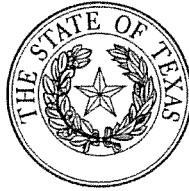


CHRISTI CRADDICK, *CHAIRMAN*
RYAN SITTON, *COMMISSIONER*
WAYNE CHRISTIAN, *COMMISSIONER*



RANDALL D. COLLINS, *DIRECTOR*

RAILROAD COMMISSION OF TEXAS

HEARINGS DIVISION

September 25, 2017

RULE 37 DOCKET NO. 0297017
STATUS NO. 806484

APPLICATION OF TALISMAN ENERGY USA INC. FOR AN EXCEPTION TO STATEWIDE RULES 37 AND 38 FOR THE COOKE RANCH C UNIT, WELL NO. C 4H, HAWKVILLE (EAGLEFORD SHALE) FIELD, LA SALLE COUNTY, TEXAS

RULE 38 DOCKET NO. 01-0297008
STATUS NO. 806491

APPLICATION OF TALISMAN ENERGY USA INC. FOR AN EXCEPTION TO STATEWIDE RULE 38 FOR THE COOKE RANCH C UNIT, WELL NO. C 5H, HAWKVILLE (EAGLEFORD SHALE) FIELD, LA SALLE COUNTY, TEXAS

RULE 38 DOCKET NO. 01-0297018
STATUS NO. 806510

APPLICATION OF TALISMAN ENERGY USA INC. FOR AN EXCEPTION TO STATEWIDE RULE 38 FOR THE COOKE RANCH C UNIT, WELL NO. C 6H, HAWKVILLE (EAGLEFORD SHALE) FIELD, LA SALLE COUNTY, TEXAS

RULE 38 DOCKET NO. 01-0297077
STATUS NO. 806518

APPLICATION OF TALISMAN ENERGY USA INC. FOR AN EXCEPTION TO STATEWIDE RULE 38 FOR THE COOKE RANCH C UNIT, WELL NO. C 7H, HAWKVILLE (EAGLEFORD SHALE) FIELD, LA SALLE COUNTY, TEXAS

RULE 38 DOCKET NO. 01-0297014
STATUS NO. 806530

APPLICATION OF TALISMAN ENERGY USA INC. FOR AN EXCEPTION TO STATEWIDE RULE 38, FOR THE COOKE RANCH C UNIT, WELL NO. C 8H, HAWKVILLE (EAGLEFORD SHALE) FIELD, LA SALLE COUNTY, TEXAS

**RULE 38 DOCKET NO. 01-0297013
STATUS NO. 806540**

**APPLICATION OF TALISMAN ENERGY USA INC. FOR AN EXCEPTION TO
STATEWIDE RULE 38 FOR THE COOKE RANCH C UNIT, WELL NO. C 9H,
HAWKVILLE (EAGLEFORD SHALE) FIELD, LA SALLE COUNTY, TEXAS**

**RULE 38 DOCKET NO. 01-0297078
STATUS NO. 807090**

**APPLICATION OF TALISMAN ENERGY USA INC. FOR AN EXCEPTION TO
STATEWIDE RULE 38 FOR THE COOKE RANCH A/B UNIT, WELL NO. A 5H,
HAWKVILLE (EAGLEFORD SHALE) FIELD, LA SALLE COUNTY, TEXAS**

**RULE 38 DOCKET NO. 01-0297076
STATUS NO. 807088**

**APPLICATION OF TALISMAN ENERGY USA INC. FOR AN EXCEPTION TO
STATEWIDE RULE 38 FOR THE COOKE RANCH A/B UNIT, WELL NO. A 6H,
HAWKVILLE (EAGLEFORD SHALE) FIELD, LA SALLE COUNTY, TEXAS**

**RULE 38 DOCKET NO. 01-0297079
STATUS NO. 807091**

**APPLICATION OF TALISMAN ENERGY USA INC. FOR AN EXCEPTION TO
STATEWIDE RULE 38 FOR THE COOKE RANCH A/B UNIT, WELL NO. A 7H,
HAWKVILLE (EAGLEFORD SHALE) FIELD, LA SALLE COUNTY, TEXAS**

**RULE 38 DOCKET NO. 01-0297080
STATUS NO. 807092**

**APPLICATION OF TALISMAN ENERGY USA INC. FOR AN EXCEPTION TO
STATEWIDE RULE 38 FOR THE COOKE RANCH A/B UNIT, WELL NO. A 8H,
HAWKVILLE (EAGLEFORD SHALE) FIELD, LA SALLE COUNTY, TEXAS**

**RULE 38 DOCKET NO. 01-0297081
STATUS NO. 807093**

**APPLICATION OF TALISMAN ENERGY USA INC. FOR AN EXCEPTION TO
STATEWIDE RULES 37 AND 38 FOR THE COOKE RANCH A/B UNIT, WELL NO. A
9H, HAWKVILLE (EAGLEFORD SHALE) FIELD, LA SALLE COUNTY, TEXAS**

APPEARANCES:

FOR APPLICANT:

Mickey Olmstead, Attorney
Clark Jobe, Attorney
Brian Burch, Attorney
Jim Clark, Petroleum Engineer
Ryan Howrish, Petroleum Engineer
Brian Velardo, Geologist
Paolo Grossi, Geologist
Farshad Lalehrokh, Petroleum Engineer
Jonathan Wood, Certified Professional Landman

APPLICANT:

Talisman Energy USA Inc.

PROTESTANT:

John Soule, Attorney
Phillip Whitworth, Attorney
Joseph A Reeves, Jr., CEO
David M. Reeves, Petroleum Engineer
Drew Reeves, VP - Land
Thomas Tourek, Geologist

REPRESENTING:

Matrix Petroleum, LLC;
JAR Resource Holdings, LP;

PROTESTANT:

John Soule, Attorney

REPRESENTING:

Devon Energy Prod. Co., LP

PROTESTANT:

John Zukowski, Attorney

REPRESENTING:

OGE, LLC

PROTESTANT:

Scott Petry, Attorney

REPRESENTING:

BHP Billiton Pet. (TxLa Op.) Co.
(f.k.a. Petrohawk)

OBSERVER:

Casey Quast, Principal Landman

REPRESENTING:

Statoil Texas Onshore Properties, LLC

PROPOSAL FOR DECISION

PROCEDURAL HISTORY

APPLICATIONS FILED:

June 3, 2015

AMENDED NOTICE OF HEARING:

August 17, 2015

HEARD BY:

Marshall Enquist – Administrative Law Judge
Karl Caldwell - Technical Examiner

HEARING DATES:

September 9, 10 and 11, 2015

ADDITIONAL HEARING DATES:

January 7 and 8, 2016

CLOSING STATEMENTS:

March 11, 2016

REPLIES TO CLOSING STATEMENTS:

March 24, 2016

PFD CIRCULATION DATE:

September 25, 2017

STATEMENT OF THE CASE

Talisman Energy USA, Inc. (“Talisman” or “Applicant”), seeks drilling permits pursuant to the provisions of Statewide Rules 37 and 38 for six horizontal wells on the 410.38-acre Cooke Ranch C Unit and five horizontal wells on the 1096.349-acre Cooke Ranch A/B Unit. The Cooke Ranch C Unit and the Cooke Ranch A/B Unit are included units within the greater 5,351.62-acre Cooke Ranch Lease. The applied-for wells are to be drilled in the Hawkville (Eagleford Shale) Field in La Salle County, Texas. Talisman intends to eventually drill the Cooke Ranch to full density through development of included Units A/B, C, D, E, F, G, H, J, K and L.¹

The field rules for the Hawkville (Eagleford Shale) Field (Docket No. 01-0296649) at the time of the hearing required a minimum 330' leaseline spacing with no minimum between well spacing rule on 320-acre units. Any unit smaller than 320 acres but not less than 40 acres is a fractional unit. Under the field rules, an operator may apply for an exception to Statewide Rule 38 to form a fractional unit of less than 160 acres but not less than 40 acres, which requires notice to designated operators, lessees of record for tracts that have no designated operator, and all owners of unleased mineral interests within 660 feet of any take point on a horizontal well within the correlative interval. If no written protest is received by the Railroad Commission within 21 days, the application shall be approved administratively by the Railroad Commission. If a written protest is received within 21 days of the issuance of notice of the application, the application will be scheduled for hearing, at which the applicant must show that the fractional proration unit and the well thereon are necessary to effectively drain an area of the field that will not be effectively drained by existing wells, or to prevent waste or confiscation. Talisman is applying for 60-acre fractional units. The field does not have a stacked lateral rule.

The applications are protested by a group of non-operating working interest owners in the lease, consisting of Matrix Petroleum, LLC; JAR Resource Holdings, LP; Devon Energy Prod. Co., LP and OGE, LLC. The working interest owners are similarly aligned in these dockets and have agreed to allow Matrix Petroleum, LLC (“Matrix”) to represent them. The working interest owners assert that there is currently no designated operator for the lease pursuant to a 1954 Joint Operating Agreement (“JOA”), and that each working interest owner is, therefore, an operator that has as much right as Talisman to drill and operate wells on the Cooke Ranch Lease. As a second basis for standing, they maintain that they are affected parties, based on their assertion that Talisman’s proposed development plan will cause waste, thus negatively affecting their interests. Their third basis for standing is their interpretation of Texas Natural Resources Code §85.321, which they argue entitles them to appear in the present hearings as protestants.

Two of the proposed wells, Well Nos. C 4H and A 9H, are protested by BHP Billiton Pet. (TxLa Op.) Co. (“BHP Billiton”), as an offset operator concerned that the two applied-for wells encroach upon a common leaseline.

¹ [Attachment 1 - Talisman Exhibit 23]

DISCUSSION OF THE EVIDENCE

Talisman Energy USA Inc.'s Direct Case

Standing

Talisman agrees that BHP Billiton is an offset operator and does not object to their standing to protest. However, Talisman does object to the standing of Matrix Petroleum, LLC ("Matrix"); JAR Resource Holdings, LP ("JAR"); Devon Energy Prod. Co., LP ("Devon"); and OGE, LLC ("OGE") to protest its eleven drilling applications. The four protesting entities are non-operating working interest owners in the 5,351.62-acre Cooke Ranch Lease and are subject to a 1954 JOA and a 1954 Unitization Agreement. Talisman argues that the Commission has never granted standing to non-operating working interest owners because their interests are already contractually protected under their JOAs. As contracts, the terms of a JOA are properly adjudicated in District Court, not at the Railroad Commission of Texas. Talisman notes that Matrix and JAR have, in fact, filed suit against Talisman as operator of the Cooke Ranch in La Salle County District Court, based, at least in part, on their interpretation of the 1954 JOA.²

The original parties to the 1954 JOA were Paul Kayser and Plymouth Oil. In 2010, Talisman and Statoil Texas Onshore Properties LLC ("Statoil") acquired 75% of the working interest previously owned by Paul Kayser through Kayser's successors in interest.³ Since that time, Talisman has acted as the operator of the lease.

In a 2013 Settlement document, titled "Stipulation of Leasehold Interest", the 2010 successors to Kayser, consisting of Talisman, Statoil, JAR, Devon, Matrix and OGE, agreed that Talisman and Statoil had each acquired a 0.317355 working interest in the Cooke Ranch Lease. A letter dated August 27, 2015 on Statoil letterhead confirms that "...from and after the date that Statoil Texas Onshore Properties LLC took its interest in the acreage included in this JOA, Statoil has considered Talisman Energy USA, Inc. to be the operator under the terms of the JOA."⁴ Combining its own interest with that of Statoil, Talisman states that it has the support of a total of 0.6347 of the working interest in the Cooke Ranch Lease, which is the majority interest. According to Talisman Exhibit 11, the 2013 Settlement document, the other working interest owners are JAR, with a 0.2 working interest; Devon, with a 0.10248 working interest; MPH (Matrix Petroleum Holdings, LLC) with a 0.01157 working interest; and OGE, with a 0.05124 working interest.⁵

² Talisman. Exhibit 1, *Talisman Energy USA, Inc. V. Matrix Petroleum, LLC; Matrix Petroleum Holdings, LLC; and JAR Resources Holdings, L.P.* No. 14-08-00158-CVL, District Court in La Salle County, 218th Judicial District

³ Talisman Exhibits 8 and 9

⁴ Talisman Exhibit No. 13

⁵ Talisman Exhibit No. 11

Talisman has applied for and drilled thirteen wells, being Well Nos. A 1H, A 2H, A 3H, A 4H, B 2H, B 5H, C 1H, C 2H, C 3H, D 1H, D 3H, F 1H and F 3H, on the Cooke Ranch Unit. Matrix Petroleum, LLC participated in these wells with Talisman.

Talisman obtained approval of its new drilling permit applications for Well Nos. C 4H and C 5H on June 11, 2015, but Drilling Permits received a protest filed on behalf of Matrix and JAR by the law offices of Scott Douglass & McConnico. By email, Drilling Permits responded that "*The protest received by the Drilling Permit department has been reviewed and determined not to fall within the scope of SWR exception notification. The protestant, if they so choose, can continue the process as a complaint and go through the hearings Section of the RRC and request a hearing date to have the Commission hear their case.*"⁶ On the same day, the Commission received a response from attorney Phillip Whitworth of the Scott Douglass law firm stating the following:

Mr. Garza – Please be advised that Matrix and JAR (Protestants) are not only working interest owners in the acreage offsetting the wells in question but also have the right to operate this acreage. There is no designated operator of such acreage. Talisman is the operator only of the existing wellbores but NOT in acreage adjacent thereto. Protestants, like Talisman, have the right to be the operator by drilling wells on this offset acreage. Protestants are, therefore, as much an operator of acreage offsetting existing wells as Talisman and are entitled to notice of these applications as leasehold owners that are directly and adversely affected by the proposed wells. Protestants accordingly request that their protests be recognized as offsets entitled to notice of these density exception applications and that the subject Talisman permit applications not be granted prior to notice and opportunity for hearing. Thank you for your attention and consideration. Flip Whitworth, Scott Douglass & McConnico, LLP.⁷

As a result of this assertion, these eleven dockets were set for hearing, and Talisman found itself defending its drilling permit applications from a protest by the minority working interest owners in the Cooke Ranch Lease. In addition, two permits that had been previously granted by Drilling Permits, for Well Nos. C 4H and C 5H, were withdrawn by the Commission, apparently due to the allegation that Talisman was not the operator of the acreage for those wells.

Talisman readily admits that it did not become operator of the Cooke Ranch Lease solely as a successor to the interests of Paul Kayser. Talisman believes it became Unit Operator through its actions in permitting wells on the Cooke Ranch Lease and behaving as Unit Operator with the consent of the other working interest owners, in particular with the written consent of Statoil.

Citing Texas caselaw, Talisman argues that, in the absence of the election of a successor operator, a person who assumes control of operations and acts as an operator becomes the Unit Operator. The caselaw is predicated on waiver, and the conduct of

⁶ Talisman Exhibit No. 37, June 17, 2015, 12:34 PM

⁷ Talisman Exhibit No. 37, June 17, 2015, 4:29 PM

other working interest owners in a unit accepting the actions of a new Unit Operator and treating that new unit Operator as if properly designated. Talisman cites *Abraxas Petroleum Corp. V. Hornburg*, 20 S.W.3d 741 (Tex. App. - El Paso 2000, no pet.) in which a Unit Operator, Pearson-Siebert Oil Company ("Pearson-Siebert"), sold and assigned its 55.357120% working interest to Abraxas Petroleum Corp. ("Abraxas"), which then acted to replace Pearson-Siebert as Unit Operator of the Cleo-Smith Lease, without formal election to the position under the terms of the controlling JOA.

