

OIL AND GAS DOCKET NO. 06-0260999

THE APPLICATION OF SULPHUR RIVER EXPLORATION INC. TO INJECT FLUID INTO A RESERVOIR PRODUCTIVE OF OIL AND GAS, BRYAN, J.W. "A" LEASE WELL NO. 2, LATHAM "B" LEASE WELL NO.1 AND ALLSUP, V.B. LEASE, WELL NO.1, BRYANS MILL (RODESSA CONS.) FIELD, CASS COUNTY, TEXAS

Heard By: Andres J. Trevino, Technical Examiner
James M. Doherty, Hearings Examiner

Appearances:

Representing:

Richard P. Marshall, Jr.
Greg Vujovich

Sulphur River Exploration, Inc.

Darrell Frost

Himself

Procedural History of Case:

Application Filed:	February 13, 2009
Request for Hearing:	January 6, 2009
Notice of Hearing:	February 25, 2009
Hearing Held:	March 17, 2009
Proposal for Decision Issued:	May 11, 2010

EXAMINERS' REPORT AND PROPOSAL FOR DECISION

STATEMENT OF THE CASE

Sulphur River Exploration, Inc. ("Sulphur River") requests authority to amend an existing injection permit by seeking to expand the injection interval in the J.W. Bryan "A" Lease Well No. 2 and to add injection authority for two additional wells into the same productive reservoir in it's Latham "B" Lease Well No. 1 and the V.B. Allsup Lease Well No. 1 in the Bryans Mill (Rodessa Cons.) Field, pursuant to Statewide Rule 46.

This application is protested by Darrell Frost, a mineral interest owner of a tract on which one of the proposed injection wells is located.

DISCUSSION OF THE EVIDENCE

Applicant's Evidence

Sulphur River wishes to dispose of existing produced saltwater and waterflood the Bryans Mill (Rodessa Cons.) Field to recover additional oil reserves. Sulphur River estimates between 80,000 to 120,000 barrels of additional oil of will be recovered from this nearly

depleted consolidated field. The Bryans Mill (Rodessa B), (Rodessa U) and the (Rodessa V) Fields were consolidated into the Bryans Mill (Rodessa Cons.) Field in 2008. Commingling of the fields will lower the economic limit of each well and extend the life of the field. The Bryans Mill fields were discovered in 1974. The Bryans Mill (Rodessa B) Field is found at a depth of 6,150 feet and has produced 730,128 BO. The Bryans Mill (Rodessa U) Field is found at a depth of 6,245 feet and has produced 837,369 BO. The Bryans Mill (Rodessa V) Field is found at a depth of 6,300 feet and has produced 303,764 BO. Two of the three fields were individually unitized and waterflooded by Shell until 1991. The Bryans Mill (Rodessa U) Field was waterflooded from 1980 till 1986 with a cumulative injection of 1,200 MBW. The Bryans Mill (Rodessa B) Field was waterflooded from 1985 till 1990 with a cumulative injection of 2,300 MBW. The Bryans Mill (Rodessa V) Field was not waterflooded as the sand is thin and of limited areal extent. The unitization agreements terminated in 1993. Sulphur River took over operations at the field in 1998. Sulphur River feels the costs associated to formally unitize this field are not justified as the field has been waterflooded in the past and the field is in final stages of development. Sulphur River will inject below the oil water contact of each sand in order to increase reservoir pressure and produce more fluids while maintaining the same water-oil ratios.

The V.B. Allsup No. 1 has a total depth of 10,645 feet. The well was originally completed in the Bryans Mill (Smackover) Field as a gas well. The well has 4,029 feet of 9 $\frac{5}{8}$ " surface casing cemented to surface, 10,470 feet of 7" casing and a 3 $\frac{1}{2}$ " liner set at 10,645 feet. The top of cement behind the 7" casing is calculated at approximately 8,987 feet. Sulphur River will require block squeezes above and below the injection interval with sufficient cement to provide at least 400 to 600 feet of cement coverage behind the casing. Additionally, Sulphur River will be required to set a bridge plug and twenty feet of cement at 6,500 feet. The Texas Commission on Environmental Quality recommends that usable-quality ground water be protected to 600 feet. (See attached wellbore diagram "A").

