

**THE APPLICATION OF PENN VIRGINIA OIL & GAS, L.P. TO INJECT FLUID INTO A RESERVOIR PRODUCTIVE OF OIL OR GAS, TJT LEASE WELL NO. 4, CARTHAGE, NORTH (COTTON VALLEY) FIELD, HARRISON COUNTY, TEXAS**

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**HEARD BY:** Donna K. Chandler, Technical Examiner  
James M. Doherty, Hearings Examiner

**APPEARANCES:**

Tim George  
Jim Clark  
Jerry Anderson

George Neale  
Rick Johnston  
David Simpson  
Lane King

**REPRESENTING:**

Penn Virginia Oil & Gas, L.P.

Avinger Timber, LLC

**EXAMINERS' REPORT AND PROPOSAL FOR DECISION**

**PROCEDURAL HISTORY**

Application Filed:	March 13, 2008
Protest Received:	April 2, 2008
Request for Hearing:	May 29, 2008
Notice of Hearing:	July 23, 2008
Date of Hearing:	October 16, 2008
Transcript Received:	November 10, 2008
Proposal For Decision Issued:	November 19, 2008

**STATEMENT OF THE CASE**

Penn Virginia Oil & Gas, L.P. ("Penn Virginia") requests authority pursuant to Statewide Rule 46 to inject salt water into the Rodessa formation in its TJT Lease Well No. 4 in Harrison County.

This application is protested by Avinger Timber, LLC ("Avinger"). Avinger is the surface owner of the tract on which the well is located.

## DISCUSSION OF THE EVIDENCE

### Applicant's Evidence

Penn Virginia proposes to use the TJT Well No. 4 to dispose of salt water produced from wells on its approximately 6,300 acre leasehold. This leasehold includes both the Railroad Commission designated TJT lease and the McKenzie lease.

The subject well was drilled in September 2006 to a total depth of approximately 10,080 feet. The well was tested in the Cotton Valley and found to be non-productive. The well has 2,690 feet of 8<sup>5</sup>/<sub>8</sub>" surface casing cemented from the casing shoe to the ground surface. The well has 10,077 feet of 4<sup>1</sup>/<sub>2</sub>" casing, with top of cement at 4,875 feet as verified by a cement bond log. The Texas Commission on Environmental Quality recommends that useable-quality ground water be protected to a depth of 450 feet, which is the base of the Wilcox. (See attached wellbore diagram).

The proposed disposal interval is the Rodessa Limestone between 5,626 and 5,782 feet. The proposed injection will be through 2<sup>7</sup>/<sub>8</sub>" tubing set on a packer at 5,526 feet. The proposed maximum injection volume is 5,000 BWPD, with an estimated average of 2,500 BWPD. The proposed maximum injection pressure is 2,810 psig. Penn Virginia plans to set a cast iron bridge plug at approximately 5,800 feet to isolate the injection interval from the open hole section below.

There are no wellbores within a ¼ mile radius of the proposed disposal well. There are two wellbores within a ½ mile radius of the proposed disposal well. Both wells are plugged dry holes drilled to depths less than 4,000 feet and therefore did not penetrate the Rodessa. These wells could not provide a conduit for escape of injected fluids from the injection interval. Additionally, the log of the No. 4 well indicates the presence of several hundred feet of shale between the proposed disposal interval and the base of useable quality water in this area.

The Rodessa interval is continuous across several miles in this area and the resistivity log of the subject well indicates it to be wet in the No. 4 well. However, the porosity appears to be sufficient to make the reservoir a good candidate for disposal of fluids. NFR Energy, LLC operates the Pilot No. 3, which was permitted for injection into the Rodessa in 2003. This well is approximately 3½ miles to the northwest of the TJT No. 4 and takes water without surface injection pressure. The nearest production from the Rodessa is approximately 2½ miles to the northwest in the Woodlawn (Rodessa) Field. .

