



RAILROAD COMMISSION OF TEXAS

HEARINGS DIVISION

OIL AND GAS DOCKET NO. 08-0291540

**THE APPLICATION OF EOG RESOURCES, INC., FOR A TIGHT FORMATION
AREA DESIGNATION IN ACCORDANCE WITH STATEWIDE RULE 101 FOR THE
WOLFCAMP AND THIRD BONE SPRING FORMATIONS IN THE PHANTOM
(WOLFCAMP) FIELD, REEVES AND LOVING COUNTIES, TEXAS**

HEARD BY: Paul Dubois – Technical Examiner
Laura Miles-Valdez – Hearings Examiner

HEARING DATE: January 7, 2015

CONFERENCE DATE: May 12, 2015

APPEARANCES:

Doug Dashiell
Mimi Weintraub
Frank Muser, P.E.

James Clark, P.E.

REPRESENTING:

EOG Resources, Inc.

Resolute Natural Resources Co., LLC

EXAMINER'S REPORT AND RECOMMENDATION

STATEMENT OF THE CASE

Pursuant to Statewide Rule 101 (16 Tex. Admin. Code §3.101) EOG Resources, Inc. (EOG) seeks a tight formation area designation for the Wolfcamp and 3rd Bone Springs Formations as defined in the correlative interval for the Phantom (Wolfcamp) Field, in portions of Reeves and Loving Counties, Texas. Rule 101 specifies the procedure by which an operator can obtain Commission certification that natural gas from a particular gas well qualifies as high-cost gas under the Texas Tax Code §201.057(a)(2)(A) and that such gas is exempt from or eligible for a reduction of the severance tax imposed by the Texas Tax Code §201. Specifically, EOG seeks Commission certification that a portion of the Phantom (Wolfcamp) Field is a "tight formation" area pursuant to Rule 101(f). The proposed tight formation area includes the vertical area encompassed by the Phantom (Wolfcamp) Field within the horizontal boundaries of the surveys and abstracts listed on Attachment A.

EOG originally applied for an approximately 143,000-acre area designation within Reeves County. A representative of Resolute Natural Resources Co., LLC (Resolute) appeared at the hearing in support of the application. Resolute also requested to include an additional 12,000 acres (approximately) to EOG's proposed area designation. Resolute provided additional data points to support this request. EOG and Resolute agreed to the joint expanded area of 154,920 acres, or about 242 square miles. After the hearing, on January 9, 2015, EOG served additional notice to all operators in the field regarding the combined area now being considered in this matter. No protests to the expanded area were received.

At the hearing, the Examiners requested a revised area map be submitted by EOG and Resolute that identifies the combined area under consideration. This map, marked as EOG's Updated Exhibit No. 7, clearly identifies the boundaries of the requested tight formation area and is the map by which operators should use to determine whether wells are completed within the designated tight formation area. EOG late-filed several other exhibits in support of its application. These exhibits were admitted and the record was closed on January 22, 2015.

APPLICABLE LAW

Statewide Rule 101 specifies the procedure by which an operator can obtain a Railroad Commission of Texas certification that natural gas from a particular gas well qualifies as high-cost natural gas under the Texas Tax Code and that such gas is eligible for a reduction of the severance tax. One of the categories of high-cost gas is gas that is produced from a designated tight formation area. In this application, EOG seeks to designate a portion of the Phantom (Wolfcamp) Field as a tight formation area. To obtain this designation pursuant to Statewide Rule 101(f)(3)(B), EOG must provide specific evidence required by the Rule and demonstrate the following:

- (i) The in situ permeability throughout the proposed formation or specific portion thereof is 0.1 millidarcies or less, as determined by geometric mean or median analysis of available data from all wells that either have been tested or are completed in the proposed formation within the requested area;
- (ii) The pre-stimulation stabilized production rate against atmospheric pressure at the wellhead, as determined by a geometric mean or median analysis of available data from all wells within the requested area that either have been tested and/or are completed in the proposed formation or specific portion thereof, does not exceed the production rate specified in the rule;
- (iii) No well drilled into the formation is expected to produce, without stimulation, more than five barrels of crude oil per day; and
- (iv) The requested designated area does not extend beyond a two and one-half

mile radius drawn from any data point well.

