

March 29, 2007

OIL AND GAS DOCKET NO. 7B-0250119

THE APPLICATION OF THE CHESAPEAKE OPERATING, INC. TO INJECT FLUID INTO A RESERVOIR PRODUCTIVE OF OIL OR GAS, CLOUD (STRAWNSAND) UNIT WELLS NO. 309; 401; 212 AND 210, HERRIN (BURSON SAND, UPPER) FIELD, HASKELL COUNTY, TEXAS

HEARD BY: Thomas H. Richter, P.E., Technical Examiner
Marshall Enquist, Hearings Examiner

APPLICANT:

Glenn Johnson, Attorney
Everett Bradley
Terry Frohnepfel
Bill G. Spencer

REPRESENTING:

Chesapeake Operating, Inc.

PORTESTANTS;

Don Rhodes

Rodney C. Brown
Ray Herren
Robert W. Herren

Ray Herren, Robert W. Herren, Paul Brown,
Rodney Brown, George Brown, Fred Brown
Brown Brothers Property - Herren Interest
Self
Self

PROCEDURAL HISTORY

Date of Application:	January 4, 2007
Date of Notice:	February 9, 2007
Date of Hearing:	February 27, 2007
Date of Transcript:	March 5, 2007
Date PFD Issued:	April 2, 2007

EXAMINERS' REPORT AND PROPOSAL FOR DECISION
STATEMENT OF THE CASE

This is the application of Chesapeake Operating, Inc. ("Chesapeake") to convert four existing wells into water injection wells on its Cloud (Strawn Sand) Unit, a secondary water flood program, in the Herrin (Burson Sand, Upper) Field. The application is opposed by the collective Protestants because they were not included in the unit and believe they will not recover their share of the reserves outside the unit.

DISCUSSION OF THE EVIDENCE

APPLICANT'S EVIDENCE

The Herrin (Burson Sand, Upper) Field was discovered in 1960 at 4,855' subsurface depth. The field is governed by Statewide Rules. Chesapeake Operating is the only operator in the field.

The Cross Timbers Operating Company, Cloud (Strawn Sand) Unit now operated by Chesapeake), secondary recovery project and entity for density authority was approved by the Commission by Order 7B-0208030 effective May 16, 1995. Currently there is only one water injection well. The conversion of the proposed four wells will result in the recovery of additional reserves through the effective waterflood process.

The Cloud (Strawn Sand) Unit is composed of five tracts. At the time of unitization, there was only one water injection well. Prior to the waterflood, the estimated ultimate recovery for primary reserves was 410,500 BO. With implementation of the waterflood in 1995, the cumulative production is now 889,000 BO and the estimated ultimate recovery is 951,000 BO. The secondary waterflood recovery project has been successful and an additional 540,000 BO have been recovered above the estimated primary recovery. Currently, the only active injection well is Well No. 501. The well is no longer capable of injecting more water than the total fluid withdrawal from the producing wells in the reservoir. It is necessary that the injection-to-withdrawal volume ratio be greater than 1:1 for pressure maintenance. Additionally, the No. 501 well is located in the extreme southern end of the unit and does not provide for an effective waterflood sweep pattern. It is proposed that three active producing wells (Wells No. 210; 212 and 309) and one inactive well (Well No. 401)¹ be converted to water injection. Proposed injection Well No. 401 on Tract No. 4 is adjacent and offsets the Protestants tract. Implementation of the proposed sweep pattern realignment will result in an estimated ultimate recovery of 1,154,000 BO for a total of 743,800 BO over primary recovery (203,400 BO additional over the current estimated secondary recovery).

The four proposed injection wells were drilled between 1983 and 1998. The wells all have sufficient surface casing (8-5/8") cemented in such a manner to protect usable quality water. The interval from the land surface to a depth of 100' must be protected (TCEQ letter dated October 4, 2006). All longstring casing (5-1/2") has been set and cemented in such a manner to insure that the injected fluids will be contained to the proposed zone of injection. Injection shall be through (2-3/8") tubing set on a packer at $\pm 4,750'$ with the tubing extending to $\pm 4,800'$. The injection interval varies with each well but the overall interval will be from 4,844' to 4,867' subsurface depth. The maximum proposed injection volume is 2,000 BWPD per well (for Well No. 210 the maximum injection volume is 1,500 BWPD) with an average of 700 BWPD per well and a maximum injection pressure of 2,000 psig. The make-up water will be produced water from wells on the Cloud (Strawn Sand) Unit and other wells producing from deeper Strawn members.

