

July 29, 2011

Rule 37 Case No. 0267624
District 09

APPLICATION OF TITAN OPERATING, LLC FOR A RULE 37 EXCEPTION FOR THE HILLIARD SOUTH UNIT LEASE, WELL NO. 1H, NEWARK EAST (BARNETT SHALE) FIELD, DENTON COUNTY, TEXAS.

APPEARANCES:

FOR APPLICANT:

Philip Whitworth, Attorney
John Hicks, Attorney
Chris Hammack, P.E.
William "Butch" Ford
Rick Johnston, P.E.
Robert J. Dollak, Jr.
Houston Sullivan
Alfred G. Allen III

APPLICANT:

Titan Operating, LLC

FOR PROTESTANTS:

George C. Neale, Attorney

PROTESTANTS:

Tammy Ngo
Eric Jellison
Tammi Vajda
Annette Taylor
William O'Brien

PROPOSAL FOR DECISION

PROCEDURAL HISTORY

APPLICATION FILED:

January 14, 2011

AMENDED NOTICE OF HEARING:

January 20, 2011

HEARD BY:

Marshall Enquist - Hearings Examiner
Richard Atkins - Technical Examiner

HEARING DATE :

January 31, 2011

PFD CIRCULATION DATE:

July 29, 2011

STATEMENT OF THE CASE

Titan Operating, LLC ("Titan" or "Applicant"), seeks an amended drilling permit pursuant to the provisions of Statewide Rule 37 for the as-drilled location of the Hilliard South Unit, Well No. 1H, a horizontal well in the Newark, East (Barnett Shale) Field, Denton County, Texas. Titan received a

drilling permit on September 16, 2010 to drill its Well No. 1H at a Rule 37 exception location on its 593.02-acre pooled unit. This permit was restricted by a “no perforation zone” (“NPZ”) and was approved administratively pursuant to Statewide Rule 37(h)(2)(A). The well, a 3337 foot lateral including a 1209 foot NPZ at the terminus, has been drilled and the casing has been run and cemented in place. However, the well has not been completed with perforations and has not produced. Appendix I to this proposal for decision is a copy of the plat associated with the September 16, 2010 drilling permit, showing the well path and the 1209 foot NPZ.

On September 27, 2010, Titan applied to remove the 1209 foot NPZ on its as-drilled well on the 433.115-acre Hilliard South Unit. In that application, the Unit boundaries remained the same as the previous 593.02-acre Unit, with the change in unit acreage reflecting the fact that Titan was describing the acreage in the Unit in terms of leased acreage rather than total acreage within the boundaries of the Unit.

Titan amended its application on January 20, 2010, still seeking to remove the 1209 foot NPZ on its as-drilled well, but reducing the size of the Hilliard South Unit to 162.002 acres. Appendix II to this proposal for decision is a copy of the plat showing the reduced boundaries of the Unit and the as-drilled well without the 1209 foot NPZ. The surface location of Well No. 1H is 1537 feet west of the east survey line and 2451 feet north of the south survey line in the J. White Survey, A-1341. The penetration point is 330 feet west of the east line of the survey and 2066 feet north of the south line. The well is on an east-west line with the terminus 3667 feet west of the east line of the survey and 2097 feet north of the south line.

Special field rules for the Newark, East (Barnett Shale) Field provide for 330 foot lease line spacing. A Rule 37 exception is needed for the proposed Hilliard South Unit, Well No. 1H, because the section of the well proposed to be perforated is closer than 330 feet to the boundaries of certain tracts internal to the unit that are unleased. Notices of Intent to Appear in Protest of the application were filed by Tammy Ngo, Mary and Danny Duffey, Craig and Marsha Cansler, David and Patricia Benton, Seoungjun Park and Sang Kim, Bobby and Annette Taylor, William and Cheryl O’Brien, Scott Smith and the Lakeview Estates Homeowners Association. All were owners of tracts within 330 feet of the portion of the well currently designated a no-perf zone. Of these protestants, Tammy Ngo, Annette Taylor and William O’Brien appeared at the hearing with their attorney, George Neale.

