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* KEY ISSUES: Waste                    *
*             Recovery of "attic" oil  *
*             Weak water drive in      *
*             tandem w/pressure        *
*             depletion drive          *
* FINAL ORDER: R37 EXCEPTION DENIED    *
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RULE 37 CASE NO. 0209368

APPLICATION OF VASTAR RESOURCES, INC. FOR A RULE 37 EXCEPTION TO DRILL WELL NO. 27, T. J. LYNE LEASE, TOM LYNE, N. (WILCOX 9350) AND WILDCAT FIELDS, LIVE OAK COUNTY, TEXAS

APPEARANCES:

FOR APPLICANT:	**APPLICANT:**
Brian Sullivan (Attorney) Steve Tomberlin	Vastar Resources, Inc.
FOR PROTESTANT:	**PROTESTANT:**
Philip F. Patman (Attorney) Larry Sohaney David J. Andrews	Duer Wagner & Company

PROPOSAL FOR DECISION

PROCEDURAL HISTORY

APPLICATION FILED:	July 7, 1995
NOTICE OF HEARING:	July 20, 1995
HEARING DATE:	October 9, 1995
TRANSCRIPT RECEIVED:	November 5, 1995
HEARD BY:	Ann Coffin, Hearings Examiner Thomas Richter, Technical Examiner
REVIEWED BY:	Meredith Kawaguchi, Legal Examiner
PFD CIRCULATION DATE:	February 12, 1996
CURRENT STATUS:	Protested

STATEMENT OF THE CASE

Vastar Resources, Inc. ("Vastar" or "applicant") has applied for a Rule 37 exception for Well No. 27, T. J. Lyne Lease, Live Oak County, Texas. The proposed well will be Vastar's seventh gas well on a 2,843 acre tract. The well requires a Rule 37 exception because it is proposed to be placed 173' from Duer Wagner & Company's lease line, whereas the applicable field rules for the Tom Lyne, N. (Wilcox 9350) Field ("subject field") require a minimum distance of 1,320' to a lease line. Duer Wagner & Company ("Duer Wagner" or "protestant") opposes Vastar's Rule 37 application.

Vastar contends that the proposed well is necessary to prevent waste.

DISCUSSION OF THE EVIDENCE

Vastar does not allege confiscation will occur if the requested Rule 37 exception is denied. Vastar's counsel stipulated that if the proposed well is produced, Vastar will obtain more than its fair share of the reservoir. Vastar owns approximately 44% of the gas-in-place in the reservoir and with the proposed well will produce 60% of the total daily field production. Currently Vastar produces about half of the total daily field production.

Applicant's Evidence

The five Vastar wells currently producing yield 10.1 million cubic feet of gas per day. Vastar alleges that a sixth well, the proposed well, is necessary to prevent waste. According to Vastar an area of the reservoir that is structurally higher than any existing completion's height will contain trapped, unrecoverable attic gas as water encroaches and drowns out wells lower on structure. The parties agree that the Tom Lyne N. (Wilcox 9350') Field is a gas depletion reservoir with a weak water drive.

Gas depletion will effectively and efficiently drain the reservoir. However, if wells lower on structure water-out before the reservoir pressure depletes, and there is no upstructure well to capture attic gas in the amount of 563 million cubic feet ("MMCF"), such gas will ultimately be lost.

Vastar's case depends on proof that the proposed location is upstructure of the existing completions. If the proposed location is at the structural crest of the reservoir, Vastar must then establish that the field will water out before it pressure depletes.

A reservoir engineer employed by Vastar sponsored Vastar's geologic interpretation. The highest well on structure is the K. W. Schreiner No. 2 at 8974 subsea. Without well control on which to base another, higher structural contour, the witness relied on a projection updip of the existing contours. He also relied on a seismic line to support the position that the reservoir gains structure as it goes from the Schreiner No. 2 to the proposed location. This seismic line was derived from a 3-D seismic grid generated by Vastar. The top of the subject reservoir in the area of the proposed location was identified on the seismic line by extrapolating from the seismic profile of a

well 3500' from the proposed location. The witness, in conjunction with a Vastar geophysicist, interpreted the seismic reflections on the seismic line to indicate a rise in structure from the highest existing completion, the Schreiner No. 2, to the proposed location. The geophysicist was not present at the hearing.

In regard to whether the field will water out before it pressure depletes, Vastar's proof consisted of water saturations in various wells producing from the reservoir. Vastar's Well No. 12, the discovery well drilled in 1971, had an initial water saturation of 35%. Until 1994 it was the only well in the field and had produced, at the date of hearing, approximately 28 MMCF. The witness established that every well drilled since the discovery well, both updip and downdip, has had a higher water saturation than the discovery well had. This proves that water is moving and is perhaps higher in the reservoir than the parties' depiction of the current gas water contact. (Both parties' representation of the gas water contact agreed closely; both parties testified that the gas water contact will not rise uniformly; it has risen unevenly and unpredictably across structural contour lines.)

Protestant's Evidence

In the protestant's opinion the proposed location will not be higher on structure than existing completions. Also, the protestant believes that the reservoir will be depleted by pressure before any water encroachment occurs.

Protestant's geologist did not endorse placing another structural contour higher than the contour established by well control based solely on a projection of the existing contours. In his opinion, it is good geologic practice to interpret the crest of the field as a plateau without direct, observable evidence that the field continues to gain elevation from the highest known structural point. According to Duer Wagner's interpretation the Rule 37 location is approximately on strike with the K. W. Schreiner No. 2 location.