The *Abraxas* court noted that any contractual right can be waived, and that the waiver could be by words or by a party's conduct. In *Abraxas*, the court found waiver by conduct. Beginning in October 1992, the non-operating working interest owners of the Cleo-Smith Lease received monthly operating statements from Abraxas and invoices for their respective share of expenses. The non-operators paid their proportionate share of expenses based on these billings. They also engaged in written and personal communications with Abraxas regarding their questions about the operation of the lease. The non-operators did not formally raise their objections to the lack of any formal selection of Abraxas as a replacement Unit Operator until the filing of suit in 1995. Citing *Purvis Oil*,⁸ the court found that the non-operating interest owners waived the requirements of the JOA pertaining to the proper selection of a successor operator by permitting another operator to perform as operator and then accepting the benefits of that party's performance.

Talisman argues that the facts in the present circumstances are parallel to those in *Abraxas*. The non-operating working interest owners have accepted the benefits of Talisman acting as Unit Operator, allowing Talisman to obtain drilling permits and drill wells on the Cooke Ranch Lease and then accepting the benefits of production. The non-operating working interest owners, Matrix, JAR, Devon and OGE, have responded to the Authorizations for Expenditures (AFE's) issued by Talisman, have received and paid Joint Interest Billing Statements (JIBS) received from Talisman, and have been allocated their share of production by Talisman. Talisman asserts that the non-operating working interest owners of the Cooke Ranch Lease have acquiesced in Talisman's assumption of the role of Unit Operator, and, pursuant to *Abraxas*, are estopped from denying that Talisman is the Unit Operator.

The non-operating working interest owners assert a second basis for their right to appear as protestants in this hearing. They suggest that they are entitled to appear as "affected parties" because Talisman's development plan for the Cooke Ranch Lease will place wells too close together. The non-operating interest owners believe wells in close proximity to one another will interfere with each other and the end result will be a reduced recovery of hydrocarbons, or waste (the ultimate loss of recoverable reserves).

Talisman responds that, first, its operations will not cause waste, and, second, that the Commission has not recognized non-operating working interest owners as parties entitled to notice of hearing in the past and has previously declined the opportunity to re-

⁸ *Purvis Oil Corp. V. Hillin*, 890 S.W.2d 931, (Tex. App. - El Paso 1994, no writ)

write its Statewide Rules to recognize non-operating working interest owners as affected parties. In adopting amendments to Statewide Rule 37 in 1997, the Commission responded to submitted comments and stated why it declined to adopt suggested changes that would expand the class of persons presumptively affected under proposed amendments to Statewide Rule 37:

Edward J. Carpenter (Carpenter) filed comments supporting the amendments but suggested expanding the class of persons presumptively affected to include the owners of offset leased mineral interests, i.e., lessor/royalty owners and nonoperating lessees. The commission declines to make these changes because royalty owners (who do not own a possessory interest) and nonoperating mineral interest owners are considered, by virtue of their contracts or leases, to be represented by the designated operator of the tract.⁹

Under the Commission's current permitting system, a Unit Operator can quickly obtain administrative approval of drilling permit applications so long as no other party is affected or entitled to a hearing. Talisman fears that if the Commission allows non-operating working interest owners to protest the actions of their Unit Operator in this hearing, then other non-operating working interest owners bound by a JOA will bring their disputes with their Unit Operators to the Commission in numerous other drilling permit application cases, unduly burdening both Unit Operators and the Commission.

Existing Wells on the Cooke Ranch Lease

The Cooke Ranch, originally named the Kayser Ranch, consisted of 7,537.33 acres described in the 1954 JOA.¹⁰ The 1954 Kayser Ranch Unit Agreement included slightly less acreage, 7,137.33 acres.¹¹ Some acreage has been excluded over time due to farm-outs.

Talisman has already drilled thirteen wells on the Cook Ranch Lease. These are the A/B Unit Well Nos. A 1H, A 2H, A 3H, A 4H, B 2H and B 5H; the C Unit Well Nos. C 1H, C 2H, and C 3H; the D Unit Well Nos. D 1H and D 3H; and the F Unit Well Nos. F 1H and F 3H.

The thirteen wells were drilled based on an incorrect title opinion that indicated the Cooke Ranch Lease consisted of 6,026.329 acres. The incorrect title opinion failed to note that some acreage to the north had already been earned by other operators as a result of farm-outs. As a result, Well Nos. F 1H, F 3H, D 1H, D 3H and C 1H were drilled with bottomholes extending off-lease to the north. Talisman received a letter from the Commission asking for an explanation of why the bottomholes of the F 1H, F 3H, D 1H, D 3H and C 1H were off-lease, an apparent violation of Statewide Rule 86.¹² After

⁹ Texas Register - 22 TexReg 8973, September 5, 1997

¹⁰ Talisman Exhibit No. 2

¹¹ Talisman Exhibit No. 4

¹² Talisman Exhibit No. 20, letter dated May 19, 2015

obtaining a more accurate title opinion, Talisman now finds the Cooke Ranch Lease consists of 5,351.62 acres. It has attempted to correct the problem of the off-lease bottomholes by forming production units with the operators of the lands trespassed against.

Some of the thirteen previously drilled wells are in need of Statewide Rule 38 exceptions of their own. Talisman was in the process of applying for those exceptions when the present applications became protested, at which point the Commission refused to allow the re-permitting of any of the thirteen existing Talisman wells on the Cooke Ranch Lease pending the outcome of the present eleven applications.¹³

Fair Share of the Recoverable Gas in Place

In Talisman's opinion, the Hawkville (Eagleford Shale) Field under the Cooke Ranch consists only of the Lower Eagleford Shale. The Upper Eagleford Shale at this location is missing due to an unconformity. Talisman sub-divides the Lower Eagleford Shale into two separate zones, an upper and a lower. The two zones are separated by thin clay layers or a thin layer of shale rock with a high clay content which cause hydraulically-induced fractures across that layer to close or "heal" quickly. In Talisman's view, the Lower Eagleford Shale beneath the Cooke Ranch Lease contains two preferred target zones, one being an upper 50-foot zone, and the other a lower 35 foot zone, with characteristics such as thickness and brittleness that lend themselves to effective fracture stimulation.¹⁴

To effectively recover the hydrocarbons within the correlative interval of the Hawkville (Eagleford Shale) Field, Talisman will space wells in a staggered pattern 250' apart, with one lateral in the upper zone and the second lateral offset 250' in the lower zone, in plan, or overhead view, repeating across the Cooke Ranch. Viewed down the centerline of the horizontal laterals, the pattern can also be described as a "W" pattern.¹⁵ The wells would appear to be 250' apart in plan view, but would actually be 500' apart within their respective upper or lower zone. This pattern will enable Talisman to recover its fair share of the recoverable reserves in place under the Cooke Ranch C and A/B Units.

A similar well spacing and staggered "W" pattern has been implemented by other operators completing wells in the Hawkville (Eagleford Shale) Field or equivalent Eagleford Fields. For example:

1. Pioneer Natural Resources has performed work to optimize well spacing, including the staggering of wells in the Washburn Ranch project located 7 to 8 miles to the northeast.¹⁶

¹³ Hearings Transcript Volume I, pp. 86 & 87, lines 6-25 and 1-11)

¹⁴ [Attachment 2 - Talisman Exhibit 46, p.5]

¹⁵ [Attachment 3 - Talisman Exhibit 42]

¹⁶ Talisman Exhibit 48, p.9

2. Devon has plans to stagger laterals in the upper and lower portions of the Lower Eagle Ford formation with spacing as tight as 330-feet (40 -acre spacing) with wells approximately 330-feet apart in plan view, and 660-feet apart within the respectively upper or lower interval in the Eagle Ford in DeWitt County.¹⁷
3. EOG has drilled laterals in the Eagle Ford in Karnes County with a “W” staggered pattern, with wells spaced 200 feet apart in plan view, which is 400 feet apart within the respective upper or lower interval on its Lake Unit, and has also staggered wells in a “W” pattern on its Milton Unit.¹⁸

In calculating the recoverable gas in place under the Cooke Ranch, Talisman’s expert Petroleum Engineer, Mr. James Clark, used commercially available IHS Harmony software. For the 410.381-acre Cooke Ranch C Unit, with a pay thickness of 210 feet, Talisman calculates the Original Gas in Place as 75.99 BCF of gas. Using a recovery factor of 61.8%, the Recoverable Gas initially in place would have been 46.97 BCF. The cumulative production from the wells already drilled and producing on the C Unit, the C 1H, C 2H and C 3H, is 2.49 BCF, leaving remaining recoverable reserves of 44.49 BCF.¹⁹

Adding the remaining gas recovery of the existing C 1H, C 2H and C 3H and the projected gas recovery of the applied-for Well Nos. C 4H, C 5H, C 6H, C 7H, C 8H and C 9H, Talisman believes its wells on the 410.381-acre C Unit will recover 25.31 BCF of gas.²⁰ Subtracting this figure from the Recoverable Gas currently in place (44.49 BCF), Talisman would still leave 19.17 BCF of recoverable gas under the C Unit.²¹ The applied-for wells C 4H through C 9H would be on 60-acre spacing, requiring Statewide Rule 38 exceptions for the wells. Talisman believes that without the requested Statewide Rule 38 exceptions, it will not be able to recover its fair share of the recoverable reserves in place beneath the C Unit.

Talisman notes that the projected recovery for the C 1H is low, due to the presence of a geohazard (a fault, or possibly rock with a higher than expected density) which has negatively impacted the effective fracture stimulation of that well. The loss of a production logging tool in the hole has also reduced production from the well. The same geohazard has affected the recoveries from the C 2H and the C 3H as well, with reduced recoveries from the toe side of the wells and much better recoveries from the heel side of the wells.²² Well Nos. C 1H and C 3H were completed by zipper-frac,²³ and microseismic activity

¹⁷ Talisman Exhibit 79, p.11

¹⁸ Talisman Exhibit 81

¹⁹ Talisman Exhibit 56

²⁰ [Attachment 4 - Talisman Exhibit 54]

²¹ Talisman Exhibit 57

²² Talisman Exhibit No. 22

²³ Zipper fracturing is a multi-horizontal well, plug-and-perf completion method involving multiple laterals that are drilled from the same pad and completed stage-by-stage in a zipper-like “back-and-forth” process as opposed to completing all stages in a single wellbore before starting completions on an adjacent wellbore [See Attachment 5 - Talisman Exhibit 83]

during the hydraulic fracture-stimulation process was monitored, with Well No. 2H serving as the repository for geophones used to record the microseismic activity of the fracture stimulation.

For the 1096.349-acre Cooke Ranch A/B Unit, with a pay thickness of 210 feet, Talisman calculates the Original Gas in Place as 203.02 BCF. Using a recovery factor of 61.8%, the Recoverable Gas initially in place would have been 125.49 BCF. The cumulative production from the wells already drilled and producing on the A/B Unit, the A 1H, A 2H, A 3H, B 2H and B 5H, is 4.26 BCF, leaving remaining recoverable reserves of 121.24 BCF. Using both decline curve projections and history match projections, Talisman calculates a Median Recovery of 644.2 Mcf per foot of lateral (Mcf/ft) that is hydraulically fracture stimulated,²⁴ just as in the C Unit.

Adding the remaining gas recovery of the existing A 1H, A 2H, A 3H, B 2H and B 5H wells to the projected recovery of the applied-for A 5H, A 6H, A 7H, A 8H and A 9H wells, Talisman believes its wells on the A/B Unit will recover 33.55 BCF.²⁵ Subtracting this figure from the Recoverable Gas currently in place (121.24 BCF), Talisman would still leave 87.69 BCF of recoverable gas under the C Unit.²⁶ The applied-for wells A 5H through A 9H would each be on 60-acre spacing, requiring Statewide Rule 38 exceptions for the wells due to the protests. Without the requested reduced spacing, Talisman believes it will not be able to recover its fair share of the recoverable reserves in place beneath the A/B Unit.

The Hawkville (Eagleford Shale) Field, like the Briscoe Ranch (Eagleford), the Eagleville (Eagle Ford-1), and the Eagleville (Eagle Ford-2) Fields, does not have a stacked lateral rule. However, the Sugarkane (Eagle Ford), Gates Ranch (Eagle Ford Shale), and De Witt (Eagle Ford Shale) Fields do have a stacked lateral rule. Talisman's petroleum engineering expert, Mr. James Clark, states "...and I can't think of any reason why a field would need a stacked lateral rule if a well was capable of draining - a horizontal well was capable of drainage (sic, probably "draining") the entire vertical thickness of the field interval."²⁷ Talisman does not believe a single well is capable of effectively and efficiently draining the 210' interval of the Hawkville (Eagleford) Shale, and that stacked laterals, in a "W" pattern, are necessary for effective hydrocarbon recovery.

The Hawkville (Eagleford Shale) Field has a 320-acre density rule. Anything less than 320 acres is a fractional unit. It is still possible to obtain a Statewide Rule 38 exception down to 40 acres per well, with a special Rule 38 density rule and notice requirements²⁸ requiring 330' notice to offsets for units less than 320 acres down to 160 acres and 660' notice to offsets for units less than 160 acres down to 40 acres.

²⁴ Talisman Exhibit 54

²⁵ Talisman Exhibit 54

²⁶ Talisman Exhibit 57

²⁷ Hearings Transcript Volume II, p. 121, lines 3-7

²⁸ Talisman Exhibit 62, Rule 3 of the Field Rules

Mr. Clark testified that the Statewide Rule 37 and 38 exceptions that are requested in the present hearing are necessary for Talisman to recover its fair share of recoverable hydrocarbons on the A, B and C units.²⁹ As to the field rules requiring 320-acre units in the Hawkville (Eagleford Shale) Field, Mr. Clark does not believe that any well in the Hawkville is actually draining 320 acres. In his opinion, the upper and lower intervals of the lower Hawkville (Eagleford Shale) Field are not in communication. Mr. Clark's history matches show an average fracture half-length of 165 feet on either side of a lateral, with drainage of approximately 250 feet on either side of a lateral, or 500 feet wide. Talisman is requesting well laterals spaced 500 feet apart in the same zone of the Eagle Ford (500' upper to upper spacing and 500' lower to lower spacing), in a staggered pattern, appearing as 250' well separation in plan view.³⁰

Using both decline curve projections and history match projections, Talisman calculates a median recovery of 644.2 Mcf/ft of fracture stimulated wellbore.³¹ History matches are used to calibrate a reservoir model, based on historical field production and pressures. Once the model is adjusted well enough to describe the past behavior of a reservoir, the model can be used to simulate future reservoir behavior with a higher degree of confidence, particularly if the model is supplemented with known geological properties of the reservoir.

All of the applied-for wells on this 500-foot spacing will be on 60-acre fractional units and will require Statewide Rule 38 exceptions. Two of the wells, the Cooke Ranch Well Nos. C 4H and A 9H, require Rule 37 exceptions in addition.