The proposed injection in the V.B. Allsup No. 1 will be through tubing with a packer set at 6,100 feet. The proposed injection interval is between 6,180 feet and 6,370 feet. The maximum rate of injection requested is 2,000 barrels of salt water per day. The maximum requested injection pressure is 2,100 psi.

The Latham "B" Lease Well No. 1 has a total depth of 10,400 feet. The well was originally completed in the Bryans Mill (Smackover) Field as a gas well. The well has 2,044 feet of 9 $\frac{3}{8}$ " surface casing cemented to surface and 10,400 feet of 5 $\frac{1}{2}$ " casing. The top of cement behind the 5 $\frac{1}{2}$ " casing is estimated at approximately 8,775 feet per cement bond log. In 1987, 650 sacks of cement were squeezed at a depth of 6,212 feet. Additionally, a bridge plug was set at 6,500 feet. The Texas Commission on Environmental Quality recommends that usable-quality ground water be protected to 575 feet. (See attached wellbore diagram "B").

The proposed injection in the Latham "B" Lease Well No. 1 will be through tubing with a packer set at 6,100 feet. The proposed injection interval is between 6,160 feet and 6,350 feet. The maximum rate of injection requested is 2,000 barrels of salt water per day. The

maximum requested injection pressure is 2,100 psi.

The J.W. Bryan "A" Lease Well No. 2 has a total depth of 6,374 feet. The well has 567 feet of 8 5/8" surface casing cemented to surface and 6,374 feet of 5 1/2" casing. The top of cement behind the 5 1/2" casing is calculated at approximately 4,549 feet. In 1985, 52 sacks of cement were squeezed at 6,237-42 feet to squeeze off old perforations. The Texas Commission on Environmental Quality recommends that usable-quality ground water be protected to 550 feet. (See attached wellbore diagram "C").

The proposed injection in the J.W. Bryan "A" Well No. 2 will be through tubing with a packer set at 6,109 feet. The proposed injection interval is between 6,140 feet and 6,330 feet. The maximum rate of injection requested is 2,000 barrels of salt water per day. The maximum requested injection pressure is 2,100 psi.

The water to be injected is produced salt water from Sulphur River's leases and salt water from its Paluxy water supply well producing water from the Paluxy aquifer. Sulphur River's leases are composed of five tracts. Three of the tracts have one injection well and at least one producing well on each tract. The two other tracts have one shut in well each and no producing wells. The leases currently produce 10-15 BOPD and 300 barrels of saltwater per day. Sulphur River is attempting to restore and increase production in the Bryans Mill (Rodessa Cons.) Field. Sulphur River believes that the proposed injection will increase the reservoir pressure which was originally 3,000 psi and has been recently measured at 400 psi. The resulting waterflood and commingling of the reservoir will result in the recovery of 80,000 to 120,000 BO which would not otherwise be recovered under primary methods.

There are eight wellbores within a 1/4 mile radius of the J.W. Bryan "A" Lease Well No. 2, Latham -B- Lease Well No. 1 and the V.B. Allsup Lease Well No. 1, seven of which penetrate the proposed injection interval. All wells are either shut in or producing wells operated by Sulphur River. These wellbores are cased in a manner which will not provide a conduit for migration of injected water from the injection interval into other oil, gas or mineral bearing formations or useable quality water zones.

Protestant's Evidence

Darrell Frost owns the mineral interests on two tracts within the field to be waterflooded. Mr. Frost is concerned the waterflood project will move oil off his properties in which he has a mineral interest on to adjacent properties in which he does not have a mineral interest. He feels the adjacent mineral interest owners will unfairly benefit from his oil moved off his mineral interest properties. Mr. Frost has leased all his mineral interests in this field to Sulphur River.