The Commission has, on occasion and after a hearing on the request, approved tight formation area designations that meet all of the criteria above except Rule 101(f)(3)(B)(iv). In those cases, the Applicants have demonstrated that the subject formation was broadly continuous across a large area—in some cases across one or several counties—and that the available data is representative of the entire requested formation area and sufficiently demonstrates that the entire requested formation area meets requirements of Rule 101(f)(3)(B)(i) through (iii).

DISCUSSION OF EVIDENCE

The Phantom (Wolfcamp) Field is an associated field that was discovered in Ward County on June 23, 1983, at a depth of 11,002 feet. The field is currently developed with oil and gas wells through portions of Ward, Culberson, Loving, Pecos, Reeves, and Winkler Counties. The current field rules were adopted on September 11, 2012 (Oil & Gas Docket No. 08-0277363). The field correlative interval is from 9,515 feet to 12,447 feet, as shown on the log of the Petrohawk Operating Company, Oxy Fee "24" Lease, Well No. 1 (API No. 42-389-32637). The correlative interval includes the lowest member of the Bone Spring Formation—the 3rd Bone Spring Sand—down through all of the Wolfcamp Formation. Wells drilled into the Phantom (Wolfcamp) Field require fracture stimulation for production. Currently, the field is being developed with horizontal wells. Fracture stimulation of wells in the fields penetrates both the Third Bone Spring and Wolfcamp Formations.

The proposed tight formation area consists of approximately 154,920 acres, mostly in Reeves County and about 10,000 acres is in Loving County. About 300 wellbores have been drilled in this area, many of which were dry holes; only about 50 wellbores have penetrated the proposed tight formation interval of the Phantom (Wolfcamp) Field. EOG's "Updated Exhibit 7" identifies the boundaries of the proposed tight area formation. If approved by the Commission, "Updated Exhibit 7" should be used by operators to determine whether a well is located within the designated area.

The Phantom (Wolfcamp) Field is continuous across and beyond the proposed tight formation area. The top of the field exhibits a smooth and continuous dip to the east-northeast from about -5,500 feet (subsea depth) in the southwest corner of the proposed area to about -7,300 feet subsea in the northeast corner. The average dip is about 75 feet per mile, or about 1.4 percent. The dip is steeper to the west where the formation is shallowest; the dip is shallower to the east where the basin is deeper. The structure map demonstrates the formation is continuous well beyond the borders of the proposed tight formation area.

EOG performed reservoir fluid compositional analysis of samples from four existing oil wells in the field. This analysis indicates that the reservoir fluid exists as an

undersaturated gas at reservoir conditions. Further, the samples exhibited a recombined heptanes and heavier (heptanes-plus) composition of less than 11 percent, and thus the sampled oil wells may be permanently reclassified as gas wells per Commission policy. The heptanes-plus values ranged from 4.391 percent to 9.777 percent. These four wells are all located within just one section of the proposed tight formation area; spatially, they are not representative of the field as a whole. However, these analyses do demonstrate that oil wells in the field may qualify for permanent classification as gas wells based on the heptane-plus composition criteria established by Commission policy.

To establish the proposed area as a tight formation, EOG and Resolute provided data from 23 data point wells (7 from EOG and 16 from Resolute). Pursuant to Statewide Rule 101(f)(3)(B)(i), the in situ permeability throughout the proposed formation must be 0.1 millidarcies (md) or less. Further, the top of the correlative interval for the Phantom (Wolfcamp) Field is 9,515 feet. However, within the proposed tight formation area, the average top of the field is 9,184 feet. Pursuant to Statewide Rule 101(f)(3)(B)(ii), the maximum allowable unstimulated production rate for a field interval whose top is from 9,000 feet to 9,500 feet may not exceed 519 thousand cubic feet (MCF) of gas per day.