The Talisman Applications

1. *Rule 37 Case No. 0297017 - Application of Talisman Energy USA Inc. for an Exception to Statewide Rules 37 and 38 for the Cooke Ranch C Unit, Well No. C 4H, Hawkville (Eagleford Shale) Field, La Salle County, Texas.*

The Cooke Ranch C Unit has a narrow panhandle to the south. Well No. C 4H well extends into the C Unit's southerly panhandle, which is only 390 to 400 feet wide.³² There is no regular location in this panhandle, but the current applied-for location is set back 330' from the common lease line with BHP Billiton on the east, so the well is actually at a legal Statewide Rule 37 location as to BHP Billiton.

Well No. C 4H is within a Statewide Rule 37 spacing distance of the west unit line, being 66 feet from the west line at the south end of the lateral and 74 feet from the west line at the north end of the lateral. Talisman is the operator of the D Unit to the west and waives its right to protest the Rule 37 exception location and the Rule 38 exception. The

²⁹ Hearing Transcript Volume II, p. 135, lines 4-9

³⁰ Hearing Transcript Volume II, p. 135, lines 4-22

³¹ Talisman Exhibit 54

³² Talisman Exhibit 24

last take point of the lateral is 111' from the south line of the unit, a legal location under the field rules.

Well No. C 4H will be on 60 acres, which requires notice be given to designated operators, lessees of record for tracts that have no designated operator, and all owners of unleased mineral interests within 660 feet of any takepoint on a horizontal well within the correlative interval. BHP Billiton is within the 660-foot notice distance to the southeast, and received notice of the requested Statewide Rule 38 exception. The permit for Well No. C 4H was previously granted by the Commission, but withdrawn after the Whitworth email indicated Talisman was not the operator of the acreage Well No. C 4H was located on.

The EUR for Well No. C 4H is 5.328 BCF.³³ The lateral is 8,270 feet long and has a projected recovery of 644.2 Mcf/ft.

2. Rule 38 Case No: 01-0297008 - Application of Talisman Energy USA Inc. for an exception to Statewide Rule 38 for the Cooke Ranch C Unit, Well No. C 5H, Hawkville (Eagleford Shale) Field, La Salle County, Texas.

The application for Well No. C 5H³⁴ does not require an exception to Statewide Rule 37, but does require an exception to Statewide Rule 38. The well location is regular to the east and west unit lines and 110 feet north of the south line, also a regular location. As operator of the D Unit to the west, Talisman waives objection to the Statewide Rule 38 exception. BHP Billiton is within the 660-foot notice distance to the southeast, and received notice of the requested Statewide Rule 38 exception.

The permit for Well No. C 5H was previously granted by the Commission but subsequently retracted due to Whitworth email. Well No. C 5H will be on 60 acres.

The EUR for Well No. C 5H is 3.381 BCF,³⁵ with a lateral 5,248 feet long and a recovery of 644.2 Mcf/ft.

3. Rule 38 Case No. 01-0297018 - Application of Talisman Energy USA Inc. for an Exception to Statewide Rule 38 for the Cooke Ranch C Unit, Well No. C 6H, Hawkville (Eagleford Shale) Field, La Salle County, Texas.

The application for Well No. C 6H³⁶ does not require an exception to Statewide Rule 37, but does require an exception to Statewide Rule 38. The well location is regular to the east and west unit lines and 110 feet north of the south line, also a regular location. As operator of the D Unit to the west, Talisman waives objection to the Statewide Rule

³³ Talisman Exhibit 54

³⁴ Talisman Exhibit 25

³⁵ Talisman Exhibit 54

³⁶ Talisman Exhibit 26

38 exception. BHP Billiton is within the 660-foot notice distance to the south, and received notice of the requested Statewide Rule 38 exception.

The EUR for Well No. C 6H is 3.552 BCF, with a lateral 5,513 feet long and a recovery of 644.2 Mcf/ft. Well No. C 6H will be on 60 acres.

4. *Rule 38 Case No. 01-0297077: Application of Talisman Energy USA Inc. for An Exception to Statewide Rule 38 for the Cooke Ranch C Unit, Well No. C 7H, Hawkville (Eagleford Shale) Field, La Salle County, Texas.*

The application for Well No. C 7H³⁷ does not require an exception to Statewide Rule 37, but does require an exception to Statewide Rule 38. The well location is regular to the east and west unit lines and is 110 feet north of the south line, also a regular location. Talisman waives objection to the Statewide Rule 38 exception. BHP Billiton is within the 660-foot notice distance to the south, and received notice of the requested Statewide Rule 38 exception.

The EUR for Well No. C 7H is 3.551 BCF, with a lateral 5,512 feet long and a recovery of 644.2 Mcf/ft. Well No. C 7H will be on 60 acres.

5. *Rule 38 Case No. 01-0297014: Application of Talisman Energy USA Inc. for an Exception to Statewide Rule 38 for the Cooke Ranch C unit, Well No. C 8H, Hawkville (Eagleford Shale) Field, La Salle County, Texas.*

The application for Well No. C 8H³⁸ does not require an exception to Statewide Rule 37 but does require an exception to Statewide Rule 38. The well location is regular to the east and west unit lines, and is 110 feet north of the south line, also a regular location. Talisman waives objection to the Statewide Rule 38 exception as operator of the A/B Unit to the east. BHP Billiton is within the 660-foot notice distance to the south, and received notice of the requested Statewide Rule 38 exception.

The EUR for Well No. C 8H is 3.660 BCF, with a lateral 5,681 feet long and a recovery of 644.2 Mcf/ft. Well No. C 8H will be on 60 acres.

6. *Rule 38 Case No. 01-0297013: Application of Talisman Energy USA Inc. for an Exception to Statewide Rule 38 for the Cooke Ranch C Unit, Well No. C 9H, Hawkville (Eagleford Shale) Field, La Salle County, Texas.*

The Unit C Well No. C 9H well is 200' off the east line of the C Unit near the surface location of the well and 250 feet off the eastline near the bottomhole location of the well, a Statewide Rule 37 location as to the C Unit boundary.³⁹ However, Talisman states it is

³⁷ Talisman Exhibit 27

³⁸ Talisman Exhibit 28

³⁹ Talisman Exhibit 29 and Exhibit 23

its own offset to the north and east (Cooke Ranch A/B Unit)⁴⁰ and has waived Statewide Rules 37 and 38 for the C 9H. The bottomhole location of the well is 110' off the south line, a legal location under the field rules. BHP Billiton is within the 660-foot notice distance to the south, and received notice of the requested Statewide Rule 37 and 38 exceptions.

The EUR for Well No. C 9H is 3.659 BCF, with a lateral 5,679 feet long and a recovery of 644.2 Mcf/ft. Well No. C 9H will be on 60 acres.

7. Rule 38 Case No. 01-0297078: Application of Talisman Energy USA Inc. for an Exception to Statewide Rule 38 for the Cooke Ranch A/B Unit, Well No. A 5H, Hawkville (Eagleford Shale) Field, La Salle County, Texas.

The application for Well No. A 5H⁴¹ does not require an exception to Statewide Rule 37, but does require an exception to Statewide Rule 38. The acreage to the east, south and west is operated by Talisman, which waives objection to the Statewide Rule 38 exception. The acreage to the north, in the Beaty, Seale & Forwood Survey, A-1076, the Cartwright Lease, is also operated by Talisman, which waives objection to the Statewide Rule 38 exception. The well is 110 feet from the north line, a legal location under the field rules.

The EUR for Well No. A 5H is 3.528 BCF, with a lateral 5,476 feet long and a recovery of 644.2 Mcf/ft. Well No. A 5H will be on 60 acres.

8. Rule 38 Case No. 01-0297076: Application of Talisman Energy USA Inc. for an Exception to Statewide Rule 38 for the Cooke Ranch A/B Unit, Well No. A 6H, Hawkville (Eagleford Shale) Field, La Salle County, Texas.

The application for Well No. A 6H⁴² does not require an exception to Statewide Rule 37, but does require an exception to Statewide Rule 38. The acreage to the east, south and west is operated by Talisman, which waives objection to the Statewide Rule 38 exception. The acreage to the north, in the Beaty, Seale & Forwood Survey, A-1076, the Cartwright Lease, is also operated by Talisman, which waives objection to the Statewide Rule 38 exception. The well is 110 feet from the north line, a legal location under the field rules.

The EUR for Well No. A 6H is 3.528 BCF, with a lateral 5,476 feet long and a recovery of 644.2 Mcf/ft. Well No. A 6H will be on 60 acres.

9. Rule 38 Case No. 01-0297079: Application of Talisman Energy USA Inc. for an Exception to Statewide Rule 38 for the Cooke Ranch A/B Unit, Well No. A 7H, Hawkville (Eagleford Shale) Field, La Salle County, Texas.

⁴⁰ Hearing Transcript Volume 1, p. 114, lines 22-25, p. 115, lines 1-7

⁴¹ Talisman Exhibit 30

⁴² Talisman Exhibit 31

The application for Well No. A 7H⁴³ does not require an exception to Statewide Rule 37, but does require an exception to Statewide Rule 38. The acreage to the south and west is operated by Talisman, which waives objection to the Statewide Rule 38 exception. The acreage to the north, in the Beaty, Seale & Forwood Survey, A-1076, the Cartwright Lease, is also operated by Talisman, which waives objection to the Statewide Rule 38 exception. The acreage to the east, in the H. & G.N. RR. Co. Survey No. 161, A-278 and the H. & G.N. RR. Co. Survey No. 158, A-1079, the Bellows Unit, is operated by Talisman, which waives objection to the Statewide Rule 38 exception. The well is 110 feet from the north line, a legal location under the field rules.

The EUR for Well No. A 7H is 3.528 BCF, with a lateral 5,476 feet long and a recovery of 644.2 Mcf/ft. Well No. A 7H will be on 60 acres.

10. *Rule 38 Case No. 01-0297080: Application of Talisman Energy USA Inc. for an Exception to Statewide Rule 38 for the Cooke Ranch A/B Unit, Well No. A 8H, Hawkville (Eagleford Shale) Field, La Salle County, Texas.*

The application for Well No. A 8H⁴⁴ does not require an exception to Statewide Rule 37, but does require an exception to Statewide Rule 38. The acreage to the south and west is operated by Talisman, which waives objection to the Statewide Rule 38 exception. The acreage to the north, in the Beaty, Seale & Forwood Survey, A-1076, the Cartwright Lease, is also operated by Talisman, which waives objection to the Statewide Rule 38 exception. The acreage to the east, in the H. & G.N. RR. Co. Survey No. 161, A-278 and the H. & G.N. RR. Co. Survey No. 158, A-1079, the Bellows Unit, is operated by Talisman, which waives objection to the Statewide Rule 38 exception. The well is 110 feet from the north line, a legal location under the field rules.

The EUR of Well No. A 8H is 3.527 BCF with a lateral 5,476 feet long and a recovery of 644.2 Mcf/ft. Well No. A 8H will be on 60 acres.

11. *Rule 38 Case No. 01-0297081: Application of Talisman Energy USA Inc. for an Exception to Statewide Rules 37 and 38, for the Cooke Ranch A/B Unit, Well No. A 9H, Hawkville (Eagleford Shale) Field, La Salle County, Texas.*

The Unit A/B Well No. A 9H is located 86' from the east line of the A/B Unit,⁴⁵ a Statewide Rule 37 location. The bottomhole location is 110' south of the north line, a legal location, and the last take point is 210' south of the north line. This well is a continuation of the 500' spacing pattern Talisman believes is necessary to recover its fair share of the recoverable reserves in place under the A/B Unit. Mr. Clark asserts that the location of the A 9H is reasonable. He also asserts that, without this location, Talisman

⁴³ Talisman Exhibit 32

⁴⁴ Talisman Exhibit 33

⁴⁵ Talisman Exhibit 34

cannot recover its fair share of reserves beneath the A/B Unit.⁴⁶ Denial of the exceptions would cause waste of recoverable reserves.⁴⁷ Talisman is the operator of the acreage to the north, in the Beaty, Seale & Forwood Survey, A-1076, the Cartwright Lease, and waives objection to the Statewide Rule 37 exception. The acreage to the east, in the H. & G.N. RR. Co. Survey No. 161, A-278 and the H. & G.N. RR. Co. Survey No. 158. A-1079, the Bellows Unit, is operated by Talisman, which waives objection to the Statewide Rule 37 exception. Talisman is the operator of all the acreage within 660 feet of the lateral and waives objection to the Statewide Rule 38 exception. BHP Billiton is apparently a non-operator in the Bellows Prospect.

The EUR of Well No. A 9H is 3.528 BCF, with a lateral 5,476 feet long and a recovery of 644.2 Mcf/ft. Well No. A 9H will be on 60 acres.

Summary

Talisman will recover 23.131 BCF if the applications for Well Nos. C 4H, C 5H, C 6H, C 7H, C 8H and C 9H are granted. Talisman will recover 17.639 BCF if the applications for Well Nos. A 5H, A 6H, A 7H, A 8H and A 9H are granted.

The cumulative production from the existing Well Nos. C 1H, C 2H and C 3H is 2.49 BCF. If the cumulative production and the remaining recovery for those three wells is added to the EUR for the applied-for C Unit wells, Talisman expects the combined wells to recover 25.31 BCF of gas.

The cumulative production from the existing Well Nos. A 1H, A 2H, A 3H, B 2H and B 5H is 4.26 BCF. If the cumulative production and the remaining recovery for those five wells is added to the EUR for the applied-for A/B Unit wells, Talisman expects the combined wells to recover 33.55 BCF of gas.

Talisman admits that it drilled several wells off-lease based on an incorrect title opinion and tried to correct that problem as soon as it obtained a corrected title opinion. Talisman points out that Matrix has permitted several wells on the Cooke Ranch Lease, such as Well Nos. E 1H, G 1H, G 2H, G 3H, G 4H and G 5H. As an example, Talisman points out that the plat for the Matrix Cooke Ranch E 1H apparently was drawn using the same incorrect title opinion that has caused Talisman to drill off-lease, with the result that the Matrix-permitted well has the same problem of extending off-lease.

Mr. Jobe (for Talisman) I just wanted to make a record that we're not the only ones out here doing the very same thing that everybody else has done for the last 56 years.

ALJ Enquist Basically you're trying to show us that Matrix stands on no higher footing than Talisman.

⁴⁶ Hearings Transcript Volume VII, p. 138-140

⁴⁷ *Id.*

Mr. Jobe Exactly.⁴⁸

Protestant Matrix's Direct Case

Standing

Matrix asserts three bases for standing. First, it is the position of Matrix that there is no designated operator of the Cooke Ranch Lease at this time. Under the 1954 JOA, at the time it was drawn up, there were only two parties to the JOA, Paul Kayser and Plymouth Oil. Those two parties agreed that Mr. Kayser would be the Operator.

Matrix quotes Section 25 of the 1954 JOA:

...in the event Operator sells or disposes of his interest in the leased acreage, the right of operation herein conferred shall not run with the transfer of interest or inure to the benefit of Operator's assignee, but in such event Non-Operator and the assignee of Operator shall select a new operator for operations hereunder.

As Matrix interprets this section, the selection of a new operator under the 1954 Cooke Ranch JOA requires unanimity, that is, the affirmative vote of all successors to both Paul Kayser and Plymouth Oil. No such unanimous selection has been made and, therefore, there is no Unit Operator of the Cooke Ranch Lease at this time.

