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THE APPLICATION OF PIONEER NATURAL RESOURCES USA INC. TO AMEND FIELD RULE NOS. 2 AND 3 IN THE SPRABERRY (TREND AREA) FIELD, VARIOUS COUNTIES, TEXAS

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**Heard by:** Richard D. Atkins, P.E. - Technical Examiner

**Hearing Date:** December 3, 2008

**Appearances:**

**Representing:**

Brian R. Sullivan  
Weldon Pierson  
Cary McGregor

Pioneer Natural Resources USA Inc.

Philip Whitworth

EOG Resources, Inc.

Tim George

Endeavor Energy Resources, LP

Greg Cloud

Concho Resources, Inc.

Glenn E. Johnson

Chesapeake Operating, Inc.

**EXAMINER'S REPORT AND RECOMMENDATION**

**STATEMENT OF THE CASE**

A hearing to amend Field Rule Nos. 2 and 3 for the Spraberry (Trend Area) Field was held on September 26, 2008 and Field Rule Nos. 2 and 3 were adopted in Docket No. 7C-0258734, effective October 20, 2008, for the portion of the Spraberry (Trend Area) Field in District 7C. This hearing was scheduled and properly noticed to consider an identical companion amendment of the Field Rules for the portion of the Spraberry (Trend Area) Field in Districts 8 and 8A.

Field rules for the Spraberry (Trend Area) Field were originally adopted in Docket No. 7C & 8-25,174, effective December 22, 1952, as amended. The rules currently in effect for the Districts 8 and 8A portion of the field are summarized as follows:

1. Correlative interval from 6,307 feet to 10,159 feet as shown on the log of the Henry Petroleum, LP - Amacker 67 Lease, Well No. 1;
2. 660'-933' well spacing;
3. 80 acre density with an 80 acre tolerance per well and special provisions for 40 acre Rule 38 exceptions after notice;
4. Allocation based on 75% acres and 25% per well;
5. Permitted gas-oil ratio of 4,000 cubic feet per barrel.

Pioneer Natural Resources USA Inc. requests that the field rules be amended to provide for 467'-660'

well spacing with no minimum between-well spacing between horizontal and vertical wells and special provisions for 20 acre Rule 38 exceptions after notice.

This application was unopposed and the examiner recommends that the Field Rules for the Spraberry (Trend Area) Field in Districts 8 and 8A be amended as proposed by Pioneer to match the existing Field Rules for the portion of the field in District 7C.

### **DISCUSSION OF EVIDENCE**

The Spraberry (Trend Area) Field currently extends over many counties and comprises approximately 1.6 MM acres with a length of 150 miles and a width of 75 miles. The field was originally discovered in 1935, but through the course of time, the field has been enlarged both horizontally and vertically. Currently, there are 11,234 wells and 198 operators carried on the proration schedules. The top allowable in the field is 121 BOPD, with an allowable gas-oil ratio of 4,000 cubic feet per barrel.

Cumulative production from the field since 1952 is 975.2 MMBO and 2.5 TCFG. Production for June 2008 was 2.5 MMBO and 7.8 BCFG. The average production from each oil well is 7.5 BOPD and 23.2 MCFGPD. Pioneer Natural Resources USA Inc. operates approximately 4,750 wells in the field.

There have been many field consolidations into the Spraberry (Trend Area) Field and the field rules have been amended to increase drilling density. The field is located in the Midland Basin and is composed of submarine deposits of sandstones, siltstones, limestones and shales. The correlative interval is over 3,500 feet thick and includes the Clearfork, Upper Spraberry, Lower Spraberry, Dean and Wolfcamp formations. Though these formations are correlative across the entire area, the sand lenses are lenticular and the porosity and permeability change quickly over short distances due to formation shaliness. The quality of the sandstones are generally characterized as poor with an average porosity of 10% and permeability of less than 1.0 millidarcy. Additionally, most zones would not be economic to produce as separate completions. Pioneer submitted core data from a number of Upper Spraberry wells across the field area that confirmed that a vast majority of the pay contained less than 1.0 millidarcy permeability.

The Spraberry (Trend Area) Field is experiencing an increase in completions due to favorable oil prices, satisfactory results from infill drilling and fracture stimulation techniques. Since 1997, there have been 823 Rule 38 exceptions approved administratively for 40 acre locations and 114 of those exceptions were approved in 2007.

Pioneer performed log analysis on nine wells that had open hole logs available. All of the wells were located in the northern portion of the field. The average net pay was estimated using cutoffs of greater than 5% porosity, less than 60% water saturation and less than 40% shale. This analysis resulted in an average net pay of 108 feet which had an average porosity of 10% and an average water saturation of 37%. Using an estimated recovery factor of 5%, Pioneer calculated volumetric recoverable reserves of 53,333 BO on a twenty acre unit.

