



# RAILROAD COMMISSION OF TEXAS

## HEARINGS DIVISION

**OIL AND GAS DOCKET NO. 08-0287087**

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**THE APPLICATION OF LAREDO PETROLEUM, INC. TO AMEND FIELD RULES FOR THE GARDEN CITY, S. (WOLFCAMP) FIELD, GLASSCOCK COUNTY, TEXAS**

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**Heard by:** Paul Dubois – Technical Examiner  
Terry Johnson – Hearings Examiner

**Hearing date:** April 1, 2014

**Appearances:**

Sandra Buch  
Carey McGregor

**Representing:**

Laredo Petroleum, Inc.

### EXAMINER'S REPORT AND RECOMMENDATION

#### STATEMENT OF THE CASE

This is the application of Laredo Petroleum, Inc., to amend field rules for the Garden City, S. (Wolfcamp) Field. Laredo is requesting changes to the current field rule requirements for well spacing, density, allowable allocation, and rules for horizontal wells. In summary, Laredo is requesting the following amendments:

1. Expand the correlative interval to include the Mississippian Lime and Woodford Shale Formations;
2. Amend lease line spacing requirements, adopt 330-feet / 100-feet take point provisions, and adopt a 50-foot box rule;
3. Adopt an administrative Rule 38 provision for wells density between 80 and 20 acres;
4. Amend the oil well allowable provisions for an MER allowable and two-factor allocation formula;

5. Amend the gas allowable two-factor allocation formula;
6. Provide for an unlimited net gas-oil ratio authority;
7. Adopt stacked lateral wells;
8. Suspend the allocation formula for the field;
9. Cancel accumulated overproduction; and
10. Establish a blanket Rule 10 authority for the subject field and three underlying fields.

This application is not protested and the examiner recommends the field rules be amended as requested by Laredo.

#### **DISCUSSION OF THE EVIDENCE**

The Garden City, S. (Wolfcamp) Field was discovered in 1964. There are currently 279 oil wells carried on the March 2014, proration schedule. There are more than 100 oil wells that have been drilled but are not yet on schedule. There are two producing gas wells on the March 2014, proration schedule. Laredo is the largest operator of wells in the field. One of the Laredo gas wells, the McMillan 30 Unit No. 1 (Gas ID No. 270080), is currently overproduced. On January 28, 2014, the Commission issued a notice of overproduction and intent to seal the well because the well produced more than twice its allowable for the month of November, 2013. The allowable for the well was adjusted in December, 2013, so overproduction of gas should not be an issue going forward. Laredo requested this hearing to address the overproduction and to also amend the field rules.

The Garden City, S. (Wolfcamp) Field is centered in Glasscock County with significant development into Sterling County to the east. Areal field development extends with limited extent into Martin, Howard, Mitchell and Reagan Counties. Within the area of Garden City, S. (Wolfcamp) Field development there are also wells completed in underlying fields including the Frysak Farms (Devonian), Deadwood (Fusselman), and Jailhouse (Fusselman). Vertically, the current correlative interval for the field is from 4,556 feet to 9,811 feet in the Cox 29 No. 2 well (API No. 42-173-33510). The current interval includes the geological formations from the Spraberry, Dean, Wolfcamp, Canyon, Strawn, Atoka, Bend, and ends at the top of the Mississippian Lime. Laredo proposes to deepen the correlative interval to 9,943 feet (still based on the Cox 29 No. 2 well). Expanding the correlative interval to 9,943 feet will include the Mississippian Lime and Woodford Shale Formations; the base of the field interval will correspond to the top of the Devonian Lime Formation. Expanding the correlative interval will reduce the need for exceptions to

Statewide Rule 10 for these intervals. Current development activity is focused on several productive horizons within the Wolfcamp Formation; many of the other geologic intervals in the section are or may be productive as well.

The general permeability ranges for the various formations that comprise the Garden City, S. (Wolfcamp) Field vary considerably. Traditional Spraberry Formation vertical wells produce from intervals with average permeability from 0.24 to 0.49 millidarcies. The Wolfcamp Formation is considerably tighter, with horizontal wells in these intervals producing from  $10^{-5}$  to  $10^{-9}$  millidarcies. Wolfcamp horizontal wells require multi-stage fracture stimulation treatments to produce from such a tight reservoir.