EOG and Resolute used both modeled (PROMAT) and core sample data to evaluate the formation permeability. The core data was obtained from both the 3rd Bone Spring and the Wolfcamp Formations. Flow rates were estimated from ONEPT modeling. Based on data from the 23 data point wells, EOG and Resolute determined the following:

- The geometric mean permeability is 0.006769 md.
- The median permeability is 0.007580.
- The geometric mean flow rate is 199 MCF per day.
- The median flow rate is 186 MCF per day.

Statewide Rule 101(f)(3)(B)(iv) requires that the requested designated area does not extend beyond a two and one-half mile radius drawn from any data point well. As shown on "Updated Exhibit 7", the data point wells are not evenly spaced across the proposed area such that all of the proposed area is within 2.5 miles of a data point well. That is, one data point well can represent a circular area of 12,566 acres. The Examiners take note of the following:

- The proposed area consists of 154,920 acres, which, at a minimum would require 13 data point wells for full coverage.
- EOG and Resolute have provided 23 data point wells, which are generally but not necessarily evenly located across the proposed area.

- EOG's analysis of geologic structure and multiple cross-sections extending beyond the proposed tight formation area demonstrate that the Phantom (Wolfcamp) Field is continuous and geologically consistent across the area.

The Examiners conclude that EOG and Resolute have met their burden of proof under Statewide Rule 101 and the proposed area should be designated by the Commission as a tight formation area.

FINDINGS OF FACT

1. Notice of the application was provided to all parties entitled to notice at least 21 days prior to the Commission review.
2. All parties entitled to notice were notified of the amended application and given 21 days to file a protest. No protests were filed.
3. Notice of this hearing was given to all parties entitled to notice at least ten days prior to the date of hearing.
4. The Phantom (Wolfcamp) Field is defined by the correlative interval from 9,515 feet to 12,447 feet, as shown on the log of the Petrohawk Operating Company, Oxy Fee "24" Lease, Well No. 1 (API No. 42-389-32637).
 - a. The correlative interval includes the lowest member of the Bone Spring Formation—the 3rd Bone Spring Sand—down through all of the Wolfcamp Formation.
 - b. The Phantom (Wolfcamp) Field is continuous across and beyond the proposed tight formation area.
5. The proposed tight formation area consists of approximately 154,920 acres, mostly in Reeves County and about 10,000 acres is in Loving County. About 300 wellbores have been drilled in this area, many of which were dry holes; only about 50 wellbores have penetrated the proposed tight formation interval of the Phantom (Wolfcamp) Field.
6. Reservoir fluid samples from four wells indicate heptanes-plus values ranging from 4.391 percent to 9.777 percent, indicating that the reservoir fluid exists as an undersaturated gas at reservoir conditions, and that wells in the field may be permanently reclassified as gas wells per Commission policy.
7. EOG and Resolute provided data from 23 data point wells for the proposed 154,920 acre tight formation area.

- a. The geometric mean in situ permeability is 0.006769 md, which is less than the 0.1 md requirement of Statewide Rule 101.
- b. The geometric mean of the pre-stimulation stabilized production rate against atmospheric pressure is 199 MCF per day, which is below the 519 MCF per day requirement of Statewide Rule 101.
- 8. Wells drilled into the Phantom (Wolfcamp) Field require fracture stimulation for production.
- 9. No well drilled into the formation is expected to produce, without stimulation, more than five barrels of crude oil per day.
- 10. The requested area does extend beyond a two and one-half mile radius drawn from any data point well; the evidence in the record demonstrates that the available data is more than sufficient to establish that the requested area meets the permeability and flow rate requirements of the Rule.
- 11. EOG's "Updated Exhibit 7" describes the areal extent of the proposed tight formation area and includes the surveys and abstracts listed on Attachment A.