Pioneer provided drainage area calculations for nine wells in the Spraberry (Trend Area) Field. The drainage areas range from 8 acres up to a maximum of 59 acres. The average drainage area was calculated to be approximately 26 acres. However, five of the nine wells will drain less than 20 acres. The proposed 20 acre Rule 38 exceptions with notice will allow for future development in the field area. Pioneer will be actively developing the field interval by drilling additional infill wells on twenty acre units.

Pioneer also performed a reservoir simulation study based on a single layer model to evaluate the benefits of 20 acre development on reservoir layers with less than 1.0 millidarcy permeability. The simulation for a 0.3 millidarcy layer showed that a 40 acre location would recover approximately 8% of the original oil in place. However, a 20 acre location would recover approximately 14% of the original oil in place resulting in an incremental gain of 75% over the 40 acre location.

Pioneer evaluated oil recoveries in the Upper Spraberry from ten sections contained within five Spraberry (Trend Area) Field units. The data was plotted on a graph with the horizontal axis displaying well spacing and the vertical axis displaying primary oil recovery per section. The graph showed a clear trend of increasing recovery with decreasing well spacing, as a 160 acre unit, an 80 acre unit and a 40 acre unit will recover 150 MBO, 600 MBO and 1.0 MMBO, respectively. By extending the trend down to 20 acre spacing, a recovery of 1.5 MMBO per section was observed, resulting in an increased recovery of 500 MBO per section.

To accommodate the special provisions for 20 acre Rule 38 exceptions and horizontal drilling, Pioneer requests 467'-660' well spacing with no minimum between-well spacing between horizontal and vertical wells.

### **FINDINGS OF FACT**

1. Notice of this hearing was given to all parties entitled to notice at least ten days prior to the date of hearing.
2. The Spraberry (Trend Area) Field currently extends over many counties and comprises approximately 1.6 MM acres with a length of 150 miles and a width of 75 miles. The field was originally discovered in 1935, but through the course of time, the field has been enlarged both horizontally and vertically.
3. There are 11,234 wells and 198 operators carried on the proration schedules. The top allowable in the field is 121 BOPD, with an allowable gas-oil ratio of 4,000 cubic feet per barrel.
4. The correlative interval is over 3,500 feet thick and includes the Clearfork, Upper Spraberry, Lower Spraberry, Dean and Wolfcamp formations. The quality of the sandstones are generally characterized as poor with an average porosity of 10% and permeability of less than 1.0 millidarcy.
5. Since 1997, there have been 823 Rule 38 exceptions by notice approved administratively for 40 acre locations and 114 of those exceptions were approved in 2007.
6. Log analysis on nine wells with open hole logs resulted in an average net pay of 108 feet which had an average porosity of 10% and an average water saturation of 37%. Using an estimated recovery factor of 5%, volumetric recoverable reserves were calculated to be 53,333 BO on a twenty acre unit.
7. Drainage area calculations for nine wells resulted in a range from 8 acres up to a maximum of 59 acres. The average drainage area was calculated to be approximately 26 acres. However, five of the nine wells will drain less than 20 acres.
8. A reservoir simulation study based on a single layer model for a 0.3 millidarcy layer showed that a 40 acre location would recover approximately 8% of the original oil in place. However, a 20 acre location would recover approximately 14% of the original oil in place resulting in an incremental gain of 75% over the 40 acre location.
9. A well spacing verses oil recovery graph showed a clear trend of increasing recovery with decreasing well spacing, as a 160 acre unit, an 80 acre unit and a 40 acre unit will recover 150 MBO, 600 MBO and 1.0 MMBO, respectively. By extending the trend down to 20 acre

spacing, a recovery of 1.5 MMBO per section was observed, resulting in an increased recovery of 500 MBO per section.

10. To support the special provisions for 20 acre Rule 38 exceptions and horizontal drilling, Pioneer requests 467'-660' well spacing with no minimum between-well spacing between horizontal and vertical wells.

**CONCLUSIONS OF LAW**

1. Notice of this hearing was given as specified in the provisions of all regulatory codes.
2. All things have occurred or been accomplished to give the Commission jurisdiction in this matter.
3. Amending the field rules for the Spraberry (Trend Area) Field is necessary to prevent waste, protect correlative rights and promote development of the field.

**RECOMMENDATION**

Based on the above findings of fact and conclusions of law, the examiner recommends that the Field Rules for the Spraberry (Trend Area) Field, Various Counties, Texas, be amended as proposed by Pioneer.

Respectfully submitted,

Richard D. Atkins, P.E.  
Technical Examiner