Within the last five years production from the field has increased significantly, mostly as the result of the completion of horizontal wells in the field. In 2005, fewer than 10 wells produced a total of about 10 BOPD; in 2012, 290 wells were producing a total of about 10,000 BOPD. Gas production has similarly increased. The number of drilling permit applications in the field has increased from 67 in 2010 to 295 for both 2012 and 2013, and that pace continues in the early months of 2014.

Laredo ideally proposes to fully develop each section of land in the field with both horizontal and vertical wells. Ideally, there will be eight equally-spaced north-south oriented horizontal wells, each holding 40 acres. There will also be sixteen vertical wells each holding 20 acres between the horizontal wells. Reducing the lease line spacing from 467 feet to 330 feet will enable Laredo (and other operators in the field) to drill one additional horizontal well on each section of land. Adding provisions for stacked lateral wells will increase the vertical coverage obtained by using multiple horizontal laterals. As envisioned, the horizontal wells will target the various Wolfcamp intervals and the vertical wells will target the best porosity developments within the correlative interval.

A microseismic analysis of fracture stimulation propagation indicates that dense fracturing extends from 150 feet to 200 feet from the stimulated wellbore. During the test case, a monitoring lateral was drilled 660 feet from the stimulation test well. Of about 25 stimulation stages, only one fracture group propagated microseismic events about 600 feet from the test well. Further, there were no events past the toe perforation and a few events on the heel perforation; all of the heel perforations were within 100 feet of the heel. Based on this study, Laredo concludes the appropriateness of 660 feet between horizontal well spacing and 100 foot take point spacing between the first and last take point and the lease line. Laredo believes this spacing will maximize recovery from their leasehold.

To maximize development in the field Laredo obtains density exceptions to Statewide Rule 38 to drill wells on units smaller than the optional 80-acre units currently allowed in the field rules. Laredo also seeks to adopt a streamlined administrative procedure for obtaining exceptions to Statewide Rule 38 for well density down to 20-acre units upon notice—with opportunity to protest—to offset operators within 1,000 feet of the

proposed well. A similar rule has been adopted in a number of other fields in the State, most notably the comparable Spraberry (Trend Area) Field. Laredo believes that field development is very active yet still in its early stages, and perhaps it is too early to establish optional units as small as 20 acres. An administrative Rule 38 exception process makes reasonable sense to Laredo as a means to proceed with denser field development and appropriate notice to offset operators.

Laredo provided calculations demonstrating how the proposed field rules will increase total recovery from the field. In summary, the incremental reserves include:

- Each additional foot of lateral length = 30 BOE per foot
- 100 foot first/last take point spacing = 20 MBOE per lateral
- 330 foot leaseline spacing = 150 MBOE per section
- Stacked lateral rule = 150 MBOE per lateral

In 2014 and 2015, Laredo anticipates the incremental reserves to total 2.1 MMBOE over the next two years. Laredo anticipates other operators will experience similar increases in recovery.

The current yardstick allowable for the field is 353 BOPD per well on 160 acres. Laredo proposes an allowable of 1,030 BOPD on 160 acres. Laredo provided peak IP and 7-day IP average production data for five wells in the field. The peak IP rates averaged 936 BOPD and the 7 day average rates were 703 BOPD. Notably, for the comparable Spraberry (Trend Area) Field the initial average was 1,580 BOPD and the 7-day average was 1,203. Field rules for the Spraberry (Trend Area) Field provide for an allowable of 515 BOPD on 80 acre units; this was the basis for Laredo's request for an allowable of 1,303 BOPD. The Parks (Consolidated) Field also produces from the Wolfcamp Formation, and it has an allowable of 2,000 BOPD. Laredo believes that an allowable of 1,030 BOPD is more representative of the efficient production capability of long horizontal wells in the field, particularly in the Wolfcamp Formation.

Along with adopting a 1,030 BOPD allowable, Laredo requests that wells in the field be allowed to produce at an unlimited net gas-oil ratio. In a tight unconventional reservoir the gas-oil ratio is a result of the volume of matrix contacted by fracture stimulation. The gas-oil ratio is not expected to influence production. The Texas Natural Resources Code requires a two-factor allocation formula because field contains more than one lenticular reservoir zones. Laredo proposes the allocation factor be adjusted to 75 percent per well and 25 percent acreage basis to reduce the influence of acreage on the allowable allocation. There is a market for all produced gas, so Laredo also requests that the allocation formula be suspended. Laredo requests cancelling overproduction in the field.