Matrix rejects the idea that it is a non-operator under the 1954 JOA. Instead, Matrix believes that it, and all the other working interest owners under the 1954 Cooke Ranch Lease JOA, are operators, just as Talisman is an operator. As such, Matrix asserts that it, and the other working interest owners, have standing to protest all of the Talisman applications.

Second, Matrix argues that it is an "affected party" because the proposed Talisman wells will cause waste. Waste will be caused by drilling on spacing that is too tight, resulting in well interference and the consequent loss of recoverable hydrocarbons, which will affect Matrix.

Matrix notes that "waste" is specifically prohibited by the Texas Natural Resources Code. Section 85.045 of the Texas Natural Resources Code prohibits waste: "The production, storage, or transportation of oil or gas in a manner, in an amount, or under conditions that constitute waste is unlawful and prohibited." Section 85.046(a)(3) of the Code states that "waste" includes "underground waste or loss, however caused and whether or not the cause of the underground waste or loss is defined in this section". Section 85.046(a)(6) of the Code, states that "waste", includes "physical waste or loss incident to or resulting from drilling, equipping, locating, spacing, or operating a well or

⁴⁸ Hearings Transcript Volume II, p. 150, lines 2-7

wells in a manner that reduces or tends to reduce the total ultimate recovery of oil or gas from any pool.” Section 86.012(a)(5) states “waste” includes “physical waste or loss incident to or resulting from so drilling, equipping, or operating a well or wells as to reduce or tend to reduce the ultimate recovery of gas from any pool.”

As a third basis for standing, Matrix cites Texas Natural Resources Code Section 85.321, which states “A party who owns an interest in property or production that may be damaged by another party violating the provisions of this chapter ... or another law of this state prohibiting waste or a valid rule or order of the commission may sue for and recover damages and have any other relief to which he may be entitled at law or in equity.” (emphasis added) Matrix argues the words “any other relief” includes the right to appear in administrative actions such as the one before the Commission in these dockets.

Talisman Applications are Premature

Matrix notes that Talisman has already permitted and drilled thirteen wells on the Cooke Ranch Lease. Those wells are on the smaller included units within the Cooke Ranch Lease and will require Statewide Rule 38 exceptions themselves. Matrix asserts that the current applications should be dismissed until Talisman obtains Statewide Rule 38 spacing exceptions for the existing wells.

Proper Well Spacing

Matrix believes the most efficient way to drain the recoverable reserves under the Cooke Ranch is with wells draining 80 acres, drilled more than 500 feet apart. Using Rate Transient Analysis (RTA) with the empirical data of known historical rates and pressures, Matrix’s expert Petroleum Engineer, David Reeves, was able to calculate reservoir characteristics and the potential for future production. The first six wells drilled on the Cooke Ranch Lease, the B 2H, B 5H, D 1H, D 3H, F 1H and F 3H, were all drilled more than 1,500 feet apart and did not experience any interference from nearby wells. These wells had an average normalized (calculated as though a well were 5,280 feet in length) SRV (Stimulated Rock Volume or Stimulated Reservoir Volume) of 78 acres with an average normalized fracture half-length of 314 feet. These wells exhibit boundary dominated flow, that is, the wells are “feeling” the boundaries of their fractured rock volume and show no effects of interference from nearby wells. Matrix believes analysis based on boundary dominated flow supports their argument that wells on the Cooke Ranch Lease should be drilled more than 500 feet apart on 80-acre spacing.

Rate Transient Analysis (RTA) indicates 60-acre spacing for wells creates overlap and interference between drainage areas. When Talisman drilled the C Pad wells (the C 1H, C 2H and C 3H), these wells had average SRV areas of 60 acres and average fracture half lengths of 248 feet. Direct measurements show that 60-acre spacing results in rate and pressure communication between wells. Using Fekete Harmony Rate Transient

Analysis for Well Nos. C 1H, C 2H and C 3H, Matrix finds the area of stimulated rock to be, respectively, 46 acres, 46 acres and 51 acres.⁴⁹

The wells drilled on the A Pad, the A 1H, A 2H and A 3H, were drilled only 250 feet apart, with an average SRV area of only 34 acres and an average fracture half-length of only 126 feet. The A Pad wells, like the C Pad wells, showed pressure communication. It is Matrix's position that drilling wells too close together, as was done with the A Pad and C Pad wells, results in communication between wells and a reduction in ultimate recoveries.

Matrix believes the Talisman calculations of pay in the Hawkville to be exaggerated. Using the log of the Cooke Ranch B 5H pilot hole, a porosity cutoff of 5 percent and a water saturation cutoff of 60 percent, the pay in the Hawkville is reduced from 210 gross feet of pay to 137 feet of net pay.⁵⁰ Matrix's calculations in this hearing are calculated using 137 feet of net pay. In addition, the Talisman water saturation calculation was at 25%. The Baker Hughes work on the log of the B 5H indicates water saturation should be 41 percent, which also reduces the calculations of net gas in place.⁵¹

Pinnacle, a service provider, produced a microseismic report for Well Nos. 1H and 3H on the Cooke Ranch C Pad. Geophones placed in Well No. C 2H recorded the microseismic events of the fracture stimulation process. In plan view, Well Nos. 1H and 3H were 500 feet apart in the lower target, with the C 2H centered between in the upper target.⁵² The upper and lower Hawkville (Eagleford Shale) Field interval was 225' thick at the heel end of the well and 150' thick at the toe end, thinning from south to north. The fracture half-length was calculated to be 500'. Well Nos. C 1H and C 3H were completed using the zipper-frac technique for stages 1-12.⁵³ The lateral of the Well No. C 1H is a bit longer and was fractured by the plug and perf method in stages 12-14. As far as vertical fracture height growth, Pinnacle reported "Proppant was likely well distributed across the target zones and some in the Buda."⁵⁴ Pinnacle, in its recommendations section, suggested continuing with well spacing of 500'.⁵⁵

Two to three months after being fractured, Well Nos. C 1H and C 2H were shut-in around the end of October 2013, allowing pressures in both wells to increase. After a week, Well No. C 1H was opened to flow. In early December, Well No. C 2H was opened to flow. Both wells produced at almost identical pressures and oil rates, an indication that the two wells were in communication.⁵⁶

⁴⁹ Matrix Exhibits 9 & 10

⁵⁰ Hearings Transcript Volume III, p. 42-43

⁵¹ Hearings Transcript Volume III, p. 45, lines 13-18

⁵² Talisman Exhibit 46, p. 8

⁵³ Talisman Exhibit 83

⁵⁴ Matrix Exhibit 6, p. 9

⁵⁵ Matrix Exhibit 6, p. 5-11

⁵⁶ Matrix Exhibits 11 & 12

Based on pressure data and flow rates, Matrix finds that Well Nos. C 1H and C 2H are in communication, and are in turn in communication with Well No. C 3H. Flow rates also indicate Well No. C 1H and Well No. D 3H on the adjoining D Unit are in communication. Although the flow rates of Well Nos. C 1H and D 3H are different, the flow rates over time parallel each other.

Matrix notes that there has been stacked lateral drilling a few miles away on the Pioneer Washburn Ranch project, similar to the stacked laterals Talisman is proposing, but Pioneer announced that drilling had been suspended on the Washburn Ranch "...where 15 wells initially brought to sales last year underperformed expectations by 1 Mboepd during Q2..."⁵⁷ Matrix interprets this announcement as evidence that drilling wells on tight spacing with stacked laterals is not a successful strategy in the Hawkville (Eagleford Shale) Field.

History Match Modeling

Matrix believes Talisman's use of History Match models is problematic. Mr. David Reeves states:

History matching is an accepted analysis tool for understanding the characterization of these wells; however, part of the problem with history matching is there are an infinite number of solutions as shown based upon different input models and variables, and Mr. Clark's selection and letting the computer select multiple of those variables without limiting as many as possible through other scientific tests showed that his is one of a possible infinite number of solutions.⁵⁸

Mr. Reeves prefers a deterministic History Match model, in which he enters as many hard values as possible, thus limiting the range of solutions. Mr. Clark, for Talisman, uses a probabilistic History Match model, in which the computer is allowed to insert a range of values for unknown variables. A probabilistic model can yield an infinite number of solutions. According to Mr. Reeves, "...because no well is an exact, perfect, ideal solution as per the reservoir engineering formulas, there's always some percent error for the history match, and so what you're trying to do is you're trying to minimize that error to the smallest degree possible..."⁵⁹

RTA Modeling

Matrix obtains a result similar to the history match models by using Rate Transient Analysis. The 80-acre wells, at a spacing of 1,500 feet and a fracture half-length of 750 feet drain approximately 76 acres. The C Pad wells, at a spacing of 490 feet and a

⁵⁷ Matrix Exhibit 1

⁵⁸ Hearings Transcript Volume IV, p. 87, lines 17-25

⁵⁹ Hearings Transcript Volume IV, p. 88, lines 18-23

fracture half-length of 245 feet, drain 60 acres and the A Pad wells, at a spacing of 253 feet and a fracture half-length of 126 feet, drain 30 acres.⁶⁰

RTA analysis shows that Well Nos. B 2H, B 5H, D 1H, D 3H, F 1H, and F 3H, which are not drilled on any particular spacing, but are far apart from each other, do not interfere with each other and each drains approximately 80 acres. The C Pad wells (Well Nos. C 1H, C 2H and C 3H) interfere with each other and compete for the same reserves. The A Pad Wells (Well Nos. A 1H, A 2H and A 3H) also interfere with each other and compete for the same reserves.

Mr. David Reeves testified:

Yes sir, if these wells were spaced further apart, it is our belief that they would take a longer time to reach that boundary and there would be no pressure or rate communication and they would not cross the dew point at an earlier date.⁶¹

Dewpoint and Condensate Banking

According to William McCain's textbook, *Reservoir Fluids*, "As pressure is reduced, liquid condenses from the gas to form a free liquid in the reservoir. This liquid will normally not flow and cannot be produced.⁶²" Pressure communication between wells means you're drilling down the pressure and the reservoir at an earlier date and crossing the dewpoint line earlier and creating condensate banking. The liquid does not normally flow and cannot be produced.⁶³ Because of dew point and condensate banking, drilling a greater number of wells can actually leave reserves in the ground in the form of immobile condensate.⁶⁴

Based on bottomhole pressure data, Matrix finds that 80-acre wells have a 2-year normalized production of 104 MBO, while 60-acre wells have a 2-year normalized production of 54 MBO, based on the pressure data from the Cooke Ranch C 1H, C 2H and C 3H.⁶⁵ Matrix also finds these 60-acre wells are in pressure communication with each other (C 1H, C 2H, C 3H and D 3H), reaching a dew point pressure of 3,703 psia in January 2014.⁶⁶ The 80-acre wells take longer to reach dewpoint pressure. The 80-acre well, Well No. D 3H, took 300 days to reach the dew point pressure while the C Pad wells, Well Nos. C 1H, C 2H and C 3H took only 120 days to reach the dew point pressure.⁶⁷ The cumulative gas production at dew point pressure of the 80-acre Well No. D 3H would be 680 MMCF, while the cumulative gas production of the C 1H, C 2H and C 3H at dew

⁶⁰ Matrix Exhibit 25

⁶¹ Hearings Transcript Volume IV, p. 73, lines 8-12

⁶² Matrix Exhibit 16

⁶³ Hearings Transcript Volume IV, p. 68, lines 18-20

⁶⁴ Hearings Transcript Volume IV, p. 69, lines 9-11

⁶⁵ Matrix Exhibit 17, Slide 41

⁶⁶ Matrix Exhibit 17, Slide 42

⁶⁷ Matrix Exhibit 17, Slide 43

point pressure would be 175 MMCF each.⁶⁸ Concerning oil production, the 80-acre wells reach the dew point after producing 75 MBO, while the 3, 60-acre wells reach dew point after each producing only 25 MBO.⁶⁹ There is a bimodal distribution of cumulative gas at dew point pressure, with Well Nos. B 2H, B 5H, D 1H, D 3H, F 1H and F 3H (80-acre wells) versus the 60-acre wells (Well Nos. C 1H, C 2H and C 3H). The same bimodal distribution occurs with oil production.⁷⁰

Waste Prevention

Matrix believes the 80-acre wells have a higher cumulative sales volume over time. For the 80-acre wells spaced 660 feet apart, Matrix calculates an EUR/ft. of 95.2 BOE/ft., whereas the C Pad 60-acre wells spaced 500 feet apart have an EUR/ft. of 59 BOE/ft. Matrix further calculates that the 80-acre wells 660' apart have a 640-acre EUR of 4.0 MMBOE while the C Pad 60-acre wells spaced 500 feet apart have a 640-acre EUR of 3.3 MMBOE.⁷¹

Matrix concludes that wells draining 80-acres spaced 660 feet apart are the most efficient, while wells draining 60-acre and 30-acre areas will show pressure communication. Drilling too many wells too close together will reduce ultimate recovery.⁷²

Protestant BHP Billiton's Direct Case

BHP Billiton, as successor in interest to Petrohawk Operating Co., protests Talisman's applications for Well Nos. A 9H and C 4H. BHP Billiton believes the wells will encroach upon the lease line of their offsetting leasehold. BHP wishes to protect its leasehold as well as its lessors.

BHP Billiton notes that Talisman's Exhibit 52 indicates the drainage area of a well will be 500 feet, or 250 feet on either side of the lateral. In the case of Well No. A 9H,⁷³ the lateral is only 86 feet from the common lease line between BHP and Talisman. If the drainage is 250 feet on either side of the lateral, and the lease line is only 86 feet away, then Well No. A 9H would drain 164 feet onto the other side of the lease line. Talisman admits that this well would "...very likely..."⁷⁴ drain the opposite leasehold in which BHP Billiton has an interest. BHP Billiton asked Talisman how it was protecting its fair share by draining another leasehold. Talisman responded that "The majority of the reserves the well is going to get is from the Talisman lease. As far as the offset, yes, I think they should drill a well offsetting that and continue that staggered pattern going onto, what is it, the Bellows, over whatever the lease is."⁷⁵

⁶⁸ Matrix Exhibit 17, Slides 44 and 45

⁶⁹ Matrix Exhibit 17, Slide 45

⁷⁰ Matrix Exhibit 17, Slide 47

⁷¹ Matrix Exhibit 19, Slide 52

⁷² Matrix Exhibit 20

⁷³ [Attachment 6 - Talisman Exhibit 52]

⁷⁴ Hearings Transcript Volume II, p. 174, line 19

⁷⁵ Hearings Transcript Volume II, p. 175, lines 1-5

BHP Billiton emphasizes the fact that Talisman does not have right to waive rights of lessees on the Bellows Prospect. BHP Cross-Examination Exhibit # 2 is the JOA for the Bellows Prospect. Article XIV of the JOA, titled Compliance with Laws and Regulations, states "A. Regulatory Agencies - Nothing herein contained shall grant, or be construed to grant, Operator the right or authority to waive or release any rights, privileges or obligations which non-operators may have under Federal or state laws or under rules, regulations or orders promulgated under such laws in reference to oil, gas and mineral operations, including the location, operation, or production of wells, on tracts offsetting or adjacent to the Contract Area."⁷⁶

BHP Billiton offers the foregoing language from the Bellows Prospect JOA for the proposition that Talisman does not have the authority to waive the rights of the lessees of the Bellows Prospect. The operator of two units side by side might often have such authority if exercised in good faith, but, in this instance, Talisman is contractually obligated, to BHP, not to waive their rights.