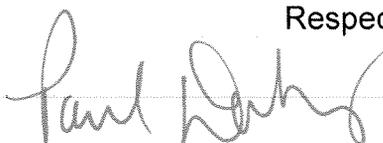
CONCLUSIONS OF LAW

- 1. Resolution of the subject application is a matter committed to the jurisdiction of the Railroad Commission of Texas. Tex. Nat. Res. Code § 81.051
- 2. All notice requirements have been satisfied. 16 Tex. Admin. Code §101.(f)(2)
- 3. The requested tight formation area meets the requirements of Statewide Rule 101. 16 Tex. Admin. Code § 3.101(f)

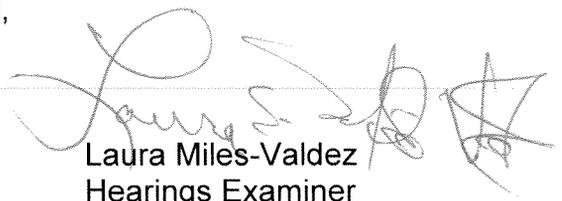
RECOMMENDATION

Based on the above findings of fact and conclusions of law, the Examiners recommend the portions of the Phantom (Wolfcamp) Field in Reeves and Loving Counties, that are within the surveys and abstracts included on Attachment A, be designated as a tight formation area pursuant to Statewide Rule 101(f).

Respectfully submitted,



Paul Dubois
Technical Examiner



Laura Miles-Valdez
Hearings Examiner

**ATTACHMENT A
SURVEYS AND ABSTRACTS**

Reeves County:

SURVEY	ABSTRACT	SURVEY	ABSTRACT
BRADY, E J	A-4743	PSL	A-4359
FRANKLIN, G A	A-5974	PSL	A-4358
H&GN RR CO	A-4344	STATE OF TEXAS	A-736
H&GN RR CO	A-3491	T&P RR CO	A-905
H&GN RR CO	A-364	T&P RR CO	A-883
H&GN RR CO	A-1671	T&P RR CO	A-3379
H&GN RR CO	A-371	T&P RR CO	A-3377
H&GN RR CO	A-1320	T&P RR CO	A-3505
H&GN RR CO	A-370	T&P RR CO	A-884
H&GN RR CO	A-1813	T&P RR CO	A-911
H&GN RR CO	A-373	T&P RR CO	A-888
H&GN RR CO	A-1511	T&P RR CO	A-3248
H&GN RR CO	A-377	T&P RR CO	A-3769
H&GN RR CO	A-5793	T&P RR CO	A-4979
H&GN RR CO	A-3955	T&P RR CO	A-889
PSL	A-2400	T&P RR CO	A-5695
PSL	A-5976	T&P RR CO	A-5183
PSL	A-4213	T&P RR CO	A-5893
PSL	A-2399	T&P RR CO	A-917
PSL	A-5470	T&P RR CO	A-893
PSL	A-2256	T&P RR CO	A-3698
PSL	A-2510	T&P RR CO	A-892
PSL	A-2509	T&P RR CO	A-3699
PSL	A-2320	T&P RR CO	A-891
PSL	A-4243	T&P RR CO	A-3373
PSL	A-5469	T&P RR CO	A-3967
PSL	A-5528	T&P RR CO	A-5498
PSL	A-5745	T&P RR CO	A-5138
PSL	A-5447	T&P RR CO	A-894
PSL	A-5640	T&P RR CO	A-3697
PSL	A-4025	T&P RR CO	A-895
PSL	A-5744	T&P RR CO	A-3696
PSL	A-4100	T&P RR CO	A-896
PSL	A-1994	T&P RR CO	A-792
PSL	A-2511	T&P RR CO	A-3946
PSL	A-2512	T&P RR CO	A-3836
PSL	A-5962	T&P RR CO	A-5497