Penn Virginia is currently hauling its produced salt water (approximately 500 BWPD) from 5 producing wells on its lease to a commercial facility, at a cost of \$280,000 per year. Use of the proposed well will significantly decrease these disposal costs, resulting in additional recovery from the producing wells. Penn Virginia is drilling approximately 3 wells per year and ultimately expects to have 12 producing wells for which water disposal will be necessary. All water would be piped from the producing wells to a central facility at the No. 4 well for disposal.

Notice of the subject application was published in *The Marshall News Messenger*, a newspaper of general circulation in Harrison County, on February 10, 2008. A copy of the application was filed on March 12, 2008 with the Harrison County Clerk's Office. Also on March 12, 2008, a copy of the application was sent to the surface owner. There are no offsetting operators within ½ mile of the well.

Penn Virginia has an active P-5 on file with the Commission, with \$250,000 financial assurance. There are no pending enforcement actions against Penn Virginia Oil & Gas, L.C.

### **Protestant's Evidence**

Avinger Timber, LLC owns the surface rights of the acreage on which the No. 4 well is located. Avinger purchased the surface rights in 2002 and uses the surface for timber harvest. It is Avinger's position that use of the proposed injection well will have adverse affects on use of the land for timber operations and recreational use of the property.

Avinger also requests that if the application is approved, the injection volume be limited to less than 5,000 BWPD because the current water production is only 500 BWPD. Avinger also requests that Penn Virginia be required to plug the T. J. Taylor "A" No. 1, discussed below, and that Penn Virginia be required to set a cast iron bridge plug at 5,800 feet in the TJT No. 4, should the permit be approved.

The T. J. Taylor "A" No. 1 well was drilled in 1964 by Tenneco Oil Company to a total depth of approximately 6,500 feet. This well is located approximately 3 miles to the southwest of the TJT No. 4 well. The well was plugged by Tenneco as a dry hole and Commission records indicate several plugs in the well, the shallowest at 4,968 feet. Avinger asserts that the well was not properly plugged, as it was a source of saltwater flow to the surface in 2004. This flow killed some vegetation in an area of approximately ½ acre around the well. The well has not yet been plugged and is on the Commission's list to be plugged with state funds. There has been no additional flow of saltwater from the well, but Avinger is concerned that injection into the No. 4 well may initiate another flow of saltwater from the T. J. Taylor "A" No. 1.

Another concern for Avinger is a well approximately 2 miles north of the TJT No. 4. This well was apparently drilled in 1935 to a depth of approximately 5,900 feet and was a dry hole. There are indications that it was converted to a water well for livestock use, but there are no records as to how the well was recompleted. If this well experienced a saltwater flow to the surface, it could flow into nearby Haggerty Creek.

Avinger believes that the location of the well is unsuitable for injection given its close proximity to Karnack Creek and Haggerty Creek. The No. 4 well is approximately 2,000 feet from the intersection of Karnack Creek and Haggerty Creek. Haggerty Creek then flows northward into Big Cypress Creek and into Caddo Lake.

Avinger does not believe that Penn Virginia has conducted their surface oil and gas operations on the lease in a prudent manner. Erosion, a gas pipeline leak in July 2008, and a flow line leak in June 2007 have resulted in damage to the surface. These damages have been remediated and Avinger has pending litigation with Penn Virginia regarding the surface use of the property.

### **EXAMINERS' OPINION**

The examiners recommend approval of the application, with a condition that a cast iron bridge plug be set at approximately 5,800 feet, with 20 feet of cement on top. The well should be permitted by Form W-1 for plug back to the Woodlawn (Rodessa) Field, which is the closest field with production from the Rodessa. With this plug back operation, the TJT No. 4 will be completed in a manner which will protect useable quality water resources and confine disposal fluids to the Rodessa interval. There is sufficient surface casing cemented to surface to protect useable quality water and there are no wellbores within a ½ mile which could provide a conduit for migration of injected fluids out of the injection interval and into useable quality water. Additionally, there are hundreds of feet of shale between the base of useable quality water and the top of the injection interval. There is also sufficient cement (at least 600 feet) behind the long string above the injection interval to confine injected fluids to the Rodessa.