Production efficiencies can often be found by downhole commingling more than one productive field within a single wellbore. Laredo provided data at hearing to show that the Garden City, S. (Wolfcamp) Field has been commingled with other fields in 69 wells. The Frysak Farms (Devonian) was commingled 115 times and the Jailhouse (Fusselman) Field has been commingled 12 times. The Deadwood (Fusselman) Field has not yet been commingled with any other fields. Providing a blanket exception to Rule 10 to downhole commingle these fields will provide administrative efficiencies for operators and staff.

### FINDINGS OF FACT

1. Notice of this hearing was sent to all persons entitled to notice.
2. The Garden City, S. (Wolfcamp) Field was discovered in 1964; Laredo is the largest operator of wells in the field.
  - a. There are currently 279 producing oil wells carried on the March 2014, proration schedule. There are more than 100 oil wells that have been drilled but are not yet on schedule.
  - b. There are two producing gas wells on the March 2014, proration schedule.
3. Laredo's McMillan 30 Unit No. 1 (Gas ID No. 270080), is currently overproduced. On January 28, 2014, the Commission issued a notice of overproduction and intent to seal the well because the well produced more than twice its allowable for the month of November, 2013.
4. The entire combined correlative interval from 4,556 feet to 9,943 feet as shown on the log of the Cox 29 Well No. 2, API No. 42-173-33510, Section 29, Block 33, T4S, T & P RR Co. Survey, Glasscock County, Texas, should be designated as a single reservoir for proration purposes and be designated as the Garden City, S. (Wolfcamp) Field. This interval is intended to include all intervals between the top of the Upper Spraberry and the base of the Woodford Shale.
5. The general permeability ranges for the various formations that comprise the Garden City, S. (Wolfcamp) Field vary considerably. Traditional Spraberry Formation vertical wells produce from intervals with average permeability from 0.24 to 0.49 millidarcies. The Wolfcamp Formation is considerably tighter, with horizontal wells in these intervals producing from  $10^{-5}$  to  $10^{-9}$  millidarcies.
6. In 2005, fewer than 10 wells produced a total of about 10 BOPD; in 2012, 290 wells were producing about 10,000 BOPD. Gas production has similarly

increased. The number of drilling permit applications in the field has increased from 67 in 2010 to 295 for both 2012 and 2013.

7. The proposed field rules will enable recovery of incremental reserves:
  - a. Each additional foot of lateral length may yield an additional 30 BOE per foot.
  - b. 100 foot first/last take point spacing provisions may yield an additional 20 MBOE per lateral.
  - c. 330 foot lease line spacing provisions may yield an additional 150 MBOE per section.
  - d. Stacked lateral rules may yield 150 MBOE per lateral.
8. A streamlined administrative procedure for obtaining exceptions to Statewide Rule 38 for well density down to 20-acre units upon notice—with opportunity to protest—to offset operators within 1,000 feet of the proposed well will promote development of the field.
9. For wells in the field, the peak IP rates averaged 936 BOPD and the 7 day average rates were 703 BOPD. Wells assigned to 160 acre units can efficiently produce under an allowable of 1,030 BOPD.
10. The gas-oil ratio in this field is a result of the volume of matrix contacted by fracture stimulation; the gas-oil ratio is not expected to influence production.
11. A two factor allocation formula meets the statutory requirements of the Texas Natural Resources Code.
  - a. A 75 percent per well and 25 percent acreage allocation formula reduces the influence of acreage.
12. There is a market for 100 percent of the gas produced from the field.
13. Providing a blanket exception to Rule 10 to downhole commingle the Frysak Farms (Devonian), Deadwood (Fusselman), and Jailhouse (Fusselman) fields will provide production efficiencies for operators and administrative efficiencies for operators and staff.

**CONCLUSIONS OF LAW**

1. Proper notice of hearing was timely issued by the Railroad Commission to appropriate persons legally entitled to notice.
2. All things necessary to the Commission attaining jurisdiction over the subject matter and the parties in this hearing have been performed.
3. Amending the field rules will prevent waste, protect correlative rights and promote development of the field.

**EXAMINER'S RECOMMENDATION**

Based on the above findings and conclusions, the examiners recommend that the field rules for the Garden City, S. (Wolfcamp) Field be amended as requested.

Respectfully submitted,



Paul Dubois  
Technical Examiner



Terry Johnson  
Hearings Examiner