OIL AND GAS DOCKET NO. 06-0255290

THE APPLICATION OF HARLETON OIL & GAS, INC. FOR A COMMERCIAL PERMIT TO INJECT FLUID INTO A RESERVOIR PRODUCTIVE OF OIL OR GAS, GOLDEN SWD WELL NO. 1, OAK HILL (PETTIT) FIELD, RUSK COUNTY, TEXAS

HEARD BY: Andres J. Trevino, Technical Examiner
James M. Doherty, Hearings Examiner

PFD PREPARED BY: Donna K. Chandler, Technical Examiner
James M. Doherty, Hearings Examiner

APPEARANCES:

Applicant:	**Representing:**
George Neale Greg Cloud Bruce Wooldridge Chad Sims	Harleton Oil & Gas, Inc.
Protestant:	
Mickey Olmstead Paul Tough James Clark	Samson Lone Star, LLC

EXAMINERS' REPORT AND PROPOSAL FOR DECISION

PROCEDURAL HISTORY

Application Filed:	November 30, 2007
Protest Received:	December 17, 2007
Request for Hearing:	January 7, 2008
Notice of Hearing:	February 6, 2008
Date of Hearing:	April 14, 29, 2008
Transcript Received:	May 12, 2008
Proposal For Decision Issued:	February 6, 2009

STATEMENT OF THE CASE

Harleton Oil & Gas, Inc. ("Harleton") requests authority pursuant to Statewide Rule 46 to operate Well No. 1 on its Golden Lease in the Oak Hill (Pettit) Field, Rusk County, as a commercial disposal well. This application is protested by Samson Lone Star, LLC, an offsetting operator within ¼ mile of the proposed well.

DISCUSSION OF THE EVIDENCE

Applicant's Evidence

The subject well has not been drilled. It is proposed to be drilled to a total depth of approximately 8,000 feet. Harleton proposes to set 800 feet of 13⅝" surface casing cemented to surface. The Texas Commission on Environmental Quality recommends that usable-quality ground water be protected to a depth of 750 feet. Harleton plans to set 8,000 feet of 7" casing, cemented with 1,685 sacks of cement. The calculated top of cement behind the 7" casing is 5,400 feet. After the well is drilled, Harleton plans to run a cement bond log to verify top of cement behind the 7" casing. (See attached wellbore diagram for proposed wellbore configuration.)

The proposed injection/disposal interval includes the Rodessa and Pettit formations between 6,000 and 7,000 feet. The Rodessa is nonproductive in the area. The nearest active Pettit production is approximately 1.5 miles to the north and there was previously a Pettit waterflood to the south of the proposed well. The Rodessa perforations are proposed from 6,070-6,150 feet and the Pettit perforations are proposed from 6,680-7,000 feet. These depths are estimated based on the log of the Golden Gas Unit No. 7, which is the closest well which penetrated the Rodessa and Pettit. The Golden Gas Unit No. 7 is approximately 600 feet southeast of the proposed disposal well. A cross-section demonstrates that both reservoirs correlate from well to well and are laterally extensive.

Injection would be through 4½" tubing set on a packer at approximately 5,950 feet. The proposed maximum injection volume is 15,000 BWPD and the proposed maximum injection pressure is 3,000 psig.

The Rodessa/Pettit interval has been used for disposal by other operators in the area. The two nearest disposal wells are the Carthage Unit 4 Well No. 1 (Carthage 4-1) and the Tatum SWD No. 1. The Carthage 4-1, about 1.3 miles to the north, is operated by Sabine Valley Pipeline LLC. This well was permitted for Pettit disposal in 1992 and Rodessa injection authority was added in 1993.[1] The well is permitted for disposal of 3,000 BWPD with a maximum surface injection pressure of 3,000 psig. This well is not a commercial disposal well. The Tatum SWD No. 1 is located slightly more than 2 miles to the southeast of the proposed disposal well. This well was permitted in 1991 for commercial disposal into the Rodessa/Pettit interval, with a maximum disposal volume of

[1]Evidence presented by Samson indicates that there has been no injection into the well since 2006.

12,000 BWPD with 3,000 psig maximum surface injection pressure. This well was plugged in 1996. There are some active Rodessa/Pettit disposal wells in the area but further removed than 2 miles.