EXAMINERS' OPINION

The examiners recommend that the applications be approved. The proposed injection wells are or will be completed in a manner which will protect useable quality water resources

and will confine the injected fluids to the injection interval. Use of the wells for injection will result in the recovery of approximately 120,000 BO as the reservoir is re-pressured.

The examiners do not believe that significant quantities of oil on the Latham B Tract will be pushed off Mr. Frost's Tract. Mr Frost's Latham "B" No. 2 well has been watered out in the past in both the Rodessa U and B reservoirs. Production and waterflood activities in the Rodessa U between 1980 and 1986 caused the Latham "B" No. 2 to water out in the Rodessa U in 1984. The Latham "B" No. 2 has produced 149,000 BO from the Rodessa U between 1974 thru 1991. The Rodessa B was waterflooded from 1985 until 1991. The Latham "B" No. 2 produced 30,000 BO from the Rodessa "B" thru 1993 until it was watered out in 1993. With the Latham "B" No. 2 well's primary oil production having been produced and swept by waterflooding both the Rodessa "U and "B", it is unlikely significant quantities of moveable oil is remaining. It is more likely that the Latham "B" No. 2 well will benefit from the proposed injection as Sulphur River will place the Latham "B" No. 1 injection well down dip from Mr. Frost's Latham "B" No. 2 well. This location will allow the Latham "B" No. 2 to recover any oil that will be pushed towards it from the proposed injector. Producing the Latham "B" No. 2 will create a "pressure sink" further reducing the quantity of oil from moving off Mr. Frost's tract. Further, all of Mr. Frost's mineral interest is leased to Sulphur River and any dispute regarding the manner in which the leased minerals are developed, so long as waste is not an issue, is a contractual dispute over which the Commission lacks jurisdiction.

Surface casings are set below the current base of usable quality water. The surface casings are cemented to the surface, however the V.B. Allsup No. 1 will require block squeezes above and below the injection interval and will be require to set a bridge plug and twenty feet of cement at 6,500 feet to convert the V.B. Allsup No. 1 into an injection well.

Approval of the permit is in the public interest given it is in the public interest to produce existing oil reserves in the area. So long as this can be done without harm to water resources. Increased production will extend the economic life of the wells. Extending the economic life of the wells will allow the wells to produce more hydrocarbons. The evidence indicates that the operation of the subject injection well will not adversely impact any surface or subsurface useable quality water.

FINDINGS OF FACT

1. Notice of this application and hearing was provided to all persons entitled to notice at least ten (10) days prior to the date of the hearing.
2. Notice of this application was published in *The Citizens Journal*, a newspaper of general circulation in Cass County, on October 5, 2008.
3. The Bryans Mill fields were discovered in 1974. The Bryans Mill (Rodessa B) Field is found at a depth of 6,150 feet and has produced 730,128 BO. The Bryans Mill (Rodessa U) Field is found at a depth of 6,245 feet and has

produced 837,369 BO. The Bryans Mill (Rodessa V) Field is found at a depth of 6,300 feet and has produced 303,764 BO.