The examiners believe Titan has proved that it cannot recover its fair share of the recoverable hydrocarbons in place beneath the Hilliard South Unit with the current “no perforation zone” in place on its Well No. 1H, and recommend that Titan’s application be approved.

DISCUSSION OF THE EVIDENCE

TITAN OPERATING, LLC

Special field rules for the Newark, East (Barnett Shale) Field provide for 330 foot lease line

spacing. As to horizontal wells, where the horizontal portion of the well is cased and cemented back above the top of the Barnett Shale formation, the distance to any property line, lease line, or subdivision line is calculated based on the distance to the nearest perforation point in the well, and not based on the penetration point or terminus. Where an external casing packer is placed in a horizontal well and cement is pumped above the external casing packer to a depth above the top of the Barnett Shale formation, the distance to any property line, lease line, or subdivision line is calculated based on the top of the external casing packer or the closest open hole section in the Barnett Shale. The standard drilling and proration unit for the Newark, East (Barnett Shale) Field is 320 acres. An operator is permitted to form optional drilling units of 20 acres.

Titan seeks removal of the 1209 foot “no perforation zone” (“NPZ”) on its Hilliard South Unit, Well No. 1H. Titan believes removal of the NPZ is necessary to prevent the loss of roughly 800,000 mcf of gas, or 0.8 Bcf of gas, that would otherwise be wasted and left in the ground. Titan also believes removal of the NPZ is necessary to afford the mineral owners within the 162 acre Hilliard South Unit a reasonable opportunity to recover their fair share of Barnett Shale reserves.

The total acreage within the perimeter of the Hilliard South Unit is 180.664 acres, in 248 separate tracts. Of these, 18.662 acres are unleased, leaving 162.002 acres leased within the Unit. Titan has leased 88.6% of the acreage within the boundaries of its Hilliard South Unit. Titan is still open to signing the unleased mineral interest owners. It offers a lease with terms of \$5,000 per acre, 25% royalty, a three year primary term and no surface use.

There are limited locations from which Titan can drill a well. Titan has a surface pad site for the Hilliard South Unit, Well No. 1H, located in an open field on the east side of the unit. Titan has a permit for this pad site from the City of Flower Mound. The west side of the Unit is a developed subdivision.

To establish the currently recoverable reserves under the 162.002-acre Hilliard South Unit, Titan presented an exhibit partially drawn from an exhibit presented in Oil & Gas Docket No. 09-0242843¹, which indicated Original Gas In Place in Denton and Tarrant Counties to be 139 BCF per acre for every 640 acres, assuming a formation thickness of 433 feet. Available well logs in the vicinity of the Hilliard South Unit indicate the thickness of the Barnett Shale locally to be 370 feet. Adjusting for formation thickness of 370 feet in the area of the Hilliard South Unit yields 118.8 BCF of gas per 640 acres. Adjusting further for the 162 leased acres of the Hilliard South Unit results in 30.1 BCF of Original Gas In Place under the leased acreage of the Unit. Applying a recovery factor of 0.3 to the Original Gas In Place under the Unit results in currently recoverable reserves of 9 Bcf under the 162 acre Hilliard South Unit.

¹ Oil & Gas Docket No. 09-0242843: Application of Devon Energy Operating Co., LP to Consider Amending the Field Rules for the Newark, East (Barnett Shale) Field, Wise, Bosque, Cooke, Denton, Erath, Hood, Jack, Johnson, Montague, Palo Pinto, Parker, Tarrant and Young Counties, Texas. Final Order Issued August 3, 2005.

Titan reviewed the Newark, East (Barnett Shale) Field wells within a five mile radius of the proposed well. Only one vertical well was found, the Callejo No. 1, a well that was drilled early in the development of the Barnett Shale. All other wells within the area of review were horizontal wells. Titan asserts that under current market conditions, vertical wells are not economic. Operators in the Newark, East (Barnett Shale) Field are not drilling vertical wells.

