Cabot Oil & Gas Corporation on a temporary basis for the Eagleville (Eagle Ford Sour) Field, subject to review in 18 months.

Respectfully submitted,

Richard D. Atkins, P.E.  
Technical Examiner