There are two wellbores within a ¼ mile radius of the proposed injection well. Both are gas wells producing from the Oak Hill (Cotton Valley) Field. One well is operated by Samson and the other is the previously discussed Golden Gas Unit No. 7 operated by BP America Production Company. The Samson well, the Turlington No. 6, is about 1,000 feet northeast of the proposed disposal well. Both wells produce from approximately 10,000 feet and have cement across the Rodessa/Pettit behind the production casing.

The site for the proposed commercial disposal facility would be located on a 4.67 acre tract with access off County Road 2192, less than ¼ mile off State Hwy. 149. There would be an entrance approximately 300 feet wide to provide easy, safe access of trucks into the facility. A topographic map and photos of the area around the intersection of Hwy. 149 and County Road 2192 indicate that the area is relatively flat and both Hwy. 149 and County Road 2192 are very straight. Harleton believes the location is very appropriate regarding traffic/safety issues.

Harleton presented evidence and testimony from the regional manager of Basic Energy Services. Basic operates approximately 100 trucks in the four county area around the proposed disposal well (Rusk, Gregg, Harrison and Panola Counties). Basic also operates 15 commercial disposal wells in the East Texas area, eight of which are in the four county area. However, none of Basic's disposal wells in the four county area are "public" commercial wells which take water from other salt water haulers. There are a total of 73 commercial disposal wells in the four county area, only six of which accept water from public haulers.

1. The nearest commercial disposal facility in the area is the Longview SWD No. 1 operated Katy Saltwater Disposal Co. This facility is approximately 7 miles northwest of Harleton's proposed well, also off Hwy. 149. Basic uses this facility daily and has experienced long wait times.
2. The Katy SWD No. 3D operated by Katy Saltwater Disposal Co. is about 20 miles from of the proposed disposal well. Very recently, Basic hauled water to the facility and was turned away due to capacity (holding tanks were full).
3. The Jones Disposal 999 No. 1 is 23 miles away and has gone back into operation recently after a prior operator of the well went bankrupt. This well is located down several county roads and access is not easy, but there is some capacity available.
4. The Davis SWD No. 4 is 34 miles away and has available capacity.
5. The Deadwood SWD No. 1 is 39 miles away and there is frequently a long wait for unloading.
6. The Panola Salty No. 1 is 24 miles away. Basic hauls water to this facility daily and often experiences long wait times to unload.

Basic's own disposal facilities are also operating at near capacity. Increased drilling activity in the area, including Cotton Valley completions which often have significant flow-back frac-water, results in the need for additional disposal capacity. It would be more economic for producers if salt water were hauled shorter distances for disposal, including to the proposed well. Harleton had recently completed two wells in the area and had to haul flow-back water from the wells to facilities over 50 miles away due to lack of closer disposal facilities.

There are three operators within ½ mile of the proposed disposal well: Samson, BP and Anadarko E & P Company LP. All three operators were given notice of the application. The proposed well is located on a 22.03 acre tract owned by Jane Clements. Harleton has a lease with Ms. Clements for surface use of the 4.67 acres on which the facilities will be located. Ms. Clements and all offsetting surface owners were given notice of the application. In addition, a copy of the application was provided to the Rusk County Clerk on November 30, 2007. Notice of the subject application was published in the *Kilgore News Herald*, a newspaper of general circulation in Rusk County, on November 6, 2007.

Commission records indicate that Harleton has a current P-5 with the Commission. Harleton has financial assurance in the amount of $50,000.

Protestant's Evidence

Samson operates about 300 wells in the Oak Hill (Cotton Valley) Field. Their leasehold covers over 20,000 acres and is largely to the west and south of the proposed disposal well. Samson believes that the Rodessa/Pettit interval is overpressured in the area. Further, Samson believes that injected fluids will not be confined to the injection interval because many wells in the area do not have cement behind production casing across the Rodessa/Pettit interval.

Samson operates the Turlington Gas Unit immediately to the north of the proposed well. The Carthage 4-1 disposal well, which is the nearest well to the proposed well which has had injection into the Rodessa and Pettit, is located just to the north of the Turlington Gas Unit. As previously discussed, this disposal well was put into operation in March 1993, with disposal into the Pettit. After an amended permit was issued, Rodessa perforations were added in November 1993. Injection operations were ceased in April 2006 after cumulative injection of 4.4 million BW.