There is a good reason that operators in the Barnett Shale are not drilling vertical wells. The only vertical well (the Callejo No. 1) in the five-mile radius study area recovered 105 Mmcf, or 0.1 Bcf. Titan presented an exhibit outlining the economics behind a vertical well, assuming a recovery five times greater than that of the existing Callejo No. 1, or 519 Mmcf or 0.5 Bcf of gas. The cost to drill and complete the vertical well, exclusive of the cost of surface facilities, would be \$2,850,000. The well would not pay out and would have a zero rate of return. In its calculations regarding the hypothetical vertical well, Titan used a gas price of \$4.50 per Mcf, which it believes is very optimistic.

Within the five mile radius of review area, Titan plotted drainhole length versus estimated ultimate recovery (EUR) for 48 wells that had sufficient production history to justify calculating an EUR. Using the least squares regression method, Titan calculated that each incremental foot of drainhole length results in the recovery of 644 Mcf of gas.

Titan calculates that short drainholes, much like vertical wells, will not pay out. Titan's currently permitted drainhole length of 2100 feet would cost \$3.4 million to drill and would recover approximately 1.15 Bcf. The well would not pay out. On the basis of a simple cash-flow calculation, the well fails to pay off by \$146,000. On a more realistic discounted cash flow basis, the well loses even more money. More importantly, if Titan limited itself to three 2100 foot horizontal drainholes drilled parallel to one another, all within the regular locations available, the total recovery would be only 3.45 Bcf, far less than the 9 Bcf of recoverable gas in place under the 162-acre Hilliard South Unit. In addition, Titan would lose money on the three wells. Titan believes no prudent operator would drill those wells.

If the NPZ on the Hilliard South Unit, Well No. 1H is removed, allowing recovery from an additional 1209 feet of drainhole, the incremental recovery would be 778 Mmcf, or almost 0.8 Bcf. If the exception is granted, the lateral of the Hilliard South Unit, Well No. 1H would be 3337 feet in length and would have an estimated ultimate recovery of 1.95 Bcf. The cost of drilling and completion would total almost \$3.7 million. The well would pay out in two years and its rate of return would be 34%. The drainhole orientation would make it possible to drill additional mirror wells on the unit and recover a larger percentage of the recoverable hydrocarbons in place. Titan believes removal of the NPZ is necessary to afford the mineral interest owners within the 162-acre South Hilliard Unit a reasonable opportunity to recover the gas under their acreage.

Titan states that even if its proposed well is approved, its projected recovery of an estimated 1.95 Bcf of gas is much less than the 9 Bcf of recoverable gas in place beneath the 162-acre Hilliard South Unit. Titan would return to the Commission and seek permits to drill additional wells.

In discussions with Titan, the protestants in this case have proposed an alternate path for Titan's well which would run diagonally from a regular location in the northeast portion of the Hilliard South Unit to a regular location in the southern half of the Hilliard South Unit, resulting in a drainhole length of 2398 feet, which would have an estimated ultimate recovery of 1.34 Bcf. The alternative well path, here referred to as the "diagonal well" for convenience, is shown on Titan Exhibit 11, which is attached as Appendix III. On the exhibit, Titan has drawn a gray dashed line which represents the 330 foot lease line spacing distance required under the field rules for the Newark, East (Barnett Shale) Field. In addition, Titan has drawn lines a 330 foot lease line spacing distance away from unleased tracts. The yellow area on the exhibit represents the regular locations available to Titan for drilling its wells.

The 2398 foot diagonal well, with an EUR of 1.34 Bcf, would have a projected rate of return of 4.8%. Titan believes is an insufficient rate of return when other investment opportunities, such as corporate bonds, yield higher rates of return. Titan also finds protestant's alternative drainhole path objectionable because the diagonal well path would prevent the drilling of additional wells. It is standard practice in the Newark, East Barnett Shale to drill additional wells on a unit parallel to each other. Due to the geometry of the Unit, and the location of the surface pad available to Titan, the diagonal well would interfere with future wells aligned with the east-west trend of the Unit. Titan does not believe any prudent operator would cross well paths and risk fracture stimulation interference in the pay zone. Besides recovering only 1.34 Bcf of gas, the diagonal well would recover none of the reserves in the western portion of the Unit, preventing the mineral owners from accessing their fair share of the currently recoverable hydrocarbons beneath the Hilliard South Unit.