Protestant OGE's Direct Case

In a side agreement to the settlement of three separate dockets in courts of Harris County and La Salle County,⁷⁷ OGE endorsed a letter from Talisman dated August 6, 2013. The letter states, in its first sentence, "Talisman Energy USA Inc. ("Talisman") is the successor operator under the 1954 JOA." The letter is to Mr. Dan Brown, Manager of OGE, LLC and under the subheading "Agreed-to and Accepted", is signed on behalf of OGE, LLC by Dan Brown, manager.

At hearing, counsel for OGE, LLC ("OGE") stated that OGE does not recognize Talisman as Unit Operator. Counsel for OGE argued that OGE had only agreed that Talisman was the operator of the wells that had been drilled up to the date of the side letter, August 6, 2013, but did not agree that Talisman was the operator of the Cooke Ranch Lease. OGE Exhibit #1 is a letter dated September 25, 2015 from Attorney Pascal Paul Piazza, counsel for OGE, to Jonathan Woods, CPL for Talisman. The letter states OGE does not agree that Talisman is the operator for all the proposed wells under the 1954 JOA and reiterates OGE's belief that none of the successor working interest owners became the agreed-upon Unit Operator.

Talisman Energy USA Inc.'s Rebuttal Case

On cross-examination, Talisman inquired whether Matrix had done any calculations of the amount of condensate banking that would occur in the Hawkville (Eagleford Shale) Field after dew point pressure was reached. Mr. David Reeves answered that he had not done any calculations in that regard and could not provide a number. "That's - as a reservoir engineer, I'm going to state this on the record that that

⁷⁶ (Footnote, pp. 16 & 17 of Bellows Prospect Model Form Operating Agreement.)

⁷⁷ Talisman Exhibit 10, Document 9

is indeterminate based on any result or any model that could be created.⁷⁸ Reeves further stated “No one can model - determine that exact volume.”⁷⁹

Talisman notes that Matrix has applied to be an operator in Texas and has applied for drilling permits on the Cooke Ranch Lease, but does not operate any wells in Texas. The permits for Well Nos. E 1H, G 1H, G 2H, G 3H, G 4H and G 5H that Matrix applied for had the same defect as some of the Talisman drilling permit applications in that they relied on an incorrect title opinion which caused the toes of the wells to go off-lease. Matrix stipulated to the mistake and stated it would amend its permit applications.

Although Matrix applied for drilling permits for these wells, it did not act as Unit Operator and propose any of the wells to its working interest partners. Talisman, in contrast, did propose its previously drilled thirteen wells to Matrix and the other working interest partners. Talisman also provided well expense projections to the working interest partners as well as JIBS (Joint Interest Billing Statements).

On cross examination, Tom Tourek, geologist for Matrix, agreed that a microseismic cloud is not the same as Stimulated Rock Volume. The microseismic cloud shows microseismic events, and some subset of those microseismic events are propped (or stimulated) fractures. The determination of the propped volume is still an evolving science. Upon examination of the log for Well No. B 5H, in the depth that Talisman believes operates as a “baffle”, Mr. Tourek stated that he could see an area with clay content, smectite and kaolinite, at approximately 10,700 feet, but that the predominant mineral was calcite (limestone) and the clay content was not high enough to matter.⁸⁰

Under questioning by Mr. Olmstead, Mr. David Reeves stated that probabilistic analysis methods exist in the software he uses, but he does not use that aspect of the software. His preference is to “hard code” the data in rather than let the computer do the work for him.⁸¹

Rate Transient Analysis (RTA)

Talisman Witness Farshad Lalehrokh, Petroleum Engineer, stated that Rate Transient Analysis simply generates a single value of $A \sqrt{K}$, with A representing the total fracture area, and K, the reservoir permeability, from which the total fracture area can be converted into frac half lengths. The program assumes the fractures are planar, that there is no dendritic growth. The RTA results must be corrected to show the correct fracture azimuth (probably not 90 degrees to the wellbore) and the fracture growth converted to dendritic growth by, for example, a Schlumberger fracture growth program called Mangrove. If you use Rate Transient Analysis in a deterministic model, it is at least

⁷⁸ Hearings Transcript Volume IV, p. 106, lines 4-7

⁷⁹ Hearings Transcript Volume IV, p. 107, lines 5-6

⁸⁰ Hearings Transcript Volume III, p. 172, lines 6-16

⁸¹ Hearings Transcript Volume III, p. 2000, lines 12-14

correct for fracture azimuth and dendritic fracture growth.⁸² It appears to Mr. Lalehrokh that Matrix did not make these corrections.

The Matrix RTA model is deterministic, which means a single value is input for each reservoir parameter, yielding a single unique answer. If a deterministic model is used, it is up to the user to define the lines which shows the extent of the linear flow. All the interpretations would be valid interpretations, but they would reflect the input choices of the user, so a deterministic RTA model can be easily manipulated.

In the probabilistic RTA model used by Talisman, a range of values is put in for each reservoir parameter (the range takes into account uncertainties in input parameters), the range in values being provided by the multi-disciplinary teams working together for Talisman. The result is a range of answers, shown by the yellow area on the upper plot on page 1 of Talisman Exhibit 74.⁸³ Every point inside the yellow area is a valid answer based on well production and pressure history. Talisman then takes the P50 value out of the range of possible answers (P50 is the median value).⁸⁴

Talisman's well spacing methodology has several steps: 1) quality control the production and pressure history, 2) gain alignment on ranges for input parameters with a multi-disciplinary team including reservoir and completion engineers, and geoscientists, 3) run probabilistic RTA, 4) add analytical modeling and history matching, and 5) add multi-well numerical modeling and history matching. Talisman does not rely on a single value of RTA to make a multimillion dollar decision.

Based on a water saturation of 41.36%, Matrix calculates a SRV area for Well No. F 1H of 79 acres, and fracture half-lengths of 327 feet.⁸⁵ Talisman believes the correct water saturation is 25%, so they end up with a fracture half-length of 256'. Talisman indicates this is just one example of why Rate Transient Analysis by itself should never be used to determine well spacing.⁸⁶

Further, Talisman states it would never use only a deterministic or even probabilistic RTA model for the well spacing decision, even though the probabilistic RTA is much superior. As a stand-alone, neither model is sufficient for well spacing decisions. The probabilistic RTA is just the first step, maybe 10% of the work.⁸⁷ Talisman agrees that with a deterministic model, as Matrix uses, it is possible to start with a desired result, and then work backwards to achieve it. Talisman also offers its opinion that drilling more wells (horizontal wells) can never result in the waste of hydrocarbons. Anything else would violate the material balance law.⁸⁸ It is Mr. Lalehrokh's opinion that the proposed well spacing and proposed staggered development is necessary to efficiently recover the

⁸² Hearings Transcript Volume IV, p. 126, lines 9-15

⁸³ [Attachment 7 - Talisman Exhibit 74]

⁸⁴ Hearings Transcript Volume IV, p. 129, lines 6-7

⁸⁵ Talisman Exhibit 77

⁸⁶ Hearings Transcript Volume IV, p. 141, lines 10-12

⁸⁷ Hearings Transcript Volume IV, p. 143, lines 5-6

⁸⁸ Hearings Transcript Volume IV, p. 143, lines 20-21

reserves under the Cooke Ranch. The requested configuration gives Talisman the best opportunity to drain the C Unit and A/B Unit areas of the Cooke Ranch.

Thickness of Hawkville (Eagleford Shale) Field Section

Talisman disagrees with the Matrix analysis that finds only 137 feet of net pay in the Hawkville (Eagleford Shale) Field under the Cooke Ranch Lease. A Petrohawk paper⁸⁹ published in 2010 states that the Hawkville (Eagleford Shale) Field varies from 125 feet to 320 feet thick, and that the entire section is net pay with good reservoir quality. The effective gas-filled porosity is 8-10%, permeability is 1.0 to 1.5 x 10⁻³ millidarcies (md), and the gas saturation exceeds 80%. The free gas under a section of land (640 acres) would range from 140 to 212 BCF.⁹⁰ The Swift-Pielop Well No. 1 density logs are most diagnostic of reservoir quality, with water saturation of 10 to 15%.

Talisman finds that the Cooke Ranch Well No. B 5H pilot hole gave 210 feet total vertical thickness, all of which is net pay with average porosity of 9% and water saturation of 25%.⁹¹

Stacked Laterals

Talisman notes that stacked laterals have been used throughout the Eagleford play. In Devon's Q3 2015 Operations Report, Devon reports using a staggered infill drilling program with wells 330 feet apart in plan view and 660 feet apart in their respective horizons. This is in the Eagleville of DeWitt County, in the lower horizon of the Eagleford. The staggered wells are 60 to 80 feet apart vertically, a lesser distance than the Talisman wells are vertically apart.⁹²

In Devon Dockets 10-0297472 and 02-0297714, Ryan Howrish of Talisman asked Cary McGregor why an operator would want stacked laterals. McGregor stated that a stacked lateral would increase recovery efficiency, and reduce waste. He also spoke about different types of interference, in the case of hydraulically-induced fractures filling only with fluid (no sand or proppant) and then healing right up, so that there was no impact between the two wells with respect to the drainage areas of the wells.⁹³

For its EOG Lake Unit in the Eagleville (Eagle Ford-1) Field, Karnes County, EOG requested a stacked lateral rule, in August 2015, for a typical staggered "W" pattern, with wells 200 feet apart in plan view, but 400 feet apart in their upper and lower sections of the pay, on 26.6 acre spacing.⁹⁴ Another example is the EOG Milton Unit in the Eagleville (Eagle Ford-1) Field, Karnes County, which is also on staggered laterals.⁹⁵

⁸⁹ Talisman Exhibit 78

⁹⁰ Talisman Exhibit 78, p. 169

⁹¹ [Attachment 8 - Talisman Exhibit 78, p. 176]

⁹² Talisman Exhibit 79

⁹³ Talisman Exhibit 80

⁹⁴ Talisman Exhibit 81

⁹⁵ Talisman Exhibit 82

Zipper Fracs, Intersecting Fracture Patterns, and Pressure Communication

On the Cooke Ranch Lease, Talisman has experimented with using the zipper-frac method to sequentially complete frac stages on multiple wellbores. For example, the A Pad and C Pad wells were completed using the zipper-frac process.⁹⁶ A Journal of Petroleum Technology (JPT) article illustrates the different types of zipper fracture techniques, The Shale Evolution: Zipper Fracture Takes Hold.⁹⁷ Zipper fracturing completions result in less down time between frac stages and increases efficiency. The zipper frac method also seems to increase production in some fields, but this effect is not seen in other fields (such as Barnett, Bakken, Haynesville, and Marcellus).

In the same JPT article, Neal Nagel, chief engineer and principal at OilField Geomechanics studied zipper-fracs and concluded that without natural fractures zipper-fractures will have no impact on production. "...one of the reasons that the zipper-fracturing method has taken off in the Eagle Ford shale more than in other areas is because of the prevalence of natural fractures. Unlike in the Barnett, Bakken, Marcellus, and Haynesville shales, operators in the Eagle Ford have reported more pressure communication between adjacent wells. This suggests that natural fractures in the Eagle Ford tend to exhibit greater communication over a longer range than in many other shale plays."⁹⁸ According to Neal Nagel, pressure communication between zipper-frac wells is important, as without that pressure change between wells, "a zipper frac is unlikely to show much benefit. Also, to achieve a positive production outcome, the wells must be properly spaced, and the fractures need to be long enough so that they touch and overlap with one another, thus ensuring there is communication between adjacent wells."⁹⁹

Mukul Sharma, a professor and chair in the Petroleum Department at the University of Texas at Austin (UT), said field data from Eagle Ford wells make it clear to him that the zipper fracture method is indeed improving initial production rates and the estimated ultimate recovery. Sharma said operators in south Texas have reported improved initial production rates ranging from 20% to 40% using the zipper method.¹⁰⁰

"...fractures need to be long enough that they touch and overlap with one another, thus ensuring there is communication between adjacent wells."¹⁰¹ This practice will ensure more rock is fractured than if a limited area is fractured carefully so as not to fracture into the pattern of an adjacent well. When adjacent wells are completed with intersecting fracture patterns, this may initially cause production interference. However, in the long term, as pressure declines, the communicating fractures will probably close up, and the wells will no longer compete for the same reserves.

⁹⁶ Hearings Transcript Volume V, p. 104, lines 22-24

⁹⁷ Talisman Exhibit 83, p. 61-62

⁹⁸ Talisman Exhibit No. 83, p. 64

⁹⁹ Talisman Exhibit No. 83, p. 65.

¹⁰⁰ Talisman Exhibit 83, p. 60

¹⁰¹ Talisman Exhibit 83, p. 65

A Pioneer Natural Resources paper concludes that the majority of pad wells stimulated with the zipper-frac method are “generally in communication early on during production and communication can continue for several months.”¹⁰² Fracture conductivity and communication between wells does decrease over time following the fracture stimulation treatment. The paper studies fracture communication between wells with chemical and radioactive tracers. The communication is spotty, with some areas showing communication between wells, but other areas showing no communication. According to Mr. Clark, “...it does imply to me that some degree of communication between adjacent wellbores can actually improve well performance.”¹⁰³ “...this basically does show that when wells start off in communication immediately or shortly after a hydraulic fracture stimulation that conductivity or connectivity does often decrease over time.”^{104,105} Matrix has compared the wellhead pressures in the Cooke Ranch Well Nos. A 1H, B 2H and C 3H, and concludes they are in pressure communication.¹⁰⁶

The C Pad Wells

Talisman acknowledges the production from the C Pad wells is poor. Talisman Exhibit 88¹⁰⁷ shows the result from the production logging tool which was run in Well No. C 1H. There is a significant change in production where the well hits the fault that Talisman believes is there. Production is poor on the toe side of the fault (60% of the lateral) but good on the heel side of the lateral (about 40% of the lateral). The fault affects Well Nos. C 2H and C 3H as well.

An URTeC paper¹⁰⁸ describes a geohazard (a fault), that was encountered during zipper-frac treatments (stages). The well had 18 stages, and the fault interfered with 10 stages, reducing treatment efficiency of the total stimulated rock because the fault accepted some of the stimulation fluids and proppant. This is similar to what Talisman has seen with the C Pad wells on the Cooke Ranch. A fault has interfered with the stimulation fluids and proppant, reducing the recovery efficiency of the C Pad wells.