There are 17 wells within a 3,000 foot radius of the Carthage 4-1 well, 15 of which are active producing Cotton Valley wells. Ten of these wells were drilled prior to injection into the Carthage 4-1 and none of these wells have intermediate casing. Some of these older wells have cement behind the production casing across the Rodessa/Pettit and others do not. Several of the more recent wells, which were drilled after disposal began into the Carthage 4-1, have intermediate casing set through the Rodessa and/or Pettit. None of the more recent wells have uncemented pipe across the Rodessa/Pettit.

One of the wells within the 3,000 foot radius of the Carthage 4-1 is Samson's Turlington No. 4. (See Attachment A, excerpt from Samson Exh. 2). This well was drilled in March 2002 approximately 3,000 feet north of the Carthage 4-1. After setting production casing to approximately 10,500 feet, a cement bond log was run indicating the top of cement was at 7,628 feet. This is below the Pettit formation. In April 2002, salt water began to flow from the ground very near the wellhead of the Turlington No. 4. A temperature survey was run in the Turlington No. 4 which indicated that the source of the water was the Rodessa at approximately 6,130 feet, flowing behind the uncemented production casing of the well. Samson squeeze-cemented the well to eliminate the flow from the Rodessa. Samson believes this salt water flow was a direct result of overpressuring of the Rodessa by injection in the Carthage 4-1. Samson also noted that the Turlington No. 4 was drilled with 12.1 pound per gallon (ppg) mud, which should have prevented any flow from a normally pressured zone. Samson believes this incident is indicative of what could happen to other producing wells which have uncemented casing across the Rodessa/Pettit within 3,000 feet of a disposal well.

Samson cited several other examples of overpressuring in the area.

1. The Tatum SWD No. 2 is approximately 2 miles to the southeast of Harleton's proposed disposal well. This disposal well was active from 1993 to 2003 and cumulative injection was about 4.5 million BW. Injection was into the Pettit, Rodessa, and, beginning in 2002, into the shallower Duck Creek. Samson drilled the Robert Beall No. 4 and No. 6 wells in 2001. (See Attachment B, excerpt from Samson Exh. 2). Both used up to 12 ppg mud drilling through the Rodessa and Pettit, after which intermediate casing was set and mud weights were reduced back down to about 10 ppg. These increased mud weights and setting of intermediate casing were necessary to prevent flow from overpressured intervals. Samson attributes the overpressuring of the Rodessa/Pettit to the injection into the Tatum SWD No. 2, which was the closest disposal well at the time.

2. In January 2007, Samson attempted to complete its Overton Gas Unit No. 5 in the Pettit. (See Attachment B). The Pettit was found to be overpressured with a gradient of 0.68 psi/foot. Normal gradient is 0.45 psi/foot. Samson believes the Pettit was overpressured due to injection into the Thornton No. 1 approximately 8,000 feet to the east. The Thornton No. 1 is the nearest well which had injection into the Pettit.[2]

3. Samson drilled its Overton Gas Unit No. 7 to the Cotton Valley in 2001. (See Attachment B). This wellbore is also about 8,000 feet away from the Thornton

[2] Key Energy drilled the Thornton No. 1 in June 1990 and disposed of water into the Pettit and Travis Peak until 2003 when Rodessa perforations were added. The well was plugged in 2007 after cumulative injection of over 6 million BW.

No. 1 disposal well. Samson set intermediate casing in this well below the base of the Pettit due to overpressuring in the Rodessa and Pettit.

4. Samson's Overton Gas Unit No.4 had produced from the Cotton Valley since 1982. In 2007, the production casing in the well failed at 6,934 feet, which is the Pettit/Travis Peak interval into which the Thornton No.1 injected. The two wells are about one mile apart. The Overton Gas Unit No. 4 is no longer producible from the Cotton Valley. Samson estimates that 668 MMCF of gas will not be recovered from the Cotton Valley as a result of the failed casing.