Under the current state of fracking technology, Titan does not have the option of completing the currently permitted first 2100 feet of lateral and returning at some later date to complete the terminal 1209 feet of drainhole. In order to stimulate these wells, the ID of the casing should be between 4 ½ and 5 ½ inches to allow an adequate rate of flow for the frac job. If Titan fraced the first 2100 feet of its lateral now and, at some unknown point in the future, returned to frac the remaining 1209 feet, it would have to set a packer and run tubing with a smaller ID. Normal frac jobs are performed at a pump rate of 30 to 60 barrels a minute. It would not be possible to get those volumes and rates through 2 7/8 inch or 3 ½ inch tubing, which would result in an inferior frac job.

As shown in Appendix III, the locations of the unleased tracts make it impossible for a well to have any take points (perforations) anywhere in the western portion of the unit without a Rule 37 exception. The only locations available to drill regular vertical wells are within the yellow area of Appendix III.

Titan is aware of the surface issues raised by the protestants, but does not believe the completion of a 3300 foot lateral versus the currently permitted 2100 foot lateral would involve a significant increase in surface equipment, nor a significant increase in truck traffic. Titan argues that these are not issues the Commission has any authority to decide.

A mineral owner has a right to choose whether or not to lease. Titan understands this, but also

points to the longstanding Rule of Capture and argues that if a well could not be permitted simply because it might drain a neighboring tract, then many fewer wells would be drilled. Titan also notes that its 162-acre Unit will not be effectively drained no matter where any single well is placed. Additional wells will be necessary.

PROTESTANTS' POSITION AND EVIDENCE

It is protestants' position that Titan is really asking for forgiveness rather than permission to complete the applied-for drainhole. Titan knowingly drilled a 3337 foot lateral, in the full knowledge that it only had the right to perforate the first 2100 feet, and fully aware that such a short lateral would be uneconomic. The protestants believe that Titan must develop its tract from regular locations first and then come to the Commission for exception locations only after proving that regular locations will not provide a fair opportunity to recover their reserves.

Protestants also believe that granting the removal of the NPZ would result in Titan draining the minerals from those unleased tracts within 330 feet of the drainhole. The protestants believe Titan should drain only those areas where its drainhole is regular to unleased interests.

Protestants also entered into the record an example of a case in which a Rule 37 application for a horizontal well was denied. In Rule 37 Case No. 0251216², Chesapeake was denied an application to drill Well No. 1H on the Ramey Unit in the Barnett Shale in Tarrant County. Protestants point to Findings of Fact Nos. 12 and 13 in that case which stated that regular locations existed on the subject unit and Conclusion of Law No. 4 which stated that the applicant had failed to establish that a Rule 37 exception location was necessary to prevent waste or confiscation. The protestants also note that the Examiners' Opinion in that case noted that exceptions to Rule 37 are not granted to eliminate risk for an operator or to provide it with the best possible well. Protestants believe that economics can not be the basis for granting a Rule 37 exception. Titan has stated that it must make at least 10% on a well to achieve a viable rate of return. In protestants' view, that is an arbitrary choice and might just as easily have been a 50% rate of return.

The protestants have a general concern that oil and gas operations will be occurring within the city of Flower Mound. Their concerns relate to both surface and subsurface issues.

The surface issues relate to the disruptive effects of oil and gas operations within the city of Flower Mound. Additional surface equipment will eventually be put in place, such as compressors, evaporators and dehydrators. Pipelines will be laid to carry the gas, which will involve eminent domain issues. There will be truck traffic to remove produced water. The protestants are concerned that these operations will lower property values in the area. However, the protestants admit that surface issues are

² Rule 37 Case No. 0251216: *Application of Chesapeake Operating, Inc. for an Exception to Statewide Rule 37 for its Ramey Lease, Well No. 1H, Tarrant County, Texas*. Final Order Issued April 15, 2009.

more properly addressed by municipalities than by the Commission.