Duer Wagner's witness testified that one seismic line is not sufficient to ensure an accurate interpretation of the reservoir's rise in the area of the proposed location. Also, in his opinion, there should have been specific velocity data in the area of the proposed location to convert seismic time to depth. The velocity survey Vastar obtained was for a well 3500' from the proposed location in a field where both parties admit there are varying velocities in different areas of the reservoir.

The witness presented an alternative interpretation of the seismic reflectors that indicates the structure flattens rather than rises going from the Schreiner No. 2 to the proposed Rule 37 location.

Duer Wagner's engineer believes the reservoir has basically a pressure depletion drive combined with a very weak water drive; the field's drive mechanism has been altered by increased gas takes from the additional seven wells drilled since 1994. Both parties agreed that as gas withdrawal significantly increases, an already weak water drive becomes less effective. As withdrawals of gas increase, reservoir pressure drops dramatically, unless there is effective pressure

support from a strong water drive. Duer Wagner presented a graph of pressure vs. time using pressures from all wells in the field. The slope of the line indicates a pressure decline rate of 125 psia per month. This rapid pressure decline demonstrates that the water drive has become practically non-existent. Duer Wagner sponsored a P/Z plot to show by the straight line decline that the reservoir is now basically a pressure depletion reservoir. The line would curve if there were any pressure support from water.

By graph and calculation Duer Wagner's witness demonstrated a minimum flow rate of 207 MCF per day necessary to continuously remove water from a wellbore so that the gas will continue to produce. By Nodal analysis of pressure at abandonment, the witness determined that with a 207 MCF minimum flow rate, the bottomhole abandonment pressure will be approximately 370 psia. As precipitously as the reservoir pressure is dropping, the reservoir should be depleted in two to five years.

Finally, the witness calculated the time that will be required to water out the subject reservoir. If the water influx rate continues at historical levels (237,000 barrels per year), it will take 88 years for water to flood the crest of the reservoir. As the wells near depletion and the pressure drops, the water will influx faster. Therefore, the witness calculated a time of 44 years to flood the crest if the water influx rate is doubled. At four times the current influx rate the reservoir will be flooded in 22 years.

EXAMINERS' OPINION

The examiners are of the opinion that Vastar did not prove waste will occur if its application is denied. A preponderance of the evidence indicates that there is no structural high above the existing completions.

Vastar's witness who sponsored the seismic evidence is an engineer. He and a geophysicist with Vastar made a joint interpretation of structure from the seismic data. The geophysicist was not present at the hearing. The witness did not know the interval velocity at the proposed location even though the reflectors indicated a possible velocity change at that location, which the witness agreed would affect depth. The structure map sponsored by Vastar was prepared by the geophysicist, a geologist, and the engineering witness who adjusted the structure map based on well control. The witness was unable to recall or did not know the geophysical explanation for various questions raised by the seismic data. Because of a lack of expertise in the area of geophysics and geology, the witness's testimony was not credible.

Duer Wagner's geologist testified that no seismic interpretation of depth could be reliable without specific velocity data for the area of the proposed location. He did not agree that velocities in a 3500' well could be extrapolated to the proposed location, particularly where there are velocity differences throughout the field area. He did not agree that the existence of a structural high at the proposed location could be based on projection of the existing contours, because fields often flatten

at the top of the structure.

The greater weight of the evidence establishes that there is not a structural high at the proposed location. The existing completions are on strike with the proposed location and can adequately drain the reservoir before water floods the highest structural positions.

Although Vastar raised legitimate questions concerning the accuracy of Duer Wagner's calculations of the number of years before the reservoir waters out, Vastar did not prepare any estimate of the rate of water influx in the past or under current conditions to support its contention that water will sweep the reservoir before it can pressure deplete. This contention is not proved by the fact alone that water saturations are higher in newly drilled wells than in the discovery well. Vastar did not refute the P/Z plot sponsored by Duer Wagner that shows little pressure support from water.

On balance, the examiners do not believe Vastar proved its waste case. We recommend that its application be denied.

FINDINGS OF FACT

1. At least ten days' notice of this hearing was given to the designated operator, all lessees of record for tracts that have no designated operator, and all owners of unleased mineral interests for each tract adjacent to the T. J. Lyne Lease and each tract nearer to the well than the prescribed minimum lease line spacing distance.

2. The application for a Rule 37 exception was filed properly by Vastar Resources, Inc. (the applicant) on Form W-1 (Application to Drill, Deepen, Plug Back or Re-enter).

3. The applicant seeks an exception to Statewide Rule 37 to drill Well No. 27 on the 2,843 acre T. J. Lyne Lease to prevent waste.

4. The applicant proposes to complete the well in the Tim Lyne, N. (Wilcox 9350') and Wildcat Fields. Field rules require the well to be 1320' from the nearest lease line and 467' respectively from the nearest lease line.

5. The proposed well is 173' from the nearest lease line.

6. Offset operator, Duer Wagner & Company, protested the application.

7. The area of the proposed location is no higher on structure in the subject field than are the existing completions.

8. The subject field is a depletion drive reservoir with an extremely weak water drive; existing wells will effectively and efficiently deplete the reservoir.

9. Applicant presented no evidence concerning the Wildcat Field.

CONCLUSIONS OF LAW

1. Proper notice of hearing was timely issued by the Railroad Commission to appropriate persons legally entitled to notice.

2. All things necessary to the Commission attaining jurisdiction over the subject matter and the parties in this hearing have been performed.

3. The requested Rule 37 exception is not necessary to prevent waste.

Respectfully submitted,

Meredith Kawaguchi
Legal Examiner

Thomas Richter, P.E.
Technical Examiner

MFK/ds