All other unit wells have been properly completed in a manner which will protect usable quality water. All offset wells within 1/4 mile of each injection well have been properly completed or plugged in a manner which will protect usable quality water. There is several hundred feet of shale above the Strawn Formation. The waterflood project has been in operation for over 11 years and over 1.45 million barrels of water have been safely injected into the Strawn Formation.

Chesapeake points out that on the Protestants tract, there have been four wells drilled that

¹ Well No. 401 was authorized for conversion to injection pursuant to Finding of Fact No. 15, Oil & Gas Docket No. 7B-0208030, as the well represented the last producing well on Tract 4 and 1105 of the royalty interest owners agreed.

penetrated the Strawn Formation of which three of the wells are immediately adjacent to the Cloud (Strawn Sand) Unit and all were plugged as dry holes. The Burson Sand, Upper is a member of the Strawn interval. Cross Timers was granted unitization and secondary recovery approval in 1995 and did not include any portion of the Protestants tract. The wells that were drilled along the western edge of the Protestant's tract adjacent to the unit were present when the unit was formed. Cross Timbers's evidence concluded that there is no reservoir quality/quantities that should have been included in the unit from the Protestant's tract. Chesapeake has found no evidence to contradict that fact. Therefore, if there is no usable reservoir under the Protestants tract, no drainage will result to the tract.

Chesapeake Operating, Inc. does have a current approved Form P-5 and maintains a \$310,000 bond for financial assurance as required by the Commission.²

Chesapeake asserts that notice of the application and of this hearing was given to all persons required to be given notice by the provisions of Statewide Rule 46. Notice of the application was published in the *Haskell Free Press*, a newspaper of general circulation in Haskell County, on October 12, 2006. Notice of the application was filed with the Haskell County Clerk on October 17, 2006.

Protestant's Evidence

The Protestants argue that Chesapeake admits that it has not investigated the logs of the wells that were drilled on protestant's tract. Therefore, Chesapeake can not definitively state that there is no Upper Burson Sand reservoir that extends beyond the unit line. Injection into Wells 201 and 401 will move reserves from the Protestant's tract. Chesapeake had a lease on the Protestant's tract which expired in 2005.

Protestant's believe that insufficient notice was given. The Commission has the latitude to determine another class of affected party status [Statewide Rule 46(c)(3)]. Ray Herren contacted a Commission employee and in a phone conversation was advised Herren would have party status as an offset mineral interest/surface owner. Herren believes this in effect establishes another class for party status.

Further, Protestants assert the newspaper notice stated *oil and gas waste* will be injected which means the application is filed as a "disposal" process and not a "waterflood" process. In addition, the notice states "...fluid waste will be injected...". Samson rebuts that the published notice clearly states "Fluid Injection Into A Productive Formation." Chesapeake asserts the suggested publication wording by the Commission is a guideline to provide sufficient information to the general public of a proposed injection application.

Protestant's assert that notice of this application was not provide to Lewis Farmer who has

² Per Commission Records of P-5 Financial Assurance as of July 7, 2006.

a well within ½ mile of proposed injection Well No. 401. Chesapeake asserts that notice of the application was provide to Lewis Farmer by mail as stated on its application.

EXAMINERS' OPINION

The examiners recommend that the application be approved. Alignment of injection wells and additional injection on the Cloud (Strawn Sand) Unit is necessary for reservoir pressure maintenance and to provide for an efficient and effective waterflood sweep pattern to maximize the ultimate recovery of secondary reserves from the field. Implementation of the proposed sweep pattern realignment and increased water injection will result in an estimated recovery of an additional 203,400 BO over the current estimated ultimate recovery. The proposed injection wells are completed in a manner which will protect useable quality water resources. There are no improperly completed or plugged wells within the areas of review which could provide a conduit for migration of injected fluids out of the approved zone.