The protestants' primary subsurface issue is the taking of their unleased mineral estate without compensation and against their will. The protestants feel they are required to sign leases on terms they do not agree with, and that no other option is offered other than the penalty of having their minerals drained without compensation. The protestants believe that the right of a mineral owner who wants to extract his minerals does not supercede the right of the adjacent mineral owner who does not want to extract his minerals. A mineral owner, or the owner of any property, has the right to chose not to sell or convey property they have legal title to.

EXAMINERS' OPINION

Part of the protestants' case relies on the fact situation and the Commission Final Order in Rule 37 Case No. 0251216 ("the Ramey case"). That case, and the present case, are distinguishable. In Rule 37 Case No. 0251216, Chesapeake had a permit to drill a lateral 1839 feet long. However, upon drilling, Chesapeake made a "business decision" and opted to ignore Commission rules and exceed its permit by drilling a 3553 foot lateral, which placed the lateral under a subdivision which had many unleased tracts. Chesapeake then came in after the fact and sought a Rule 37 exception permit despite the availability of regular locations in its unit. Much of Chesapeake's case was based on the argument that it required wells of a certain length in order that they be economic.

In the Ramey case, the Examiners' Opinion correctly stated:

Chesapeake's witnesses claim they need the applied-for irregular location to allow them to have a commercial well. However, neither Chesapeake nor any other operator is guaranteed a well that meets its self-imposed criteria for economic viability - each mineral interest owner is entitled to a fair and equal opportunity to recover its fair share of the hydrocarbons under its tract. Economic requirements: 1) vary from company to company (applicant to applicant); 2) are not evenly applied; 3) are not specific to the property rights of a given tract; and 4) are subject to unpredictable external market fluctuations in the price of oil and natural gas. An operator's economic requirements therefore cannot be the basis for granting an exception to statewide Rule 37 to protect correlative rights. See *Rule 37 Case No. 0206334: Application of Enron Oil & Gas Company for an Exception to Statewide Rule 37 to Drill Its No. 17 Well, Frank Reed 117 Lease, Sawyer (Canyon) Field, Sutton County, Texas*, and *Rule 37 Case No. 0245869: Application of Chesapeake Operating, Inc. For an Exception to Statewide Rule 37 to Drill Well No. 4 on the Green Gas Unit Lease, Oak Hill (Cotton valley) Fields, Gregg County, Texas* (Final Order entered January 15, 2009).

In the present case, Titan had a valid Commission permit to drill the entirety of its 3337 foot lateral, and has legally done so, which was not the case in Chesapeake's *Ramey* case. Titan's calculations regarding the economic viability of vertical wells and short horizontal wells are certainly interesting and undoubtedly are important considerations in a business sense. However, they are not the standard applied by the Commission in determining whether an exception to Statewide Rule 37 is

warranted.

To establish entitlement to an exception to Rule 37 to prevent confiscation, an applicant must show that, absent the applied-for well, it will be denied a reasonable opportunity to recover its fair share of hydrocarbons currently in place under the lease, or their equivalent in kind. The applicant must satisfy a two-pronged test: 1.) the applicant must show that it will not be afforded a reasonable opportunity to recover its fair share of hydrocarbons currently in place by drilling a well at a regular location; and 2.) the applicant must show that the proposed irregular location is reasonable.

It is the basic right of every landowner or lessee to a fair and reasonable chance to recover the oil and gas under their property as recognized by the Texas Supreme Court in *Gulf Land Co. v. Atlantic Refining Co.*, 131 S.W.2d 73, 80 (Tex. 1939). Denial of that fair chance is confiscation within the meaning of Rule 37. *Id.*

Fair share is based on recoverable reserves on the entire lease or unit. Titan has demonstrated the presence of 9 Bcf of currently recoverable gas under the 162-acre Hilliard South Unit. Appendix III demonstrates that there are no regular locations on the west side of the unit. Without a Rule 37 exception, none of the reserves on the west side of the unit will be recovered. The evidence demonstrates that if Titan is confined to drilling the available regular location for its Well No. 1H, it will be able to perforate 2100 feet of lateral, which will recover only 1.15 Bcf of gas, virtually all from the eastern side of the unit. Titan's calculations demonstrate that removal of the NPZ designation for 1209 feet of lateral in its Well No. 1H is necessary for the recovery of an additional 778 Mmcf or almost 0.8 Bcf of gas from the western portion of the unit that could not be recovered by any other well drilled at a regular location. The total recovery for the well would be 1.95 Bcf of gas.