**ATTACHMENT A
SURVEYS AND ABSTRACTS**

SURVEY	ABSTRACT	SURVEY	ABSTRACT
PSL	A-2317	T&P RR CO	A-794
PSL	A-2318	T&P RR CO	A-735
PSL	A-5187	T&P RR CO	A-793
PSL	A-3945	T&P RR CO	A-2228
PSL	A-3903	T&P RR CO	A-795
PSL	A-5743	T&P RR CO	A-3180
PSL	A-4127	T&P RR CO	A-5263
PSL	A-4799	T&P RR CO	A-800
PSL	A-4600	T&P RR CO	A-5884
PSL	A-4599	T&P RR CO	A-5957
PSL	A-5405	T&P RR CO	A-799
PSL	A-737	T&P RR CO	A-3172
PSL	A-738	T&P RR CO	A-801
PSL	A-5801	T&P RR CO	A-3964
PSL	A-5981	T&P RR CO	A-806
PSL	A-3615	T&P RR CO	A-3272
PSL	A-6001	T&P RR CO	A-4430
PSL	A-3562	T&P RR CO	A-805
PSL	A-2226	T&P RR CO	A-5891
PSL	A-3614	T&P RR CO	A-3171
PSL	A-4560	T&P RR CO	A-807
PSL	A-2227	T&P RR CO	A-3395
PSL	A-3965	T&P RR CO	A-812
PSL	A-4448	T&P RR CO	A-3173
PSL	A-4449	T&P RR CO	A-811
PSL	A-4933	T&P RR CO	A-3148
PSL	A-743	T&P RR CO	A-813
PSL	A-1878	T&P RR CO	A-3174
PSL	A-5978	T&P RR CO	A-3149
PSL	A-4556	T&P RR CO	A-817
PSL	A-2241	T&P RR CO	A-5828
PSL	A-1993	T&P RR CO	A-818
PSL	A-2469	T&P RR CO	A-3150
PSL	A-4153	T&P RR CO	A-819
PSL	A-4453	T&P RR CO	A-796
PSL	A-4452	T&P RR CO	A-2098
PSL	A-4434	T&P RR CO	A-6030
PSL	A-4451	T&P RR CO	A-797
PSL	A-4450	T&P RR CO	A-2096
PSL	A-744	T&P RR CO	A-798

**ATTACHMENT A
SURVEYS AND ABSTRACTS**

SURVEY	ABSTRACT	SURVEY	ABSTRACT
PSL	A-745	T&P RR CO	A-741
PSL	A-746	T&P RR CO	A-802
PSL	A-2049	T&P RR CO	A-4643
PSL	A-2471	T&P RR CO	A-803
PSL	A-2470	T&P RR CO	A-749
PSL	A-3948	T&P RR CO	A-804
PSL	A-4454	T&P RR CO	A-4429
PSL	A-4455	T&P RR CO	A-808
PSL	A-2038	T&P RR CO	A-4202
PSL	A-4435	T&P RR CO	A-809
PSL	A-4436	T&P RR CO	A-3269
PSL	A-4437	T&P RR CO	A-4432
PSL	A-4441	T&P RR CO	A-810
PSL	A-4442	T&P RR CO	A-4431
PSL	A-4443	T&P RR CO	A-814
PSL	A-4444	T&P RR CO	A-5193
PSL	A-2490	T&P RR CO	A-4741
PSL	A-2491	T&P RR CO	A-816
PSL	A-2291	T&P RR CO	A-4742
PSL	A-2292	T&P RR CO	A-815
PSL	A-5704	T&P RR CO	A-970
PSL	A-5967	T&P RR CO	A-3566
PSL	A-2383	T&P RR CO	A-4744
PSL	A-4439	T&P RR CO	A-5897
PSL	A-4438	T&P RR CO	A-3151
PSL	A-4447	T&P RR CO	A-820
PSL	A-4446	T&P RR CO	A-3263
PSL	A-4445	T&P RR CO	A-4433
PSL	A-5473	T&P RR CO	A-4099
PSL	A-2488	T&P RR CO	A-971
PSL	A-753	T&P RR CO	A-3267
PSL	A-5858	T&P RR CO	A-3266
PSL	A-5902	T&P RR CO	A-3264
PSL	A-5016	T&P RR CO	A-3262
PSL	A-5875	T&P RR CO	A-5825
PSL	A-5983	T&P RR CO	A-4077
PSL	A-6007	T&P RR CO	A-3268
PSL	A-3003	T&P RR CO	A-3265
PSL	A-5770	T&P RR CO	A-5660
PSL	A-2642	T&P RR CO	A-5111