For the C Pad wells, once a well has produced 36% of the original gas in place, the dew point will be reached. “The recovered volumes of gas in condensate at dew point are completely independent of the time and production rates it takes to deplete to this point.”¹⁰⁹ The poor performance of the C Pad wells is due to their short length, small drainage area and poor fracture stimulations. Mr. Jim Clark states it has nothing to do with dew points or condensate banking.¹¹⁰ According to Mr. Clark “There’s two things there. It is producing from - there is a relatively small contribution on the toe side of the

¹⁰² Talisman Exhibit 85, p. 8

¹⁰³ Hearings Transcript Volume IV, p. 172, lines 3-5

¹⁰⁴ Hearings Transcript Volume IV, p. 174, lines 21-25

¹⁰⁵ Talisman Exhibit 85

¹⁰⁶ Talisman Exhibit 87/Matrix Exhibit 13, slide 39

¹⁰⁷ [Attachment 8 - Talisman Exhibit 88]

¹⁰⁸ Talisman Exhibit 84

¹⁰⁹ Hearings Transcript Volume IV, p. 186, lines 7-10

¹¹⁰ Talisman Exhibit 89

fault, and yes, I do believe that's because the rock wasn't stimulated as effectively on that side.¹¹¹

Condensate Banking

A FESCO Report titled Retrograde Gas PVT Fluid Study for the Cooke Ranch No. B 5H, observed the dew point at 3,607 PSIG. The maximum observed volume of condensed retrograde liquid was 1.937% of hydrocarbon pore space, at 1,800 PSI.¹¹² This is the maximum amount of pore space that will be condensate, a very small volume. Talisman believes there is no significant condensate banking in the reservoir.¹¹³

Matrix has alleged condensate banking might cause the loss of hydrocarbons on the Cooke Ranch Lease, and has quoted McCain's *Reservoir Fluids* book to the effect that condensate in the reservoir will not flow. Jim Clark defines "condensate banking" slightly differently than McCain. "So, I make a distinction. There's retrograde condensation which is actually forming a condensate saturation in the reservoir, and then there's banking where that saturation is significant enough to where it inhibits flow to the wellbore, so, that's the distinction I make. And I don't believe the latter occurs. No doubt you have some retrograde condensation at Cooke Ranch, but to me it's extremely minor and based on both this PVT study and the numerical modeling that I understand Talisman has done, its insignificant at the Cooke Ranch."¹¹⁴ "...within a given drainage volume, you're going to get the exact same amount of gas and the exact same amount of condensate down to dew point, and it has no dependence on how long it takes to get there..."¹¹⁵ "You're only going to produce what's in the drainage volume."¹¹⁶ Asked if Matrix had presented any evidence to quantify condensate banking on the Cooke Ranch, Mr. Clark replied, "No, they just said it was occurring."¹¹⁷

Q. Olmstead - And so is there any way, then, if the maximum is 1.93 percent, is there any way for that small a pore volume to restrict production at all or cause any kind of condensate banking or waste?

A. Clark - I just don't see how a one and a half percent liquid in the pores could cause any kind of banking or interfere with flow.¹¹⁸

Impact on Reserves

¹¹¹ Hearings Transcript Volume V, p. 89, lines 22-25

¹¹² Hearings Transcript Volume IV, p. 188, lines 17-23

¹¹³ Talisman Exhibit 90

¹¹⁴ Hearings Transcript Volume V, p. 67, lines 13-23

¹¹⁵ Hearings Transcript Volume V, p. 62, lines 2-5

¹¹⁶ Hearings Transcript Volume V, p. 90, lines 19-20

¹¹⁷ Hearings Transcript Volume V, p. 92, lines 1-7

¹¹⁸ Hearings Transcript Volume V, p. 91, lines 22-25, p. 92, lines 1-3

Talisman's Exhibit 91 compares the recoveries on two hypothetical 480-acre tracts based on actual wells already drilled and producing. One hypothetical based on six wells (Well Nos. B 2H, B 5H, D 1H, D 3H, F 1H and F 3H) on 660-foot spacing and 80-acre drainages on the same plane on 480 acres yields an EUR of 23,382 MMCF. The second hypothetical based on three A Pad wells (Well Nos. A 1H, A 2H and A 3H) extrapolated to 15 wells on 500 foot spacing (250 foot spacing in plan view), or staggered, stacked laterals, and 60-acre drainages, results in an EUR of 43,800 MMCF. The wells on tighter spacing result in an 87% increase in recoverable reserves.¹¹⁹

Q. Olmstead: "And so then, the A pad wells prove that Talisman's staggered development program works, don't they."

A. Clark: "I believe they do. They are good wells, and they were drilled in that stacked staggered configuration and I believe it's going to result in recovery and allow them to, in this case, efficiently develop this hypothetical 480-acre area."¹²⁰

Decline Curve Projections

Matrix requested that Mr. Clark quote the guidance language from the Fekete software. "...when a well is placed on production, there will be transient flow initially. Eventually all of the boundaries will be felt and it is only after this time the decline curve analysis becomes applicable."¹²¹ The Fekete guidance language also states "...For the period of production included in the decline analysis, the sandface flowing pressures must be relatively constant before a reliable set of decline parameters can be extracted."¹²² Mr. Clark stated, "Well, I agree the longer the well has produced, the more confident you become in your projection and at some point you will hit boundary dominated flow, but, no, I would not say that to do a decline curve projection of a well while it's in the early life of its transient analysis is completely invalid. You just - - you get a greater degree of confidence as more time goes by and you acquire more data."¹²³

Mr. Clark calculated fair share analysis based on decline curves and history matches. "I did both for quality control, but I believe the history matches are more accurate, but they are both within, I think, 13 percent of each other on the average."¹²⁴ "I would say it's more standard to see a decline curve analysis."¹²⁵ "The decline curve doesn't care about any factors like thickness, number of fractures. Anything like that. It's just a straight rate projection."¹²⁶

¹¹⁹ Talisman Exhibit 91, p. 2 and 3

¹²⁰ Hearings Transcript Volume IV, p. 193, lines 17-24

¹²¹ Hearings Transcript Volume V, p. 77, lines 19-23

¹²² Hearings Transcript Volume V, p. 78, lines 17-20

¹²³ Hearings Transcript Volume V, p. 79, lines 3-11

¹²⁴ Hearings Transcript Volume V, p. 95 and p. 96, lines 21-25 and 1-2

¹²⁵ Hearings Transcript Volume V, p. 96, lines 9-10

¹²⁶ Hearings Transcript Volume V, p. 96, lines 18-20

Same Rock

In making its case, Talisman has quoted papers that discuss conditions in several different Eagleford fields. Talisman emphasizes the fact that the Eagleford rock is essentially the same in each of the different fields.

Q. Olmstead: Is there anything special about the Cooke Ranch Lease or the Hawkville Field that would require it to be developed differently than Devon, Pioneer and EOG are developing their leases in different Eagle Ford fields?

A. Clark: I mean, no, it's the same formation. It's - - in fact, it's a little thinner at this location in DeWitt and obviously the thinner the formation, the more need for vertical distribution of horizontal stacked laterals, but, no, there is nothing - - it's the same basic geological formation."¹²⁷

Mr. Clark believes it is reasonable to apply concepts from one Eagleford field to another. He stated, "Well, it's the same rock. They are all on - - all of the major Eagle Ford fields are on pretty uniform spacing, no between-well spacing. The dual 100/330 lease line setbacks. It's the same rock. This is the only field that - - of the main Eagle Ford fields in this play that does not already have a stacked lateral rule and I see no reason why it shouldn't."¹²⁸

Matrix has alleged that Pioneer's suspension of its Washburn Ranch Project indicates that stacked laterals are not viable in the Hawkville (Eagleford Shale) Field. Talisman notes that on the second page of its update, Pioneer explains that there was a fire at the central gathering facility on the Washburn Ranch lease, with production significantly curtailed until year-end 2014. As a result of the fire, the production forecast for 2015 was based on limited production data.¹²⁹

ALJ'S AND TECHNICAL EXAMINER'S OPINION

Standing

The first issue to arise in these dockets is one of standing. Matrix, JAR, Devon and OGE, (hereinafter condensed to "Matrix" but inclusive of all four parties) initially alleged that under the terms of the 1954 JOA, there was no designated operator of the Cooke Ranch Lease. By email dated June 17, 2015, counsel for Matrix asserted that

"Talisman is the operator only of the existing wellbores but NOT in acreage adjacent thereto. Protestants, like Talisman, have the right to be operator by drilling wells

¹²⁷ Hearings Transcript Volume V, p. 82 and 83, lines 24-25 and 1-9

¹²⁸ Hearings Transcript Volume V, p. 95, lines 5-16

¹²⁹ Talisman Cross Exhibit 7

on this offset acreage. Protestants are, therefore, as much an operator of acreage offsetting existing wells as Talisman and are entitled to notice of these applications as leasehold owners that are directly and adversely affected by the proposed wells.”¹³⁰

Based on this unsupported assertion of standing, without a final and unappealable interpretation of the relevant JOA by any District Court, or other court of appropriate jurisdiction, Matrix was able to have the eleven subject applications set for hearing.

At hearing, Matrix suggested a different basis for standing.

“...Matrix and JAR are affected persons regardless of their status as non-operating working interest owners or whatever, and due process requires that their arguments be heard. They are affected in these cases because the proposed wells, the evidence that we will present, will not - - are not only not necessary to prevent waste would be a typical approach to an applicant who is presenting evidence, but in fact our evidence will show that the wells will cause waste; that is, that they will reduce the ultimate recovery of oil and gas.”¹³¹

Matrix further stated,

“We are not here arguing that non-operating working interest owners in all instances are entitled to notice. In fact, we are not really complaining about notice here although we think Talisman should have known that we would have been affected and should have provided notice, but our main argument, again, is the proposed wells, drilled as they are proposed where they are proposed will cause waste.”¹³²

The first argument, that there is no designated operator for the Cooke Ranch Lease, derives from Matrix’s reading of the 1954 JOA. The 1954 JOA is not a standard JOA. As designed in 1954, it addressed the rights of two parties, Mr. Paul Kayser and Plymouth Oil Company, and failed to clearly address the rights of successor parties in the event of multiple successors. The 1954 JOA is a contract, and the proper venue for defining the rights of parties under the terms of an ambiguous contract is District Court. According to the parties, the interpretation of the 1954 JOA and related matters are currently the subject of litigation in La Salle County District Court.¹³³

In opposing the standing of Matrix, Talisman argued that the Commission has previously declined to expand the notice provisions of Statewide Rule 37 to expand “...the class of persons presumptively affected to include the owners of offset leased mineral interests, i.e., lessor/royalty owners and non-operating lessees.” The Commission stated

¹³⁰ Talisman Exhibit 37

¹³¹ Hearings Transcript Volume I, p. 23, lines 15-25

¹³² Hearings Transcript Volume I, p. 25 and 26, lines 23-25 and 1-5

¹³³ Talisman. Exhibit 1, *Talisman Energy USA, Inc. V. Matrix Petroleum, LLC; Matrix Petroleum Holdings, LLC; and JAR Resources Holdings, L.P.* No. 14-08-00158-CVL, District Court in La Salle County, 218th Judicial District

it "...declines to make these changes because royalty owners (who do not own a possessory interest) and non-operating mineral interest owners are considered, by virtue of their contracts or leases, to be represented by the designated operator of the tract."¹³⁴

Talisman's argument is at least partially on point. The suggested changes to Statewide Rule 37 would have increased the class of presumptively affected persons to include "offset" leased mineral interests. The protesting parties here are not offset, but on-lease. They are clearly not represented by the designated operator of an offset tract. On the other hand, the ALJ and Technical Examiner find it persuasive that royalty owners and non-operating mineral interest owners are considered, by virtue of their contracts or leases, to be represented by the designated operator of the tract. There must be a determination of whether or not there is a single Unit Operator of the Cooke Ranch Lease, or whether each separate mineral interest owner is an operator on the Cooke Ranch Lease. This determination is within the jurisdiction of the District Courts, not the Commission.

The ALJ and Technical Examiner cannot undertake to usurp the role of the District Court in divining the meaning of the contract and the rights of the parties. The ALJ and Technical Examiner believe it was Matrix's burden to provide the Commission with evidence of their standing pursuant to the 1954 JOA, in the form of a final and unappealable decision by a court of competent jurisdiction. Matrix has not met this burden, and cannot definitively show that it has as much right as Talisman to develop the acreage of the Cooke Ranch Lease. The ALJ and Technical Examiner do not believe the Commission should stand paralyzed waiting for a judicial determination that may take years before finality, and, accordingly, do not find Matrix (including JAR, Devon and OGE) has shown it has standing under the rationale stated in the Whitworth email of June 17, 2015.

Matrix has a second argument that it is an "affected party" because Talisman's proposed wells will cause waste, which will harm Matrix. All of the Talisman application dockets require an exception to Statewide Rule 38. Under Statewide Rule 38, the applicant must provide the Commission with "...a list of the names and addresses of all affected persons. For the purpose of giving notice of application, the Commission presumes that affected persons include the operators and unleased mineral owners of all adjacent offset tracts, and the operators and unleased mineral interest owners of all tracts nearer to the proposed well than the prescribed minimum leaseline spacing distance." (emphasis added)

The ALJ and Technical Examiner find the same problem with this assertion as the previous argument that Matrix, et al, are "operators" on the Cooke Ranch Lease. To fit within the definition of "affected parties", the mineral interest owners must demonstrate that they are operators on the Cooke Ranch Lease. That argument depends on a judicial finding regarding the rights of the parties under the 1954 JOA, which is currently under litigation but short of resolution. Matrix has attempted to bolster its position by filing as a

¹³⁴ Texas Register - 22 TexReg 8973, September 5, 1997

Form P-5 operator with the Commission, and has actually received a few drilling permits for wells on the Cooke Ranch Lease. However, Matrix has not drilled any of these wells and, at the time of the hearings, was not the P-5 operator of any well in Texas. The ALJ and Technical Examiner do not believe Matrix has shown that it is an “operator” of the Cooke Ranch Lease, and, accordingly, not an “affected party”. Matrix’s second argument does not provide a basis for standing.

Matrix asserts a third basis for the right to protest the present dockets. Matrix begins by noting that “waste” is prohibited by the Texas Natural Resources Code. Section 85.045 of the Texas Natural Resources Code prohibits waste: “The production, storage, or transportation of oil or gas in a manner, in an amount, or under conditions that constitute waste is unlawful and prohibited.” Section 85.046(a)(3) of the Code states that “waste” includes “underground waste or loss, however caused and whether or not the cause of the underground waste or loss is defined in this section”. Section 85.046(a)(6) of the Code, states that “waste”, includes “physical waste or loss incident to or resulting from drilling, equipping, locating, spacing, or operating a well or wells in a manner that reduces or tends to reduce the total ultimate recovery of oil or gas from any pool.” Section 86.012(a)(5) states “waste” includes “physical waste or loss incident to or resulting from so drilling, equipping, or operating a well or wells as to reduce or tend to reduce the ultimate recovery of gas from any pool.”

Matrix argues that the proposed Talisman wells will cause waste because they will be drilled too close together and will interfere with each other, resulting in lower recoveries of hydrocarbons than wells spaced farther apart, which it argues fits the definition of waste under Tex. Nat. Res. Code §85.046(a)(6) of “physical waste...resulting from the drilling, equipping, locating, spacing or operating a well...as to reduce...the ultimate recovery of gas from any pool.”

Texas Natural Resources Code §85.321 states.

“A party who owns an interest in property or production that may be damaged by another party violating the provisions of this chapter ... or another law of this state prohibiting waste or a valid rule or order of the commission may sue for and recover damages and have any other relief to which he may be entitled at law or in equity. Provided, however, that in any action brought under this section or otherwise, alleging waste to have been caused by an act or omission of a lease owner or operator, it shall be a defense that the lease owner or operator was acting as a reasonably prudent operator would act under the same or similar facts and circumstances.” (emphasis added)

Matrix argues that the right to appear in administrative actions such as the one before the Commission in these dockets is encompassed within the term “any other relief”. The ALJ and Technical Examiner do not agree with Matrix’s interpretation of this statute. The plain language of the statute creates a private cause of action in the District Courts of Texas. The term “any other relief” expands on the term “recover damages” and would, for example, authorize injunctive relief in addition to the recovery of damages. We

believe the statute only provides a private cause of action in District Court, and is not a basis for standing in the present application hearings before the Commission. Matrix's third argument does not provide a basis for standing in the present dockets. Accordingly, the ALJ and Technical Examiner find that Matrix Petroleum, LLC; JAR Resource Holdings, LP; Devon Energy Prod. Co., LP; and OGE. LLC do not have standing to protest the eleven Talisman Energy USA Inc. application dockets now before the Commission.