Protestants argue that at least a portion of its tract should be included in the unit is without merit. Consideration of being included in the unit is not timely. The unit and the waterflood secondary recovery program were authorized and have been in progress since 1995. Oil & Gas Docket No. 7B-0208030, effective May 16, 1995, states in Finding of Fact No. 19 ... *“The owners of interest in the oil and gas under each tract of land within the area reasonably defined by development and capable of inclusion in a contiguous unit have been given the opportunity to enter the unit on the same yardstick basis as owners of interest in oil and gas under the other tracts of the unit.”* Finding of Fact No. 31 provides ... *“The unit contains only the acreage reasonably necessary to accomplish the proposed secondary recovery operations.”* It is not the applicant’s burden to re-evaluate and re-substantiate the existing unit’s limits. Indeed, unit agreements typically provide for unit size enlargements or reductions subsequent to approval. However, Chesapeake asserts that it has seen no evidence that any portion of the Protestants tract should be or should have been included in the Cloud (Strawn Sand) Unit. Protestant’s argument that Chesapeake should have reviewed the electric logs of the plugged wells on its tract to prove there is no contributing Upper Burson Sand reservoir is in error. In light of the previous approval of the unit, it is the Protestants burden of proof to provide substantiating evidence that the western portion of its tract is productive/contributing to the Upper Burson Sand reservoir underlying the Cloud (Strawn Sand) Unit. The Protestants did not submit any geological/engineering data in support of its position.

NOTICE ISSUES

Protestants believe that Hayden Farmer, an a operator within ½ mile of proposed injection Well No. 401 did not receive proper notice of the application. First, a protestant can not complain of notice failure on behalf of another party. Secondly, the Certificate of Notice submitted by Chesapeake certifies that notice of the subject application was served on Hayden Farmer.

Protestants complain of the lack of or misleading notice of application and/or hearing.

Chesapeake complied with the notice provisions of Statewide Rule 46 (the provision are identical to Statewide Rule 9) which provides for the following:

c) *Notice and opportunity for hearing.*

(1) *The applicant shall give notice by mailing or delivering a copy of the application to affected persons who include the owner of record of the surface tract on which the well is located; each commission-designated operator of any well located within one half mile of the proposed injection well; the county clerk of the county in which the well is located; and the city clerk or other appropriate city official of any city where the well is located within the corporate limits of the city, on or before the date the application is mailed to or filed with the commission. For the purposes of this section, the term "of record" means recorded in the real property or probate records of the county in which the property is located.*

(3) *If, in connection with a particular application, the commission or its delegate determines that another class of persons should receive notice of the application, the commission or its delegate may require the applicant to mail or deliver a copy of the application to members of that class. Such classes of persons could include adjacent surface owners or underground water conservation districts.*

(4) *In order to give notice to other local governments, interested, or affected persons, notice of the application shall be published (emphasis added) once by the applicant in a newspaper of general circulation for the county where the well will be located in a form approved by the commission or its delegate. The applicant shall file with the commission in Austin proof of publication prior to the hearing or administrative approval.*

(5) *Protested applications:*

(A) *If a protest from an affected person or local government is made to the commission within 15 days of receipt of the application or of publication, whichever is later, or if the commission or its delegate determines that a hearing is in the public interest, then a hearing will be held on the application after the commission provides notice of hearing to all affected persons, local governments, or other persons, who express an interest, **in writing** (emphasis added), in the application.*

Ray Herren and Robert Herren submitted written protests and thus were granted party status and were placed on the Certificate of Notice for the Rescheduled Hearing Dated February 9, 2007. All other parties either appeared in person or through a representative.³

FINDINGS OF FACT

1. Notice of this hearing was given to all persons required to be given notice by the provisions of Statewide Rule 46. Notice of the application was published in the *Haskell Free Press*, a newspaper of general circulation in Haskell County, on October 12, 2006. Notice of the

³ Don Rhodes & Associates, Inc. letter dated February 22, 2007, received February 23, 2007.

application was filed with the Haskell County Clerk on October 17, 2006.