4. Two of the three fields were unitized and waterflooded by Shell until 1991. The Bryans Mill (Rodessa U) Field was waterflooded from 1980 till 1986 with a cumulative injection of 1,200 MBW. The Bryans Mill (Rodessa B) Field was waterflooded from 1985 till 1990 with a cumulative injection of 2,300 MBW. The Bryans Mill (Rodessa V) Field was not waterflooded. The unitization agreements terminated in 1993.
5. The J.W. Bryan "A" Lease is assigned an existing Fluid Injection Project No. F-10204. Leases V.B. Allsup and Latham "B" will require new Fluid Injection Project designations.
6. Sulphur River took over operations at the field in 1998. Sulphur River believes it is uneconomic to formally unitize the Bryans Mill (Rodessa Cons.) Field as it is in late stages of depletion.
7. The Bryans Mill (Rodessa B), (Rodessa U) and the (Rodessa V) Fields were consolidated into the Bryans Mill (Rodessa Cons.) Field in 2008. Commingling of the fields will lower the economic limit of each well and extend the life of the field.
8. Injection into the J.W. Bryan "A" Lease Well No. 2, Latham "B" Lease Well No. 1 and the V.B. Allsup Lease Well No. 1 will allow Sulphur River to re-pressurize this depletion drive reservoir for secondary recovery. The injection will occur below the oil water contact of each individual zone. The expected additional recovery is approximately 120,000 BO.
9. There are eight wellbores within a ¼ mile radius of the J.W. Bryan "A" Lease Well No. 2, Latham "B" Lease Well No. 1 and the V.B. Allsup Lease Well No. 1. These wellbores are cased in a manner which will not provide a conduit for migration of injected water from the injection interval into other oil, gas or mineral bearing formations or useable quality water zones.
10. The proposed injection into the V.B. Allsup No. 1 will not endanger useable quality water.
 - a. The Texas Commission on Environmental Quality recommends protection of useable quality water resources to a depth of 600 feet.
 - b. The well has 4,029 feet of 9 5/8" surface casing cemented to surface and 10,470 feet of 7" casing. The top of cement behind the 7" casing is at approximately 8,987 feet, with a 3 1/2" liner set at a depth of 10,645 feet.

- c. Injected fluids will be confined to the injection interval between 6,180 feet and 6,370 feet.
 - d. The proposed permit will require block squeezes above and below the injection interval and the setting of a bridge plug and twenty feet of cement at 6,500 feet.
- 11. The proposed injection into the Latham "B" No. 1 will not endanger useable quality water.
 - a. The Texas Commission on Environmental Quality recommends protection of useable quality water resources to a depth of 575 feet.
 - b. The well has 2,044 feet of 9 3/8" surface casing cemented to surface and 10,400 feet of 5 1/2" casing. The top of cement behind the 5 1/2" casing is at approximately 8,775 feet per cement bond log. In 1987 650 sacks of cement were squeezed at 6,212 feet and a bridge plug was set at 6,500 feet.
 - c. Injected fluids will be confined to the injection interval between 6,160 feet and 6,350 feet.
- 12. The proposed injection into the J.W. Bryan "A" No. 2 will not endanger useable quality water.
 - a. The Texas Commission on Environmental Quality recommends protection of useable quality water resources to a depth of 550 feet.
 - b. The well has 567 feet of 8 5/8" surface casing cemented to surface and 6,374 feet of 5 1/2" casing. The top of cement behind the 5 1/2" casing is at approximately 4,549 feet.
 - c. Injected fluids will be confined to the injection interval between 6,140 feet and 6,330 feet.
- 13. The Commission's docket database does show current and past enforcement dockets against Sulphur River Exploration, Inc. related to other leases.
- 14. The proposed injection is in the public interest because it will result in the recovery of additional oil from the Bryans Mill (Rodessa Cons.) Field without endangering water resources or any oil, gas or other mineral formation and will extend the life of the producing wells operated by Sulphur River, thereby preventing the waste of oil.

CONCLUSIONS OF LAW

1. Proper notice was issued in accordance with the applicable statutory and regulatory requirements.
2. All things have occurred to give the Railroad Commission jurisdiction to consider this matter.
3. Sulphur River Exploration, Inc. has met its burden of proof and satisfied the requirements of Chapter 27 of the Texas Water Code and the Railroad Commission's Statewide Rule 46.
4. Approval of the application will not harm useable quality water resources, will not present a hazard to other mineral bearing formations, and will result in the recovery of additional secondary reserves from the Bryans Mill (Rodessa Cons.) Field.

EXAMINERS' RECOMMENDATION

Based on the above findings and conclusions, the examiners recommend that the application of Sulphur River Exploration, Inc. for authority to inject salt water into its J.W. Bryan "A" Lease Well No. 2, Latham "B" Lease Well No. 1 and the V.B. Allsup Lease Well No. 1 be approved as set out in the attached Final Orders.

Respectfully submitted,

Andres J. Trevino, P.E.
Technical Examiner

James M. Doherty
Hearings Examiner