

OIL AND GAS DOCKET NO. 7C-0245766

THE APPLICATION OF HGN OPERATING COMPANY, INC. TO AMEND THE FIELD RULES FOR THE VELREX (CANYON SAND) FIELD, SCHLEICHER AND TOM GREEN COUNTIES, TEXAS

Heard by: Donna K. Chandler, Technical Examiner
Mark J. Helmueller, Hearings Examiner

Procedural history:

Application Received:	January 5, 2006
Notice of Hearing:	January 13, 2006
Protest Received:	January 19, 2006
Hearing held:	March 2, 2006
Transcript Issued:	March 17, 2006
PFD Issued:	April 25, 2006

Appearances:

Representing:

Applicant:

David Gross
Dale Miller

HGN Operating Company

Protestant:

Tim George
John Miller
Jeff Sparks

Discovery Operating Company

EXAMINERS' REPORT AND PROPOSAL FOR DECISION

STATEMENT OF THE CASE

Field rules for the Velrex (Canyon) Field are summarized as follows:

1. 990'-1,980' well spacing;
2. 640 acre gas units with optional 320 acre units;

3. Allocation based on 100% acreage (currently suspended).

HGN Operating Company, Inc. ("HGN") requests that the rules be amended as follows:

1. Designation of the field as the correlative interval from 6,549 feet to 6,882 feet as shown on the log of the R. L. Henderson Well No. 2;
2. 467'-1,200' well spacing;
3. 640 acre gas units with optional 40 acre units;
4. Allocation based on 100% acreage (no change).

This application was protested by Discovery Operating, Inc. ("Discovery"). Discovery opposes any changes to the field rules.

DISCUSSION OF THE EVIDENCE

Background

The Velrex (Canyon Sand) Field was discovered in July 1961 upon completion of the R. L. Henderson No. 1 at a depth of approximately 6,500 feet. A total of 18 wells have produced from the field and there are currently 14 producing wells listed on the proration schedule. The field is classified as non-associated and the has AOF status.

Field rules were originally adopted on August 29, 1966. These rules provided for 990'-1,980' well spacing, 640 acre density and 100% acreage allocation. In 1974, the Commission amended the density rule to provide for optional 320 acre units. In 1978, a hearing was held to amend the rules to provide for 160 acre optional density. This application was denied by the Commission. No other changes to the rules have occurred.

HGN Evidence

Most of the wells in the field were drilled in the 1960's and 1970's. The most recent completion was the R. L. Henderson "D" No. 1Y by Discovery in 1997. Discovery has recently drilled a new well in the field which has not been completed.

Wells in this field have varying capabilities, with cumulative production from individual wells ranging from 67 MMCF to 7,400 MMCF of gas. Four of the 18 wells have already produced over 5,000 MMCF of gas. Daily production from the field is currently less than 100 MCFD per well.

In determining drainage areas for wells in the field, HGN used the following reservoir

parameters: 14% average porosity, 30% average water saturation, 25 feet average net pay, and 80% recovery efficiency. The calculations include an original reservoir pressure of 2,728 psi. These are the same reservoir parameters used in the 1974 and 1978 Commission proceedings for this field. Volumetric calculations show that the recoverable gas-in-place beneath 640 acres is approximately 10,900 MMCF and the recoverable gas-in-place beneath 40 acres is approximately 681 MMCF. For the 18 wells which have been carried in the field, drainage areas range from less than 10 acres to 442 acres.¹ Of the 16 remaining wells, seven have calculated drainage areas of less than 80 acres.

By planimentering the estimated limits of the field, HGN believes that the field covers approximately 4,370 acres, and would initially contain approximately 75,000 MMCF of recoverable gas-in-place. Cumulative production from the field to date is about 37,700 MMCF of gas and estimated remaining reserves from the existing wells are about 26,000 MMCF. HGN believes that these calculations demonstrate that there is significant additional gas which will not be recovered by the existing wells.

HGN believes that the subject field has limited sand development in some areas, which results in small drainage areas for some wells. HGN believes this is demonstrated by the pressure data available for the wells in the field. Some wells that initially had near-virgin pressures will have very low ultimate recoveries, while other wells which encountered depleted pressures will ultimately recover several times as much gas as higher pressure wells. HGN believes that this difference in recovery is a result of the presence of sands which are not continuous in all wells. Additional wells are necessary to recover the reserves which will not be recovered by existing wells.

HGN requests that the Velrex (Canyon Sand) Field be designated as the correlative interval from 6,549 feet to 6,882 feet as shown on the log of the R. L. Henderson Well No. 2. This well is an oil well which is classified in the adjacent Velrex (Canyon, Up.) Field. From previous maps submitted to the Commission, the Velrex (Canyon, Up.) oil field and the Velrex (Canyon Sand) gas field are separated by a sand pinch-out. This proposed interval includes several "stray" Canyon sands below the main "Velrex" sand.