2. The Herrin (Burson Sand, Upper) Field was discovered in 1960 at 4,855' subsurface depth.
3. The Cross Timbers Operating Company (now Chesapeake Operating, Inc.), Cloud (Strawn Sand) Unit, secondary recovery project and entity for density authority was approved by the Commission by Order 7B-0208030 effective May 16, 1995.
 - a. Currently there is only one water injection well.
 - b. Prior to the waterflood, the estimated ultimate recovery for primary reserves was 410,500 BO.
 - c. Implementation of the waterflood in 1995 has resulted in cumulative production of 889,000 BO and the estimated ultimate recovery is 951,000 BO.
 - d. The secondary waterflood recovery project has been successful and an additional 540,000 BO have been recovered above the estimated primary recovery.
4. The conversion of the proposed four wells will result in the recovery of additional reserves through the effective secondary waterflood process.
 - a. Implementation of the proposed sweep pattern realignment will result in an estimated ultimate recovery of 1,154,000 BO for a total of 743,800 BO over primary recovery (203,400 BO additional over the current estimated recovery).
 - b. The injection-to-withdrawal volume ratio must be greater than 1:1 for reservoir pressure maintenance.
 - c. The current injection Well No. 501 well is located in the extreme southern end of the unit, does not provide an injection volume ratio greater than 1:1 and does not provide for an effective waterflood sweep pattern.
5. All unit wells have been properly completed in a manner which will protect usable quality water. All offset wells within 1/4 mile of each injection well have been properly completed or plugged in a manner which will protect usable quality water.
6. The four proposed injection wells (Unit Wells No. 210; 212; 309; and 401) were drilled between 1983 and 1998. The wells all have sufficient surface casing (8-5/8") cemented in such a manner to protect usable quality water.
 - a. All longstring casing (5-1/2") has been set and cemented in such a manner to insure that the injected fluids will be contained to the proposed zone of injection.

- b. Injection shall be through (2-3/8") tubing set on a packer at $\pm 4,750'$ with the tubing extending to $\pm 4,800'$.
 - c. The injection interval varies with each well but the overall interval will be from 4,844' to 4,867' subsurface depth.
 - d. The maximum proposed injection volume is 2,000 BWPD per well, except for Well No. 210, and a maximum injection pressure of 2,000 psig. Well No. 210 will have a maximum injection volume of 1500 BWPD.
 - e. The make-up water will be produced water from wells on the Cloud (Strawn Sand) Unit and other wells producing from deeper Strawn members.
 - f. The interval from the land surface to a depth of 100' must be protected (TCEQ letter dated October 4, 2006).
 - g. There are several hundred feet of shale above the Strawn Formation.
7. Waterflood injection for secondary recovery purposes will not impair the correlative rights of the Protestants' s Tract.
- a. Four wells were drilled on the Protestants tract that penetrated the Strawn Formation (3 wells along the western edge of the Protestant's tract adjacent to the Cloud (Strawn Sand) Unit), were present when the unit was formed and plugged as dry holes.
 - b. The Burson Sand, Upper is a member of the Strawn interval.
 - c. Cross Timbers was granted unitization and secondary recovery approval in 1995 and did not include any portion of the Protestants tract as there is no reservoir quality/quantities that should have been included in the unit.
 - d. No geological or engineering evidence was submitted to contradict the limits of the Cloud (Strawn Sand) Unit boundary.
8. The proposed injection is in the public interest because it will maximize oil recovery from the Herrin (Burson Sand, Upper) Field without endangering useable quality water.
9. Chesapeake Operating, Inc. does have a current approved Form P-5 and maintains a \$310,000 bond for financial assurance as required by the Commission.

CONCLUSIONS OF LAW

1. Proper notice was timely given to all parties entitled to notice pursuant to applicable statutes

and rules.

2. All things have occurred and have been accomplished to give the Commission jurisdiction in this case.
3. The use of the proposed disposal well will not endanger oil, gas, or geothermal resources or cause the pollution of surface water or fresh water strata.
4. The applicant has complied with the requirements for approval set forth in Statewide Rule 46 and the provisions of Sec. 27.051 of the Texas Water Code.
5. The use of the proposed injection wells are in the public interest pursuant to Sec 27.051 of the Texas Water Code.

EXAMINERS' RECOMMENDATION

Based on the above findings and conclusions, the examiners recommend that the application of Chesapeake Operating, Inc. to inject water for secondary recovery purposes into Unit Wells No. 210; 212; 309 and 401 on the Cloud (Strawn Sand) Unit in the Herrin (Burson Sand, Upper) Field be approved subject to conditions as set out in the attached Final Order.

Respectfully submitted,

Thomas H. Richter, P.E.
Technical Hearings Examiner
Office of General Counsel

Marshall Enquist
Hearings Examiner
Office of General Counsel