Talisman admits that neither it nor any other working interest owner directly succeeded to the position of Unit Operator under the 1954 JOA. Article 25 of the JOA states:

In the Event Operator sells or disposes of his interest in the leased acreage, the right of operation herein conferred shall not run with the transfer of interest or inure to the benefit of Operator's assignee, but in such event Non-operator and the assignee of Operator shall select the new Operator for operations hereunder.

Talisman did not automatically become Unit Operator upon acquisition of part of the 75% working interest of Paul Kayser. In 2010, Talisman and Statoil together had 63.4 percent of the working interest in the Cooke Ranch acreage, the majority interest.

Talisman cites *Abraxas Petroleum Corp. V. Hornburg*, 20 S.W.3d 741 (Tex. App. - El Paso 2000, no pet.), in which the court found that the non-operating working interest owners in the Cleo-Smith Lease had waived their right to require that a new Operator be formally selected when they acquiesced in the succession of operators when the prior operator, Pearson-Siebert Oil Company, sold and assigned its 55.357120% working interest to Abraxas, which then assumed its place as Operator of the Cleo-Smith Lease.

The *Abraxas* court noted that any contractual right can be waived, and that the waiver could be by words or by a party's conduct. In *Abraxas*, the prior operator, Pearson-Siebert Oil Company, sold and assigned its 55.357120% working interest to *Abraxas*, which then assumed its place as Operator of the Cleo-Smith Lease. Beginning in October 1992, the non-operating working interest owners of the Cleo-Smith Lease received monthly operating statements from *Abraxas* and an invoice for their respective shares. The non-operators paid their proportionate share of expenses based on these billings. They also engaged in written and personal communications with *Abraxas* regarding their questions about the operation of the lease. The non-operators did not formally raise their objections to the non-selection of *Abraxas* until the filing of suit on 1995. Citing *Purvis Oil*¹³⁵ (footnote and cite below), the court found that the non-operating interest owners could waive the requirements of a JOA pertaining to the proper selection of a successor operator by permitting another operator to act as operator and accepting the benefits of that party's performance.

Talisman argues that, in the present case, the non-operating working interest owners have done just that, in allowing Talisman to obtain drilling permits and drill wells

¹³⁵ *Purvis Oil Corp. V. Hillin*, 890 S.W.2d 931, (Tex. App. - El Paso 1994, no writ)

on the Cooke Ranch Lease and then accepting the benefits of production. The non-operating working interest owners, Matrix, JAR, Devon and OGE, have responded to the Authorizations for Expenditures (AFE's) issued by Talisman, have received and paid Joint Interest Billing Statements (JIBS) received from Talisman and have been allocated their share of production by Talisman. Talisman asserts that the non-operating working interest owners of the Cooke Ranch Lease have acquiesced in Talisman's assumption of the role of Unit Operator, and are estopped from denying that Talisman is the Unit Operator.

If the ALJ and Technical Examiner thought the decision was within the Commission's jurisdiction, we would agree with Talisman's evaluation of its status pursuant to the Abraxas case. It would seem the non-operating mineral interest owners have waived their right to dispute Talisman's right to operate the Cooke Ranch Unit. However, while the ALJ and Technical Examiner believe that Talisman is correct in asserting that the protestants, other than BHP Billiton, lack standing in the eleven application dockets, the ALJ and Technical Examiner also recognize that this conclusion is ultimately dependent on a finding in a court of competent jurisdiction. The ALJ and Technical Examiner therefore conclude, based on the facts that Talisman has already drilled thirteen wells on the Cooke Ranch Lease, has acted as operator of the Cooke Ranch Lease, has provided AFEs to the other interest owners in the Cooke Ranch Lease, has issued JIBS (Joint Interest Billing Statements) to the other interest owners of the Cooke Ranch Lease and has apportioned production between itself and the other interest owners in the Cooke Ranch Lease, that Talisman is at least an operator of the Cooke Ranch Lease with the right to file the subject drilling permit applications.

Waste

Even if the ALJ and Technical Examiner had found that Matrix, et al, had standing in the eleven dockets, we do not find that Matrix has proved its allegation that Talisman will cause waste. The heart of the Matrix case is that wells on the Cooke Ranch Lease should be drilled on 80-acre spacing and far enough apart, whether 500 or 660 feet apart, that there is no pressure communication between the wells.

Matrix took the position that communication between wells should be avoided, as pressure communication would cause the wells to compete for the same reserves and cause waste. Adherence to this approach would leave unfractured rock between wells, rock that would then not contribute to the recovery achieved by the wells. The weight of the competent evidence from hearing leads to the conclusion that intersecting fracture patterns indicates more fractured rock, greater connectivity between well laterals and fractures, and that deliberate well-to-well communication indicates the presence of natural fractures, connected fracture patterns, and higher recoveries in the Eagle Ford.

The evidence also indicates that fracturing adjacent wells to the extent that the fracture patterns intersect may result in a 20 percent to 40 percent increase in initial

production rates.¹³⁶ The evidence indicates that wells with intersecting fractures on 60-acre spacing, with staggered laterals 250 feet apart in plan view and 500 feet apart within their respective depth intervals, will effectively drain the Cooke Ranch Lease, and result in a higher recovery of hydrocarbons than the wells on 80-acre spacing advocated by Matrix. The ALJ and Technical Examiner give no credence to Matrix's assertion that Talisman's applied-for drilling permits and well-spacing plans will cause waste on the Cooke Ranch Lease.

BHP Billiton

BHP Billiton protests Talisman's application for Well Co. C 4H on the C Unit and Well No. A 9H on the A/B Unit, Cooke Ranch Lease, La Salle County. Talisman does not dispute the right of BHP Billiton, as an offset operator, to protest its applications.

For Well No. C 4H, the Talisman plat¹³⁷ does not indicate the operator to the south. However, another Talisman plat¹³⁸ identifies the operator to the south of the C Unit as Petrohawk Operating Co., the predecessor in interest to BHP Billiton, in the Socorro Farming Co. Survey No. 310, A-820.

Because the requested well permit is for an acreage amount of 60 acres, the field rules require notice to adjacent operators within 660 feet. The acreage operated by BHP Billiton is clearly within 660 feet of Well No. C 4H, so BHP Billiton was entitled to notice. However, Well No. C 4H is set back 330 feet from the N/S trending lease line between the BHP Billiton acreage and the Talisman acreage, a legal location under the Hawkville (Eagleford Shale) Field rules. The record evidence does not indicate whether BHP Billiton is the operator of the C.C.S.D. & R.G.N.G RR. Co. Survey No. 172, A-953, the acreage directly south of the C Unit, but even if it is, the last take-point for the Well No. C 4H is 110 feet from the south line of the unit, which is a legal location under the field rules. Well No. C 4H is not in violation of the lease line spacing rules for the Hawkville (Eagleford) Shale in regard to BHP Billiton. BHP Billiton did not challenge the well on a Statewide Rule 38 basis.

Regarding Well No. A 9H, the Talisman plat¹³⁹ indicates the well is only 86 feet west of the common N/S line between the Cooke Ranch A/B Unit and the acreage to the east. BHP Billiton Cross Examination Exhibit No. 1¹⁴⁰ indicates the neighboring acreage to the east is the Bellows Prospect, with the northern half shown on a plat in the memorandum as the C. Sullivan Survey Abstract No. 1079. On the Talisman plat, this is shown as the H. & G.N. RR. Co. Survey No. 158, A-1079. These are apparently two different survey names for the same tract. The memorandum describes Talisman Energy USA Inc, as Operator of the Bellows Prospect and Petrohawk Properties (acquired by BHP Billiton) as a Non-Operator.

¹³⁶ Talisman Exhibit 83, p. 60

¹³⁷ Talisman Exhibit 24

¹³⁸ Talisman Exhibit 26

¹³⁹ Talisman Exhibit 34

¹⁴⁰ BHP Cross Exhibit 1, p. 6

As Operator of the Bellows Prospect, Talisman waives objection to the Statewide Rule 37 exception location of Well No. A 9H, which is well inside the 330-foot spacing distance required by the Hawkville (Eagle Ford) Field rules. At hearing, BHP Billiton reminded Talisman that the JOA for the Bellows Prospect does not give Talisman the right to waive the interests of the Non-Operators. “Nothing herein contained shall grant, or be construed to grant, Operator the right or authority to waive or release any rights, privileges or obligations which non-operators may have under Federal or state laws or under rules, regulations or orders promulgated under such laws in reference to oil, gas and mineral operations, including the location, operation, or production of wells, on tracts offsetting or adjacent to the Contract Area.”¹⁴¹

It is not the Commission’s responsibility to enforce the provisions of the Operating Agreement for the Bellows Prospect. If BHP Billiton wishes to allege Talisman will be in breach of the Operating Agreement for the Bellows Prospect if it waives objection to the Statewide Rule 37 leaseline spacing exception for Well No. A 9H, BHP Billiton’s relief is in District Court.

BHP Billiton did not present any evidence challenging Talisman’s request for a Statewide Rule 38 exception for Well No. A 9H.

Summary

In these dockets, working interest owners in a large lease have brought their disputes with their ostensible Unit Operator to the Commission for resolution. The disputes involve well spacing and completion techniques. Even in the context of the present eleven dockets, the ALJ and Technical Examiner do not think it is appropriate for this agency to be in the business of dictating well completion techniques to individual operators. Industry is constantly searching for greater efficiencies and developing new techniques to maximize hydrocarbon recovery. Innovation and experimentation would be stifled if operators were constantly subject to second guessing at the regulatory level.

Talisman has drilled wells on 80, 60 and 30-acre spacings to determine what works best in the Hawkville (Eagleford Shale) Field on the Cooke Ranch Lease. It has attempted to increase production by employing zipper-frac techniques and fracturing the wells so that the fracture patterns intersect, maximizing the amount of Stimulated Reservoir Volume. Talisman has drilled wells and fractured them in an attempt to drain an entire interval with a single well, and then compared the results to a staggered, stacked lateral system. As a result, it has decided to develop the Cooke Ranch Lease with wells drilled on a staggered, stacked lateral basis with wells draining 60 acres.

¹⁴¹ BHP Cross Exhibit 2, p. 16 & 17

Correlative Rights and Prevention of Confiscation

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 37.¹⁴² To obtain an exception to Statewide Rule 37 to protect correlative rights and prevent confiscation, the applicant must show that: 1) it is not possible for the applicant to recover its fair share of minerals under its tract from regular locations; and 2) that the proposed irregular location is reasonable.

An owner of oil and gas is entitled to a reasonable opportunity to recover the reserves underlying his tract, and any denial of that opportunity amounts to confiscation. *Atlantic Refining Co. v. Railroad Commission*, 346 S.W.2d 801 (Tex. 1961); *Imperial American Resources Fund, Inc. v. Railroad Commission*, 557 S.W.2d 280 (Tex. 1977). An applicant seeking exceptions to Statewide Rules 37 and/or 38 based on prevention of confiscation must show that: 1) it is not feasible for the applicant to recover its fair share of minerals from regular locations; and 2) that the proposed irregular locations are reasonable.

The ALJ and Technical Examiner agree with Talisman's expert testimony that no well in the Hawkville (Eagleford Shale) Field is capable of draining 320 acres, as evidenced by the field rules which allow for fractional units down to 40 acres. Talisman seeks fractional units with 60-acre spacing. Because the eleven subject dockets were protested, Talisman gave notice to designated operators, lessees of record for tracts that have no designated operator, and all owners of unleased mineral interests within 660 feet of any take point on the applied-for horizontal wells.

Talisman has evaluated completions with wells drilled with 80-acre, 60-acre and 30-acre drainage areas. Talisman finds that wells drilled with 60-acre drainage areas, on a staggered, or "W", pattern with wells spaced 500 feet apart within their particular interval, which appears to show wells drilled 250 feet apart in plan view, will most effectively recover the reserves in place beneath the Cooke Ranch Lease.

The Examiners find that it is not feasible for Talisman to recover its fair share of minerals in the Hawkville (Eagleford Shale) Field under the Cooke Ranch Lease with wells drilled on an 80-acre drainage pattern spaced 600 or 660 feet apart. The Examiners also find that Talisman's experiments with different drainage patterns on the lease, and experiments with different completion techniques were reasonable acts by Talisman and exhibit a prudent approach to discovering the optimum completion technique and drainage area for optimum recovery of hydrocarbons in the subject field beneath the Cooke Ranch Lease. The Examiners are of the opinion that approval of the Statewide Rule 37 and 38 exceptions requested by Talisman are necessary to prevent confiscation and protect correlative rights.

¹⁴² *Gulf Land Co. v. Atlantic Refining Co.*, 131 S.W.2d 73, 80 (Tex. 1939)

Fair share is measured by the currently recoverable reserves beneath the C Unit, which in this case is 44.49 BCF. The currently recoverable reserves beneath the A/B Unit is 121.24 BCF.

The ALJ and Technical Examiner recommend that the Statewide Rule 38 exception applications of Talisman for Well Nos. C 4H, C 5H, C 6H, C 7H, C 8H and C 9H on the C Unit of the Cooke Ranch Lease, Hawkville (Eagleford Shale) Field, La Salle County, Texas be granted. The ALJ and Technical Examiner recommend that the Statewide Rule 38 exception applications of Talisman for Well Nos. A 5H, A 6H, A 7H, A 8H and A 9H on the A/B Unit of the Cooke Ranch Lease, Hawkville (Eagleford Shale) Field, La Salle County, Texas be granted.

The Examiners further find that the Statewide Rule 37 application of Talisman for its Well No. C 4H should be approved. The well is at a regular location in regard to Protestant BHP Billiton. The well is at an irregular location, 74 feet to 86 feet from the west lease line of the Cooke Ranch C Unit, but Talisman is the operator of the adjoining Cooke Ranch D Unit to the west and waives protest.

The Examiners further find that the Statewide Rule 37 application of Talisman for its Well No. A 9H should be approved. The well is at an irregular location in regard to Protestant BHP Billiton, but BHP Billiton is not the operator of the adjacent Bellows Prospect to the east. Talisman is Unit Operator of the Bellows Prospect and waives protest.

Based on the record in the eleven dockets, 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. Talisman Energy USA Inc. ("Talisman" or "Applicant"), seeks exceptions to Statewide Rule 38 for the Cooke Ranch Lease C Unit, Well Nos. C 4H, C 5H, C 6H, C 7H, C 8H and C 9H in the Hawkville (Eagleford Shale) Field in La Salle County.
3. Talisman Energy USA Inc. ("Talisman" or "Applicant"), seeks exceptions to Statewide Rule 38 for the Cooke Ranch Lease A/B Unit, Well Nos. A 5H, A 6H, A 7H, A 8H, and A 9H in the Hawkville (Eagleford Shale) Field in La Salle County.