Discovery Evidence

Discovery believes that HGN has other available options to develop their acreage, besides amending the field rules. HGN has only three wells carried in the subject field: the R. L. Henderson Nos. 1, 3 and 4. The Nos. 1 and 3 wells are found in Section 59, along with three other HGN wells which are carried in the Cody Bell (Canyon) Field. The Cody Bell (Canyon) Field produces from the same correlative interval as the Velrex (Canyon Sand) Field and field classifications are overlapping in Section 59. The R. L. Henderson

¹One well carried in the field, the Margaret Hallman Heirs No. 1, has produced only 28 MMCF of gas. HGN believes this well, along with the Thomas Oil & Gas, Duff No. 1079G, which has produced 122 MMCF of gas, are not properly classified in the Velrex (Canyon Sand) Field, being more than two miles from any other well and perforated much shallower.

No. 3 is southeast of the three HGN wells carried in the Cody Bell (Canyon) Field, indicating a discrepancy in field classification of wells by HGN. Additionally, Discovery showed that the R. L. Henderson No. 1 is actually perforated in the Henderson Sand about 200 feet shallower than the "Velrex" sand, and not within the proposed designated interval for the Velrex (Canyon Sand) Field. That leaves HGN with only one well actually producing from the Velrex (Canyon Sand) Field. (See Discovery Exh. No. 9, attached).

Discovery recently drilled its R. L. Henderson "A" No. 2 to the Velrex (Canyon Sand) Field. This well encountered only 250 psi bottomhole pressure and will not be completed in the Velrex (Canyon Sand) Field due to this depleted pressure. Based on this depleted pressure and the pressure data available for other wells in the Velrex (Canyon Sand) Field, Discovery believes that the existing wells in the field will efficiently drain the reservoir. The initial reservoir pressure in the field was approximately 2,700 psi. Several wells early in the life of the field had initial pressures of 2,000 psi or greater. Most completions in the 1960's and 1970's were encountering pressures in line with current pressures across the field. A few wells encountered higher than expected initial pressures. However, these wells experienced rapid, significant pressure decline, such that the pressures for all wells properly classified in the Velrex (Canyon Sand) Field now fall on a similar trend. Four examples of the later higher-pressure wells in the Velrex (Canyon Sand) Field are summarized as follows:

- Discovery's R. L. Henderson 'B' No. 1 was completed in 1964 with an initial pressure of 2,220 psi. In only three months, the pressure in the well had decreased by over 600 psi, indicating that the area around this well had been affected by production from the R. L. Henderson Nos. 1 and 2, both almost 4,000 feet away.
- Crown Central Petroleum's R.L. Henderson No. 3 was completed in 1979 with an initial pressure of 1,831 psi. At that time, the other wells in the field has pressures in the range of 1,000 psi. After only 3 years and production of only 199 MMCF of gas, the pressure had depleted to 838 psi, in line with the pressures of the other wells in the field at the time. The nearest well to this well was over 4,000 feet away.
- Discovery's R. L. Henderson 'B' No. 4X was completed in 1982 when the reservoir pressure was 600-800 psi. This well, however, had an initial pressure of 2,437 psi. By 1989, this well's pressure was 650 psi, in line with pressures in other wells in the field at that time.
- Discovery's R. L. Henderson 'D' No. 1Y was completed in 1997 with an initial pressure of 2,435 psi. Field pressure was generally less than 500 psi at that time. Pressure in this well declined to less than 500 psi in less than one year and the well has only produced 71 MMCF of gas.

Discovery believes that the pressure performance of these three wells indicates that the wells encountered reservoir which had already been affected by prior production.

Discovery calculated drainage areas for the 11 wells which it believes are properly classified in the Velrex (Canyon Sand) Field. Of these 11 wells, four have drainage areas

of less than 100 acres. Each of these four wells encountered areas of the reservoir drained by existing wells, as described by the aforementioned pressure data. Discovery's calculated drainage areas for the remaining seven wells in the field range from 222 acres to 706 acres. The seven wells excluded from Discovery's study are as follows:

- a. Two of the wells are far removed from the field area, the Margaret Hallman Heirs No. 1 and the Duff 1079G;
- b. Two are perforated in the Henderson Sand above the Velrex interval, the R. L. Henderson No. 1 and the Eldorado No. 1;
- c. Two are located within the apparent field limits of the Cody Bell (Canyon) Field, the R. L. Henderson No. 3 and the Roach No. 1;
- d. One is completed deeper than the Velrex interval, the Meador No. 1, and has always been mapped across a sand pinchout from the rest of the Velrex (Canyon Sand) Field.