Approval of the requested permit is in the public interest. It will provide Penn Virginia with an economical means of disposing of its produced water from its wells on the lease, thereby extending the life of the producing wells, and maximizing ultimate recovery.

The surface issues raised by protestant are in litigation. No violations of Commission rules have been observed. The well which experienced a salt water flow several years ago is about three miles from the proposed injection well and was never operated by Penn Virginia. The other well which Avinger expressed concern about is about two miles from the proposed injection well. Commission rules require review of wells within ¼ mile of any injection well. In this case, Penn Virginia extended the review area to ½ mile and neither of the two wells within the ½ mile area are drilled deep enough to penetrate the Rodessa. The examiners see no reason to consider the status of wells far outside the area of review.

### **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.
  - a. Notice of the application was published in the *Marshall News Messenger*, a newspaper of general circulation in Harrison County, on February 10, 2008.
  - b. A copy of the application was filed on March 12, 2008 with the Harrison County Clerk's Office.

- c. On March 12, 2008, a copy of the application was sent to the surface owner of the tract on which the well is located.
  2. The TJT Well No. 4 is cased and cemented in a manner to protect useable quality water.
    - a. The subject well was drilled in September 2006 to a total depth of approximately 10,080 feet.
    - b. The well has 2,690 feet of 8<sup>5</sup>/<sub>8</sub>" surface casing cemented from the casing shoe to the ground surface.
    - c. The well has 10,077 feet of 4<sup>1</sup>/<sub>2</sub>" casing, with top of cement at 4,875 feet, based on a cement bond log.
    - d. The Texas Commission on Environmental Quality recommends that useable-quality ground water be protected to a depth of 450 feet, which is through the base of the Wilcox.
    - e. There are several hundred feet of shale intervals between the proposed injection interval and the base of useable quality water in this area.
  3. Fluids injected into the TJT No. 4 will be confined to the injection interval.
    - a. The proposed disposal interval is the non-productive Rodessa between 5,626 and 5,782 feet.
    - b. The proposed injection will be through 2<sup>7</sup>/<sub>8</sub>" tubing set on a packer at 5,526 feet.
    - c. There are no wellbores within ½ mile of the subject well which penetrate the injection interval.
    - d. A cast iron bridge plug with 20 feet of cement must be set at 5,800 feet prior to injection into the Rodessa.
  4. Use of the TJT No. 4 to dispose of produced water from Penn Virginia's wells on its leasehold is in the public interest to provide an economical means of disposal and extend the life of the producing wells operated by Penn Virginia, thereby preventing the waste of oil.
  5. Penn Virginia Oil & Gas, L.P. has an active P-5 on file with the Commission, with \$250,000 financial assurance.

6. There are no current violations of Commission rules on the TJT lease and there are no pending enforcement actions.

**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. The use or installation of the proposed injection well is in the public interest as it will extend the life of producing wells and prevent the waste of oil.
4. The use or installation of the proposed injection well will not endanger or injure any oil, gas, or other mineral formation.
5. With proper safeguards, as provided by terms and conditions in the attached final order which are incorporated herein by reference, both ground and surface fresh water can be adequately protected from pollution.
6. Penn Virginia Oil & Gas, L.P. has made a satisfactory showing of financial responsibility to the extent required by Section 27.073 of the Texas Water Code.
7. Penn Virginia Oil & Gas, L.P. has met its burden of proof and satisfied the requirements of Chapter 27.051 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 approved as set out in the attached Final Order.

Respectfully submitted,

Donna K. Chandler  
Technical Examiner

James M. Doherty  
Hearings Examiner