Samson permitted two disposal wells in 2000 in an area about 4-5 miles southwest of Harleton's proposed disposal well. The Overton Gas Unit No. 1 disposal well was used for injection into the shallower Ft. Worth formation at about 3,350 feet until July 2005. Cumulative injection into the well was 2.6 million BW and the well was plugged in February 2006. The Longhorn Gas Unit No. 1 disposal well injected approximately 1 million BW into the Rodessa between September 2000 and November 2002. This well has been plugged back. Samson discontinued use of these two disposal wells because it believed that further injection into the wells would endanger Samson's Cotton Valley wells by further overpressuring of zones behind uncemented casing. Samson drilled two new disposal wells in an area to the north and west, an area which does not appear to be overpressured in the Rodessa and/or Pettit. The Hylyn Brooke SWD No. 1 was drilled in 2003 and is injecting into the Pettit, with cumulative injection of 2.8 million BW through October 2007. The Griffin Merrit SWD No. 1 was drilled in April 2005 and has injected almost 1 million BW into the Pettit through October 2007.

As previously discussed, there are 17 wells within 3,000 feet of the Carthage 4-1 disposal well, several of which do not have intermediate casing across the Rodessa/Pettit. Similarly, Samson has identified 13 wells within 3,000 feet of the proposed Harleton disposal well. Ten of the wells are active Cotton Valley producers. One of the Cotton Valley wells, the Turlington No. 1 operated by Samson, does not have cement behind the production casing across the Rodessa/Pettit interval and is about 3,000 feet from the proposed well. Samson believes that injection by Harleton into the Rodessa and Pettit may result in flow of salt water to the surface similar to that in the Turlington No. 4. Samson also suggests that shallower plugged dry holes in the area, such as the K. B. Martin No. 1, could provide a conduit for injected fluids from the overpressured zone to migrate to other wells and possibly to the surface.

Samson has six producing Cotton Valley wells on its Turlington Unit north of the proposed disposal well. Samson estimates that remaining reserves for these wells are 2.7 BCF of gas. These reserves could be at risk if the injection application is approved. Assuming injection is at a rate of 10,000 BWPD, injected water will leave the confines of the 4.67 acre tract in about 3 days because the nearest lease line is only 82 feet away. Under the same assumption, the injected water would reach the Turlington lease 300 feet away in 41 days.

EXAMINERS' OPINION

The examiners recommend that the application be denied. Harleton proposes a wellbore completion which would accomplish confinement of injected fluids to the injection interval in that wellbore. The two wells within ¼ mile of the proposed well are cased and cemented across the Rodessa/Pettit interval which would not allow migration of fluids out of the injection interval. However, in this case, there is evidence that both the Rodessa and Pettit intervals are overpressured in the area and prior injection into the intervals has affected wells at distances much further than ¼ mile away.

The Carthage Gas Unit 4 Well No. 1 disposal well is located about 7,000 feet north of the proposed disposal well. This disposal well was put into operation in March 1993, with disposal into the Pettit. Rodessa perforations were added in November 1993. Injection operations were ceased in April 2006 after cumulative injection of 4.4 million BW. Samson's Turlington Well No. 4 was drilled in 2002 and is located approximately 3,000 feet south of the Carthage 4-1. (See Attachment A). The examiners agree with Samson that the salt water flow which occurred at the Turlington No. 4 was a result of injection into the Rodessa in the Carthage 4-1 well. As further evidence that the Rodessa is over-pressured, drilling information for the Turlington No. 4 indicates that the well was drilled through the Rodessa and Pettit with 12.1 ppg mud. For a normally pressured zone, mud weights of 9-9.5 ppg would have been sufficient. Because this salt water flow occurred at a distance of 3,000 feet from the disposal well, the examiners believe it is appropriate to analyze wells further away from the proposed disposal well than ¼ mile. The evidence indicates that there is at least one well within 3,000 feet, the Turlington No. 1, which does not have cemented pipe across the Rodessa/Pettit interval. A similar salt water flow could occur as a result of the proposed injection.

The examiners also believe that the Pettit is over-pressured as a result of injection in the area. The Tatum SWD No. 2 is approximately 2 miles to the southeast of Harleton's proposed disposal well. This disposal well was active from 1993 to 2003 and cumulative injection was about 4.5 million BW. Injection was into the Pettit, Rodessa, and, beginning in 2002, into the shallower Duck Creek. Both the Beall No. 4 and No. 6 encountered overpressured Rodessa/Pettit during drilling of the two wells in 2001. (See Attachment B).