**ATTACHMENT A
SURVEYS AND ABSTRACTS**

<u>SURVEY</u>	<u>ABSTRACT</u>	<u>SURVEY</u>	<u>ABSTRACT</u>
PSL	A-757	T&P RR CO	A-861
PSL	A-2382	T&P RR CO	A-5048
PSL	A-2182	T&P RR CO	A-862
PSL	A-5869	T&P RR CO	A-5832
PSL	A-4440	T&P RR CO	A-863
PSL	A-5035	T&P RR CO	A-5993
PSL	A-5033	T&P RR CO	A-2444
PSL	A-5040	T&P RR CO	A-867
PSL	A-1908	T&P RR CO	A-771
PSL	A-1905	T&P RR CO	A-5095
PSL	A-1906	T&P RR CO	A-5829
PSL	A-2695	T&P RR CO	A-860
PSL	A-760	T&P RR CO	A-5830
PSL	A-2634	T&P RR CO	A-5831
PSL	A-2600	T&P RR CO	A-859
PSL	A-2181	T&P RR CO	A-972
PSL	A-4577	T&P RR CO	A-1969
PSL	A-5034	T&P RR CO	A-5112
PSL	A-5042	T&P RR CO	A-5659
PSL	A-5041	T&P RR CO	A-864
PSL	A-5052	T&P RR CO	A-5049
PSL	A-1907	T&P RR CO	A-2183
PSL	A-2489	T&P RR CO	A-973
PSL	A-5702	T&P RR CO	A-5051
PSL	A-5705	T&P RR CO	A-866
PSL	A-5940	T&P RR CO	A-5050
PSL	A-3597	T&P RR CO	A-865
PSL	A-3942	T&P RR CO	A-974
PSL	A-5108	PSL/CASEY, LA	A-5471
PSL/HILL, GP	A-5746	PSL/MEEKER, JR	A-5999
PSL/MEEKER, FR	A-5747	PSL/CARTER, JB	A-5748
PSL/BRUCE, RA	A-2559	PSL/ANDERSON, LW	A-4345
T&P RR CO/CARTER, JB	A-5697	T&P RR CO/COX, JM	A-5423
T&P RR CO/SWAIN, H	A-5639	T&P RR CO/MEEKER, JR	A-5696
H&GN RR CO/PORTER, LO	A-1807	H&GN RR CO/NELL, JB	A-2370
H&GN RR CO	A-362	H&GN RR CO	A-366
H&GN RR CO/ANDERSON LW	A-4343	H&GN RR CO/DERACY, J	A-2603
H&GN RR CO	A-368	H&GN RR CO/WOODCOCK, AH	A-1889

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SURVEYS AND ABSTRACTS**

<u>SURVEY</u>	<u>ABSTRACT</u>	<u>SURVEY</u>	<u>ABSTRACT</u>
H&GN RR CO/BELL, IJ	A-1512	H&GN RR CO	A-372
H&GN RR CO/PYLE, HE	A-1814	H&GN RR CO/BELL, IJ	A-4353

Loving County:

<u>SURVEY</u>	<u>ABSTRACT</u>
H&TC RR CO	A-14