The location of Well No. 1H is reasonable. As shown on Appendix III, movement of the lateral to the south would result in a shorter lateral (and a lesser recovery of gas) due to the necessity of avoiding an impermissible mineral trespass on an unleased tract and would also potentially result in further Rule 37 spacing exception problems in the portion of the lateral to the east that is currently regular. Movement of the lateral to the north would also result in a shorter lateral due to the necessity of avoiding an impermissible mineral trespass. Both options result in shorter laterals which would further deprive the mineral owners of the 160-acre Hilliard South Unit of the chance to obtain their fair share of the currently recoverable reserves in place.

The examiners are not persuaded by protestants' argument that Titan must develop all of its regular locations on the east side of the unit before seeking Rule 37 relief from the Commission. First, Titan has presented convincing engineering evidence that it is not technically feasible to perforate the 2100 feet of the lateral that are regular and then at some later date, possibly after acquisition of additional leases, come back and perforate the 1209 feet of the well that are presently irregular. Such a course would result in a poorly fraced 1209 feet of lateral, decreasing the recovery from that 1209 feet of lateral. Second, if Titan is confined in this and future applications to drilling only regular locations and those in which it is its own offset, Titan could drill two additional 2100 foot laterals,

resulting in three laterals with a combined EUR of approximately 3.45 Bcf of gas. The resulting recovery of an amount less than half the currently recoverable reserves under the Hilliard South Unit of 9.0 Bcf would deprive the mineral owners of the Hilliard South Unit of a reasonable opportunity to recover their fair share of the recoverable reserves beneath the unit.

To establish entitlement to an exception to Rule 37 to prevent waste, an applicant must establish three elements: 1.) unusual conditions, different from conditions in adjacent parts of the field, exist under the tract for which the exception is sought; 2.) as a result of the unusual conditions, hydrocarbons will be recovered by the well for which a permit is sought that would not have been recovered by any existing well or by additional wells drilled at regular locations; and 3.) that the volume of otherwise unrecoverable reserves is substantial.

Titan did not show the presence of any unusual condition in the Newark, East (Barnett Shale) Field beneath the Hilliard South Unit that is different from conditions in adjacent parts of the field. Titan is not entitled to an exception to Statewide Rule 37 based on prevention of waste.

The examiners recommend that Titan be granted an exception to Statewide Rule 37 for its Well No. 1H on the 160-acre Hilliard South Unit in Denton County based on prevention of confiscation. Based on the record in this docket, the examiners recommend adoption of the following Findings of Fact and Conclusions of Law:

FINDINGS OF FACT

1. At least 10 days notice of this hearing was given to the designated operator, all offset operators, all lessees of record for tracts that have no designated operator, and all owners of record of unleased mineral interests for each affected adjacent tract.
2. Titan Operating, L.L.C. ("Titan" or "Applicant"), seeks an exception to Statewide Rule 37 for the as-drilled location of its Hilliard South Unit, Well No. 1H, in the Newark, East (Barnett Shale) Field in Denton County.
3. On September 16, 2010, Titan obtained a permit to drill the Hilliard South Unit, Well No. 1H, at a Rule 37 location on the 593.016-acre pooled unit, a well with a 3337 foot lateral and a 1209 foot no-perf zone at the terminal end of the lateral. The plat associated with that application is attached to this proposal for decision as Appendix I, which is incorporated into this finding by reference.
4. Titan has drilled and cemented the Hilliard South Unit, Well No. 1H, but the well has not been completed with perforations and has not produced.
5. On September 27, 2010, Titan submitted an application to remove the 1209 foot no-perf zone from the lateral of its Well No. 1H on its 433.115-acre Hilliard South Unit. The reduced acreage reflects the actual leased acreage in the unit.