Another disposal well, the Thornton No. 1, was drilled in June 1990 and disposed of water into the Pettit and Travis Peak until 2003 when Rodessa perforations were added. The well was plugged in 2007 after cumulative injection of over 6 million BW. The Thornton well is about 2½ miles away from the proposed disposal well. The evidence indicates that several wells, some up to 8,000 feet from these disposal wells, had to increase mud weights to drill through the Rodessa and Pettit, indicating over-pressuring of the zones. Specifically, in January 2007, Samson attempted to complete its Overton Gas Unit No. 5 in the Pettit and the well flowed salt water; shut-in tubing pressure in the well was 1,475 psi. The pressure gradient in the Pettit was determined to be 0.68 psi/foot, compared to a normal gradient of 0.45 psi/foot. The Thornton No. 1 is approximately 8,000 feet to the east of the Overton Gas Unit No. 5 but it is the nearest well which had injection into the Pettit. In another well, Samson's Overton Gas Unit No.4, the well had produced from the Cotton

Valley since 1982. In 2007, the production casing in the well failed at 6,934 feet, which is the approximately depth of the Pettit interval into which the Thornton No.1 had injected. The two wells are about one mile apart.

The examiners do not believe that Harleton has demonstrated that injected fluids will be confined to the Rodessa/Pettit interval due to the existing overpressuring of the Rodessa/Pettit. There are numerous Cotton Valley producing wells in the area which do not have cemented casing across the proposed disposal interval. These wells may provide a conduit for migration of injected salt water out of the disposal interval, possibly even to the surface.

FINDINGS OF FACT

1. Notice of this application was given to all persons entitled to notice pursuant to Statewide Rule 46. Notice of the application was published in the *Kilgore News Herald*, a newspaper of general circulation in Rusk County, on November 6, 2007.

2. Harleton Oil & Gas, Inc. requests authority to operate a commercial disposal well in Rusk County with injection into the Rodessa and Pettit formations between 6,000 and 7,000 feet. The Rodessa is nonproductive in the area. The nearest active Pettit production is approximately 1.5 miles to the north.

3. Harleton Oil & Gas, Inc. did not establish that the proposed injection will be confined to the injection interval.

   a. Both the Rodessa and Pettit intervals proposed for injection are overpressured in the area and prior injection into the intervals has affected wells at distances much farther than ¼ mile away.

   b. The Carthage Gas Unit 4 Well No. 1 disposal well is located about 7,000 feet north of the proposed disposal well. Approximately 4.4 million barrels of water (“BW”) were injected into the Rodessa and Pettit between 1993 and April 2006.

   c. The Turlington No. 4 was drilled by Samson in 2002 approximately 3,000 feet south of the Carthage 4-1 disposal well. The Turlington No. 4 did not have cement behind production casing across the Rodessa and flowed salt water to the surface in April 2002. The source of the salt water was the Rodessa, as verified by a temperature survey.

   d. The Robert Beall No. 4 and No. 6 wells were drilled by Samson in 2001 and both encountered overpressuring in the Rodessa and Pettit during drilling. The nearest disposal well was the Tatum SWD to the south of the two wells. This disposal well was active from 1993 to 2003 and cumulative injection was about 4.5 million BW.

e. In January 2007, Samson attempted to complete its Overton Gas Unit No. 5 in the Pettit. The well flowed salt water with a shut-in tubing pressure of 1,475 psi, equal to a pressure gradient of 0.68 psi/foot. The Thornton No. 1 is approximately 8,000 feet to the east of the Overton Gas Unit No. 5 but it is the nearest well which had injection into the Pettit. Thornton No. 1 disposed of over 6 million BW into the Pettit and Rodessa between 1990 and 2003.

f. Samson's Overton Gas Unit No.4 had produced from the Cotton Valley since 1982. In 2007, the production casing in the well failed at 6,934 feet, which is the approximate depth of the Pettit interval into which the Thornton No.1 had injected about one mile away from the Overton Gas Unit No. 4.

g. During the drilling of several other wells in the area, mud weights had to be increased to drill through the Rodessa and Pettit, indicating over-pressuring of the zones.

h. There are numerous Cotton Valley producing wells in the area which do not have cemented casing across the proposed disposal interval, one within 3,000 feet of the proposed disposal well.

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. Harleton Oil & Gas, Inc. has not 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.

EXAMINERS' RECOMMENDATION

Based on the above findings and conclusions, the examiners recommend that the application be denied.

Respectfully submitted,

Donna K. Chandler
Technical Examiner

James M. Doherty
Hearings Examiner