4. Talisman Energy USA Inc. ("Talisman" or "Applicant"), seeks an exception to Statewide Rule 37 for the Cooke Ranch Lease C Unit, Well No. C 4H in the Hawkville (Eagleford Shale) Field in La Salle County.
5. Talisman Energy USA Inc. ("Talisman" or "Applicant"), seeks an exception to Statewide Rule 37 for the Cooke Ranch Lease A/B Unit, Well No. A 9H in the Hawkville (Eagleford Shale) Field in La Salle County.
6. The eleven Statewide Rule 37 and 38 exception applications filed by Talisman were protested by Matrix Petroleum, LLC ("Matrix"); JAR Resource Holdings, LP ("JAR"); Devon Energy Prod. Co., LP ("Devon"); OGE, LLC ("OGE"); and BHP Billiton Pet. (TxLa Op.) Co. (BHP Billiton).
7. Statoil Texas Onshore properties, LLC appeared in the hearings as an observer.
8. The Cooke Ranch, originally named the Kayser Ranch, consisted of 7,537.33 acres described in a 1954 JOA (Joint Operating Agreement). The 1954 Kayser Ranch Unit Agreement included slightly less acreage, 7,137.33 acres. Some acreage has been excluded over time due to farm-outs.
 - a. The 1954 JOA was not a typical JOA, and was crafted to describe the responsibilities of the two parties to the JOA, Paul Kayser and Plymouth Oil.
 - b. The 1954 JOA did not unambiguously describe a method of electing a successor operator of the unit.
 - c. In 2010, Talisman and Statoil Texas Onshore Properties LLC ("Statoil") acquired 75% of the working interest previously owned by Paul Kayser through Kayser's successors in interest. Since that time, Talisman has acted as the operator of the lease.
 - d. In a 2013 Settlement document, titled "Stipulation of Leasehold Interest", the 2010 successors to Kayser, consisting of Talisman, Statoil, JAR, Devon, Matrix and OGE, agreed that Talisman and Statoil had each acquired a 0.317355 working interest in the Cooke Ranch Lease. The other working interest owners, and their working interests, are JAR, with a 0.2 working interest; Devon, with a 0.10248 working interest; MPH (Matrix Petroleum Holdings, LLC) with a 0.01157 working interest; and OGE, with a 0.05124 working interest.
 - e. A letter dated August 27, 2015 on Statoil letterhead confirms that "...from and after the date that Statoil Texas Onshore Properties LLC took its interest in the acreage included in this JOA, Statoil has considered Talisman Energy USA, Inc. to be the operator under the terms of the JOA." Combining its own interest with that of Statoil, Talisman states that it has the support

of a total of 0.6347 of the working interest in the Cooke Ranch Lease, which is the majority interest.

9. Matrix, JAR, Devon and OGE assert they have three bases for standing to appear as protestants in the eleven Talisman Statewide Rule 37 and 38 application dockets. Those are:
 - a. Under the 1954 JOA, a successor Unit Operator has not been selected for the Cooke Ranch Lease. Matrix, JAR, Devon and OGE assert that they are operators of the Cooke Ranch Lease with as much right to develop the acreage as Talisman.
 - b. Matrix, JAR, Devon and OGE assert the Talisman applications will cause waste on the Cooke Ranch Lease, and that they will be adversely affected by Talisman's operations, making them "affected parties". Under Statewide Rule 38, the applicant must provide the Commission with "...a list of the names and addresses of all affected persons. For the purpose of giving notice of application, the Commission presumes that affected persons include the operators and unleased mineral owners of all adjacent offset tracts, and the operators and unleased mineral interest owners of all tracts nearer to the proposed well than the prescribed minimum leaseline spacing distance."
 - c. Matrix argues that Talisman will cause waste on the Cooke Ranch Lease, a property in which protestants own an interest. Matrix quotes Texas Natural Resources Code §85.321, which states. "A party who owns an interest in property or production that may be damaged by another party violating the provisions of this chapter ... or another law of this state prohibiting waste or a valid rule or order of the commission may sue for and recover damages and have any other relief to which he may be entitled at law or in equity. Provided, however, that in any action brought under this section or otherwise, alleging waste to have been caused by an act or omission of a lease owner or operator, it shall be a defense that the lease owner or operator was acting as a reasonably prudent operator would act under the same or similar facts and circumstances." Matrix argues that the right to appear in administrative actions such as the one before the Commission in these dockets is encompassed within the term "any other relief".
10. The Commission does not have the authority to interpret contracts. Matrix did not provide the Commission with a final and unappealable order from a court of competent jurisdiction stating that Matrix was an operator of the Cooke Ranch Lease pursuant to the 1954 JOA.
11. Without a judgment that Matrix and the other working interest owners of the Cooke Ranch Lease are equivalent to operators, Matrix and the other working interest

owners cannot fit within the categories of presumed affected parties described in the rule, which consist of "...the operators and unleased mineral interest owners of all tracts nearer to the proposed well than the prescribed minimum lease line spacing distance."

12. In Texas Natural Resources Code §85.321, a private cause of action in District Court is created for any person owning an interest in property damaged by another party in violation of a law of the state prohibiting waste, and may sue for and recover damages and have any other relief to which he may be entitled at law or in equity. The term "any other relief" expands on the term "recover damages" and would, for example, authorize injunctive relief in addition to the recovery of damages. It is not the basis for standing in the present administrative permit application dockets.
13. BHP Billiton is the operator of a tract south of the Cooke Ranch Lease Well No. C 4H and is an interest owner in the Bellows Prospect, a tract east of the Cooke Ranch Lease Well No. A 9H. Talisman does not dispute BHP Billiton's right to appear as a protestant in the dockets for those wells.
14. Talisman has drilled thirteen wells on the Cook Ranch Lease. These are the A/B Unit Well Nos. A 1H, A 2H, A 3H, A 4H, B 2H and B 5H; the C Unit Well Nos. C 1H, C 2H, and C 3H; the D Unit Well Nos. D 1H and D 3H; and the F Unit Well Nos. F 1H and F 3H.
15. The thirteen Talisman wells were drilled based on an incorrect title opinion that indicated the Cooke Ranch Lease consisted of 6,026.329 acres. The incorrect title opinion failed to note that some acreage to the north had already been earned by other operators as a result of farm-outs. As a result, Well Nos. F 1H, F 3H, D 1H, D 3H and C 1H were drilled with bottomholes extending off-lease to the north.
16. Talisman received a letter dated May 19, 2015, from the Commission, asking for an explanation of why the bottomholes of the F 1H, F 3H, D 1H, D 3H and C 1H were off-lease, an apparent violation of Statewide Rule 86. After obtaining a more accurate title opinion, Talisman now finds the Cooke Ranch Lease consists of 5,351.62 acres. It has attempted to correct the problem of the off-lease bottomholes by forming production units with the operators of the lands trespassed against.
17. Some of the thirteen previously drilled wells are in need of Statewide Rule 38 exceptions of their own. Talisman was in the process of applying for those exceptions when the present applications became protested, at which point the Commission refused to allow the re-permitting of any of the thirteen existing Talisman wells on the Cooke Ranch Lease pending the outcome of the present eleven applications.

18. For the 410.381-acre Cooke Ranch C Unit, with a pay thickness of 210 feet, Talisman calculates the Original Gas in Place as 75.99 BCF of gas. Using a recovery factor of 61.8%, the Recoverable Gas initially in place would have been 46.97 BCF. The cumulative production from the wells already drilled and producing on the C Unit, the C 1H, C 2H and C 3H, is 2.49 BCF, leaving remaining recoverable reserves of 44.49 BCF, which is Talisman's fair share.
19. For the 1096.349-acre Cooke Ranch A/B Unit, with a pay thickness of 210 feet, Talisman calculates the Original Gas in Place as 203.02 BCF. Using a recovery factor of 61.8%, the Recoverable Gas initially in place would have been 125.49 BCF. The cumulative production from the wells already drilled and producing on the A/B Unit, the A 1H, A 2H, A 3H, B 2H and B 5H, is 4.26 BCF, leaving remaining recoverable reserves of 121.24 BCF, which is Talisman's fair share.
20. Matrix argued that the most efficient way to recover the remaining reserves under the Cooke Ranch Lease was with wells draining 80 acres spaced more than 500 feet apart. The wells should exhibit boundary dominated flow and show no effects of interference from nearby wells.
21. Talisman drilled wells with 80-acre drainage, 60-acre drainage and 30-acre drainage.
22. Talisman finds that the Hawkville (Eagleford Shale) Field under the Cooke Ranch Lease consists only of the of the Lower Eagleford Shale. The Upper Eagleford Shale at this location is missing due to an unconformity.
 - a. Talisman divides the Lower Eagleford Shale into two separate zones, an upper and a lower.
 - b. The two zones are separated by thin clay layers or a thin layer of shale rock with a high clay content which would cause fracs across that layer to close or "heal" quickly.
 - c. The Lower Eagleford Shale beneath the Cooke Ranch Lease contains two preferred target zones, one an upper 50-foot zone and the other a lower 35 foot zone, with characteristics such as thickness and brittleness that lend themselves to effective fracture stimulation.
 - d. To effectively produce the zones, Talisman will space wells in a staggered pattern 250' apart, with one well in the upper zone and the second well offset 250' in the lower zone, in plan, or overhead view, repeating across the Cooke Ranch. Viewed down the centerline of the horizontal laterals, the pattern can also be described as a "W" pattern. The wells would appear to be 250' apart in plan view, but would actually be 500' apart within their respective upper or lower zones.

- e. A similar staggered pattern has been used on the Washburn Ranch project 7.7 miles to the NE, developed by Pioneer Natural Resources; in DeWitt County by Devon; and in Karnes County by EOG on its Lake Unit and Milton Unit. These projects are in the Hawkville (Eagleford Shale) Field or equivalent Eagleford Fields.
23. Talisman will fracture stimulate the applied-for wells such that their fracture patterns overlap and the wells, at least initially, will be in pressure communication.
 - a. Overlapping fracture stimulation patterns result in more fractured rock than wells drilled far apart that show no interference from nearby wells.
 - b. Talisman will stimulate its wells by zipper fracturing, which allows for time savings in the fracture process and has also been found to increase initial production by 20% to 40% in south Texas.
 - c. Wells with overlapping fracture patterns may show communication and interference initially, but these effects lessen over time as pressures decrease and the conductivity or connectivity decreases.
24. Talisman compared the recoveries on two hypothetical 480-acre tracts based on actual wells already drilled and producing. One hypothetical based on six wells (Well Nos. B 2H, B 5H, D 1H, D 3H, F 1H and F 3H) on 660-foot spacing and 80-acre drainages drilled on the same plane on 480 acres yields an EUR of 23,382 MMCF. The second hypothetical based on three A Pad wells (Well Nos. A 1H, A 2H and A 3H) extrapolated to 15 wells on 500-foot spacing (250 foot spacing in plan view) and 60-acre drainages, or staggered stacked laterals, results in an EUR of 43,800 MMCF. The wells on tighter spacing result in an 87% increase in recoverable reserves
25. The Cooke Ranch C Unit has a narrow panhandle to the south. Well No. C 4H well extends into the C Unit's southerly panhandle, which is only 390 to 400 feet wide. There is no regular location in this panhandle, but the current applied-for location is set back 330' from the common lease line with BHP Billiton on the east, so the well is actually at a legal Statewide Rule 37 location as to BHP Billiton. Talisman is the operator of the D Unit to the west and waives the Statewide Rule 37 protest.
26. The Unit A/B Well No. A 9H is located 86' from the east line of the A/B Unit (Exhibit 34), a Statewide Rule 37 exception location. The bottomhole location is 110' south of the north line, a legal location, and the last take point is 210' south of the north line. Talisman is the operator of the acreage to the north, in the Beaty, Seale & Forwood Survey, A-1076, the Cartwright Lease, and waives objection to the Statewide Rule 37 exception. The acreage to the east, in the H. & G.N. RR. Co. Survey No. 161, A-278 and the H. & G.N. RR. Co. Survey No. 158, A-1079, the Bellows Prospect, is operated by Talisman, which waives objection to the

Statewide Rule 37 exception. Talisman is the operator of all the acreage within 660 feet of the lateral and waives objection to the Statewide Rule 38 exception. BHP Billiton is a non-operator in the Bellows Prospect.

27. It is not possible for Talisman to recover its fair share of the hydrocarbons beneath the Cooke Ranch Lease with wells drilled at regular locations.
28. Talisman's proposed irregular locations are reasonable.

CONCLUSIONS OF LAW

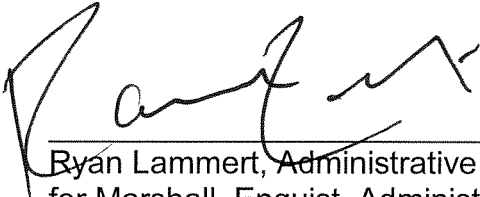
1. Proper notice of hearing was timely given to all persons legally entitled to notice.
2. All things have occurred to give the Commission jurisdiction to decide this matter.
3. Approval of a Rule 37 exception for the proposed location of the Cooke Ranch Lease, Well No. C 4H, Hawkville (Eagleford Shale) Field, La Salle County, Texas, as proposed by Talisman Energy USA Inc. is necessary to prevent confiscation and protect the correlative rights of the leased mineral owners.
4. Approval of a Rule 37 exception for the proposed location of the Cooke Ranch Lease, Well No. A 9H, Hawkville (Eagleford Shale) Field, La Salle County, Texas, as proposed by Talisman Energy USA Inc. is necessary to prevent confiscation and protect the correlative rights of the leased mineral owners.
5. Approval of Rule 38 exceptions for the proposed location of the Cooke Ranch Lease, C Unit, Well Nos. C 4H, C 5H, C 6H, C 7H, C 8H and C 9H, Hawkville (Eagleford Shale) Field, La Salle County, Texas, as proposed by Talisman Energy USA Inc. is necessary to prevent confiscation and protect the correlative rights of the leased mineral owners.
6. Approval of Rule 38 exceptions for the proposed location of the Cooke Ranch Lease, A/B Unit, Well Nos. A 5H, A 6H, A 7H, A 8H and A 9H, Hawkville (Eagleford Shale) Field, La Salle County, Texas, as proposed by Talisman Energy USA Inc. is necessary to prevent confiscation and protect the correlative rights of the leased mineral owners.
7. Talisman Energy USA Inc. has met its burden of proof and satisfied the requirements of Railroad Commission Statewide Rules 37 and 38.

RECOMMENDATION

The Examiners recommend that the application of Talisman Energy USA Inc. for exceptions to Statewide Rule 38 for its Cooke Ranch Lease, C Unit, Well Nos. C 4H, C 5H, C 6H, C 7H, C 8H and C 9H, and its Cooke Ranch Lease, A/B Unit, Well Nos. A 5H,

A 6H, A 7H, A 8H and A 9H, Hawkville (Eagleford Shale) Field, La Salle County, Texas, be approved. The Examiners also recommend that the Statewide Rule 37 exception locations for the Cooke Ranch Lease, C Unit, Well No. C 4H and the Cooke Ranch Lease, A/B Unit, Well No. A 9H, Hawkville (Eagleford Shale) Field, La Salle County, Texas, be approved as necessary to prevent confiscation and protect correlative rights.

Respectfully submitted,



Ryan Lammert, Administrative Law Judge
for Marshall, Enquist, Administrative Law Judge



Karl Caldwell
Technical Examiner