6. On January 1, 2011, Titan amended its application and changed its unit size, reducing the Hilliard South Unit to 162.002 acres. The boundaries of the Hilliard South Unit encompass 180.664 acres, but the acreage lease by Titan within the unit is 162.002 acres. The plat associated with that application is attached to this proposal for decision as Appendix II, which is incorporated into this finding by reference.
7. Special field rules for the Newark, East (Barnett Shale) Field provide for 330 foot lease line spacing. A Rule 37 exception is needed for the proposed Hilliard South Unit, Well No. 1H, because the section of the well proposed to be perforated is closer than 330 feet to the boundaries of certain tracts internal to the unit that are unleased.
8. Special field rules for the Newark, East (Barnett Shale) Field provide for 330 foot lease line spacing. As to horizontal wells, where the horizontal portion of the well is cased and cemented back above the top of the Barnett Shale formation, the distance to any property line, lease line, or subdivision line is calculated based on the distance to the nearest perforation point in the well, and not based on the penetration point or terminus. Where an external casing packer is placed in a horizontal well and cement is pumped above the external casing packer to a depth above the top of the Barnett Shale formation, the distance to any property line, lease line, or subdivision line is calculated based on the top of the external casing packer or the closest open hole section in the Barnett Shale. The standard drilling and proration unit for the Newark, East (Barnett Shale) Field is 320 acres. An operator is permitted to form optional drilling units of 20 acres.
9. The surface location of the Hilliard South Unit, Well No 1H is located within the unit, 1537 feet from the east line and 2451 feet from the south line of the J. White Survey, A-1341, Denton County, Texas. The penetration point is 330 feet from the east line and 2066 feet from the south line of the J. White Survey. The terminus location is 1624 feet from the west line and 2097 feet from the south line of the J. White Survey.
10. The proposed surface location for Well No. 1H is the only surface location available to Titan for the drilling of wells on the Hilliard South Unit, that is, it is the only surface location approved by the City of Flower Mound.
11. The Titan application is opposed by the owners of unleased surface tracts internal to the Hilliard South Unit. Their tracts are within 330 feet of the as-drilled lateral.
12. The Barnett Shale formation is present and productive under the entirety of the Hilliard South Unit. The formation is approximately 370 feet thick in the area of the Unit.
13. To establish the currently recoverable reserves under the 162.002-acre Hilliard South Unit, Titan presented an exhibit partially drawn from an exhibit presented in Oil & Gas Docket No. 09-0242843, which indicated Original Gas In Place in Denton and Tarrant Counties to be 139 BCF

per acre for every 640 acres, assuming a formation thickness of 433 feet.

- a. Available well logs in the vicinity of the Hilliard South Unit indicate the thickness of the Barnett Shale locally to be 370 feet. Adjusting for formation thickness of 370 feet in the area of the Hilliard South Unit yields 118.8 BCF of gas per 640 acres.
 - b. Adjusting further for the 162 leased acres of the Hilliard South Unit rather than 640 acres results in 30.1 BCF of Original Gas In Place under the leased acreage of the Unit.
 - c. Applying a recovery factor of 0.3 to the Original Gas In Place under the Hilliard South Unit results in currently recoverable reserves of 9 BCF under the 162 acre Hilliard South Unit.
14. Titan plotted drainhole length versus estimated ultimate recovery for 48 wells with a five mile radius of review of the applied-for well. Using the least squares regression method, Titan calculated that each incremental foot of drainhole length results in the recovery of 644 Mcf of gas.
15. The total length of the Well No. 1H drainhole after removal of the 1209 foot NPZ as proposed by Titan, from upper perforation to lower perforation, is 3337 feet. Applying Titan's calculated incremental recovery of 644 Mcf per foot of drainhole, Well No. 1H is calculated to have an estimated ultimate recovery of 1.95 Bcf of gas.
16. As permitted, Well No. 1H has a "no perforation zone" ("NPZ") at its terminus that is 1209 feet long. Removal of the NPZ would result in the recovery of 778 Mmcft of gas or 0.778 Bcf of gas that would otherwise not be recoverable.
17. The only regular locations available to Titan to recover its fair share of the currently recoverable reserves beneath the Hilliard South Unit are shown on Titan Exhibit 11, which is attached to this proposal for decision as Appendix III, which is incorporated into this finding by reference.
 - a. On Appendix III, the gray dashed line represents the 330 foot leaseline spacing distance required by the field rules for the Barnett Shale Field. The cross-hatched area represents 330 foot leaseline spacing from the unleased tracts on the Hilliard South Unit. The yellow area represents the regular drilling locations available to Titan.
 - b. There are no regular drilling locations available to Titan on the western side of the Hilliard South Unit.