Discovery objects to HGN's proposal to designate the Velrex (Canyon Sand) Field to include "stray" Canyon sands within a 330 foot interval. Discovery believes that waste will occur if this depleted 250 psi main sand is commingled with other stray sand members within HGN's proposed correlative interval, as the stray sands would have much higher pressures and cause crossflow. However, Discovery admits that it has perforated stray sands in a couple of its wells, which may have contributed to higher initial pressures in those wells. Discovery agreed that Rule 10 exceptions would be necessary for its wells perforated outside the main sand.

EXAMINERS' OPINION

The examiners recommend that the field rules for the Velrex (Canyon Sand) Field be amended, but only with the addition of a designated interval for the field and a two factor allocation formula. It is recommended that the field be defined based on the log of the discovery well for the field, the R. L. Henderson No. 1 now operated by Discovery Operating. The interval is from 6,490 feet to 6,870 feet as shown on that log. Both HGN and Discovery have wells which are perforated in stray sands outside the "main" pay of the field. Concurrent production from the sands has apparently not resulted in any production problems and the reserves from the stray sands would be marginal, making separate completions uneconomic. Because this interval consists of several separate productive intervals, statutes require that a two factor allocation formula be adopted for the field. The examiners recommend that allocation be based on 75% acreage and 25% deliverability, to be effective if the allocation formula for the field is ever re-instated.

The examiners agree with Discovery's analysis of the field. HGN's drainage calculations included all 18 wells which were ever classified in the Velrex (Canyon) Field, ignoring the evidence that seven of the wells should not have been properly placed in the Velrex (Canyon) Field. When one only considers the 11 properly classified wells as

identified by Discovery, it is apparent that the wells in the field are in pressure communication. The four wells for which HGN calculated a smaller drainage area were all drilled in depleted portions of the field. The completion of these wells in depleted portions of the field resulted in lower recoveries and correspondingly lower drainage areas. The examiners conclude that Discovery's pressure data is reliable evidence that optional 40 acres units are not required to prevent waste.

In Section 59, HGN has wells classified in two different Canyon fields and one of the wells in the section is perforated more than 200 feet above the proposed correlative interval for the field. HGN could further develop its acreage under the existing field rules for the Cody Bell (Canyon) Field, the field in which three of its wells in Section 59 are carried. Additionally, HGN could establish that it is entitled to a density exception to Statewide Rule 38. The examiners note that there have been no requests for exceptions to the density rule in this field.

FINDINGS OF FACT

1. Notice of this hearing was given to all persons entitled to notice at least ten (10) days prior to the hearing.
2. The Velrex (Canyon Sand) Field was discovered in 1961. In 1966, field rules were adopted for the field which provided for 640 acre density. In 1974, the field rules were amended to provide for optional 320 acre density. There have been no changes to the field rules since 1974.
3. Pressure data indicate that the eleven wells properly classified in the field are in pressure communication and additional wells are not necessary to adequately drain the field.
 - a. Initial reservoir pressure was 2,728 psi.
 - b. Most wells drilled in the early life of the field encountered pressures in line with the declining field pressure.
 - c. Some wells encountered higher than expected initial pressures, but the pressures in these wells depleted rapidly such that the wells now have pressures on trend with the fieldwide reservoir pressures.
 - d. Discovery's recently drilled R. L. Henderson "A" No. 2 encountered a depleted 250 psi bottomhole pressure.
4. Calculated drainage areas for the 11 wells properly classified in the Velrex (Canyon Sand) Field indicate that the current rule providing for 640/optional 320 acre density is appropriate for the field.
 - a. Four of the eleven wells have calculated drainage areas of less than

100 acres, but all four wells encountered depleted portions of the reservoir.

- b. The remaining seven wells have calculated drainage areas ranging from 222 acres to 706 acres.
5. Designation of the Velrex (Canyon Sand) Field as the correlative interval from 6,490 feet to 6,870 feet as shown on the log of the Discovery Operating Co. - R. L. Henderson Well No. 1 is necessary to maximize recovery from various marginal Canyon sands within the correlative interval. This interval does not include the Henderson Sand.
6. Allocation based on 75% acreage and 25% deliverability is a reasonable allocation formula which will meet statutory requirements, should the allocation formula in the field ever be re-instated.

CONCLUSIONS OF LAW

1. Proper notice was given to all parties entitled to notice as required by all applicable rules and applicable statutory and regulatory provisions.
2. All things necessary to give the Commission jurisdiction to decide this matter have been performed or have occurred.
3. Designation of a correlative interval for the Velrex (Canyon Sand) Field is necessary to prevent waste.
4. Amending the spacing and density rule for the Velrex (Canyon Sand) Field is not necessary to prevent waste or protect correlative rights.

EXAMINERS' RECOMMENDATION

Based on the above findings and conclusions, the examiners recommend that the field rules for the Velrex (Canyon Sand) Field be amended to include a designated interval for the field and a two-factor allocation formula. The examiners recommend denial of HGN's application to amend the spacing and density rules for the field.

Respectfully submitted,

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