- c. Assuming that it would be feasible to drill wells on the Hilliard South Unit where wells drilled from the single available surface location might remain regular, or at least 330 feet from any unleased mineral property line, these regularly located wells would not provide Titan and its lessors a reasonable opportunity to recover their fair share of gas beneath the unit.
 - d. Titan could drill three parallel wells, each with drainholes approximately 2100 feet long within the “regular” area shown in yellow on Appendix III. Together, the three wells would recover approximately 3.45 Bcf of gas, much less than the 9.0 Bcf of recoverable gas beneath the Hilliard South Unit.
- 18. The “no perforation zone” (“NPZ”) restriction placed on Well No. 1H which prevents perforation of the lateral within 330 feet of any unleased tract will leave a substantial amount of gas unrecovered and preclude Titan and its lessors from recovering their fair share of gas beneath the Unit.
 - a. Well No. 1H, with NPZ in place, will be perforated over 2100 feet of its length from its first perforation point and will recover an estimated 1.15 Bcf of gas.
 - b. Well No. 1H, with the NPZ removed, will be perforated over 3337 feet of its length from its first perforation point and recover an estimated 1.95 Bcf of gas.
 - c. The difference between the recoveries of Well No. 1H, with the NPZ in place and with the NPZ removed, is approximately 0.8 Bcf of gas. This additional gas would be recovered from the west side of the Unit, and could not be recovered by any other well.
- 19. An alternative drilling location, drilled on a northeast-southwest diagonal (“the diagonal well”) within the area of regular locations, would be approximately 2398 feet long and would recover an estimated 1.34 Bcf of gas.
 - a. The diagonal well would not recover the 9.0 Bcf of recoverable gas beneath the Hilliard South Unit.
 - b. The diagonal well would prevent further mineral development of the 160-acre Hilliard South Unit by intersecting with and interfering with any future wells that might be drilled parallel to the existing Well No. 1H.
- 20. The as-drilled location of the Hilliard South Unit, Well No. 1H is reasonable.
 - a. The location of the well is consistent with the location of a well drilled as the first well in development plan requiring multiple parallel wells in a unit oriented

east-west.

- b. Movement of Well No. 1H to the south would result in a shorter lateral due to the necessity of avoiding an impermissible mineral trespass against an unleased tract and would also result in possible additional Rule 37 problems in the portion of the lateral to the east that is currently regular.
 - c. Movement of Well No. 1H to the north would result in a shorter lateral due to the necessity of avoiding an impermissible mineral trespass against an unleased tract.
21. Titan made several attempts to lease all of the unleased tracts and remains open to signing the unleased mineral interest owners. It offers a lease with terms of \$5,000 per acre, 25% royalty, three year primary term and no surface use.

CONCLUSIONS OF LAW

- 1. Proper notice of hearing was timely given to all persons legally entitled to notice.
- 2. All things have occurred to give the Commission jurisdiction to decide this matter.
- 3. Approval of a Rule 37 exception for the as-drilled location of the Hilliard South Unit, Well No. 1H, as proposed to be perforated by Titan Operating, LLC, is necessary to prevent confiscation and protect the correlative rights of the mineral owners.

RECOMMENDATION

The examiners recommend that the application of Titan Operating, LLC, for a Statewide Rule 37 exception for the as-drilled location of the Hilliard South Unit, Well No. 1H in the Newark, East (Barnett Shale) Field, Denton County, be granted as necessary to prevent confiscation and protect correlative rights.

Respectfully submitted,

Marshall Enquist
Hearings Examiner

Richard Atkins
Technical Examiner