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HEARINGS SECTION

RAILROAD COMMISSION OF TEXAS

OFFICE OF GENERAL COUNSEL

OIL AND GAS DOCKET NO. 08-0257097

THE APPLICATION OF ENTERPRISE PRODUCTS OPERATING LLC FOR AUTHORITY PURSUANT TO RULE 9 AND RULE 36 TO DISPOSE OF OIL AND GAS WASTE CONTAINING HYDROGEN SULFIDE INTO ITS REESE CLEVELAND GAS UNIT WELL NO. 1, WAHA (CHERRY CANYON H₂S-DISP) FIELD, REEVES COUNTY, TEXAS

Heard by: Donna K. Chandler on November 23, 2009

Appearances:

Representing:

Tim George
Robert Price
James Clark

Enterprise Products Operating LLC

John Hicks

Pitts Energy Co.

EXAMINER'S REPORT AND PROPOSAL FOR DECISION

STATEMENT OF THE CASE

Enterprise Products Operating LLC ("Enterprise") is seeking authority to inject acid gas in its currently permitted disposal well, the Reese Cleveland Gas Unit Well No. 1, in the Waha (Cherry Canyon-H₂S Disp) Field. This field was approved in 2006 and there is currently one acid gas disposal well carried in the field, the Waha Plant No. 1 operated by Regency Field Services LLC.

Statewide Rule 36(c)(10)(A) requires that a public hearing be held before the injection of fluid containing hydrogen sulfide ("H₂S" or "sour gas"), when "injection fluid is a gaseous mixture...where the 100 ppm radius of exposure is in excess of 50 feet and includes any part of a public area except a public road; or, if the 500 ppm radius of exposure is in excess of 50 feet and includes any part of a public road; or, if the 100 ppm radius of exposure is 3,000 feet or greater." In this case, the 100 ppm radius of exposure ("ROE") is greater than 3,000 feet and includes one residence.

The Commission's Field Operations section has approved the contingency plan which incorporates the injection well. The Commission's Technical Permitting staff had no objection to approval of the Rule 9 authority.

This application had originally been protested by Pitts Energy Co. However, Pitts withdrew its protest prior to the hearing. The examiner recommends approval of the Rule 36 and Rule 9 authority.

DISCUSSION OF THE EVIDENCE

Enterprise operates the Waha treatment plant 3.2 miles northwest of Cayanosa, Texas in Reeves County. This plant removes CO₂ and H₂S from produced gas from the low pressure Gomez gathering system and the high pressure Monahans gathering system. Approximately 100 MMCFD of 20,000 ppm H₂S gas from 285 wells is delivered to the plant from the high pressure system and about 40 MMCFD of 100 ppm H₂S gas is delivered to the plant from the low pressure system.

Currently, the waste gas from the plant is incinerated, as it has been for many years. However, under 2003 legislation, incineration of the waste gas from the plant is no longer an option due to the amounts of sulfur dioxide and CO₂ being released into the atmosphere. Enterprise therefore plans to compress the acid gas and inject it into the non-productive Cherry Canyon formation in the Reese Cleveland Gas Unit No. 1. Besides injection, the only other option would be to construct a sulfur recovery plant. However, this option would not address the CO₂ issues.

The Reese Cleveland Gas Unit Well No. 1 was permitted for disposal of Waha plant effluent water in 1983. The approved disposal interval is the non-productive Cherry Canyon from 6,190 feet to 6,300 feet. The maximum permitted surface injection pressure is 1,800 psig and the maximum permitted injection volume is 1,200 BWPD. The well is currently carried in the Waha (Delaware) Field. Enterprise proposes that the disposal permit for the well be amended to include disposal of acid gas.

The subject disposal well has 2,200 feet of 8 5/8" casing cemented to surface. The TCEQ recommends that usable quality water be protected to a depth of 2,150 feet. The well has 6,305 feet of 7 7/8" casing, with top fo cement calculated to be 2,657 feet. Injection is through 2 7/8" tubing on a packer set at 6,139 feet. Enterprise requests authority to dispose of a maximum of 3,400 barrels per day. This volume includes approximately 8.5 MMCF of acid gas (3.3% H₂S, 91.7% CO₂ and 5% other gases) and approximately 840 BWPD.

The 100 ppm radius of exposure ("ROE") is 3,429 feet and the 500 ppm ROE is 1,567 feet. These calculations are based on a maximum escape volume of 8.5 MMCFD and 33,000 ppm H₂S concentration. The 500 ppm ROE includes a portion of a county road. The 100 ppm ROE includes one residence. A contingency plan for the plant is already in effect and the subject well has been incorporated into that plan. The plan has been approved by the Commission.

There are two wellbores within 1/4 mile of the Reese Cleveland Gas Unit No. 1. One of the wells, the Wayne Moore No. 7 is not drilled deep enough to penetrate the disposal

interval. The Reese Cleveland Gas Unit No. 1, was plugged and abandoned in 1996. This well has a total depth of 14,964 feet and there are numerous plugs set in the well. However, calculations indicate that there is no cement behind casing across the Cherry Canyon disposal interval. Enterprise plans to re-enter this well, drilling out all plugs above 6,611 feet. A cement squeeze will be performed at 6,200 feet and the well will be re-plugged. Enterprise has no objection to a permit requirement specifying this re-entry.

The disposal system is designed with numerous safeguards and the injection well will be shut-in if unusual conditions, such as low or high pressures or flow rates, are observed. Sensors will be installed throughout the area to detect any release of H₂S. The plant is manned on a 24 hour basis by personnel trained in H₂S safety. All equipment that will be subject to H₂S complies with NACE MR 0175.

FINDINGS OF FACT

1. Notice of Rule 9 application was sent to offset operators within ½ mile and to the Reeves County Clerk on March 17, 2009.
2. Notice of this hearing to inject hydrogen sulfide was sent to all persons entitled to notice and was published on March 20, 2009 in the *Pecos Enterprise*, a newspaper of general circulation in Reeves County.
3. Enterprise Products Operating, LLC requests authority to inject fluids containing H₂S into the Reese Cleveland Gas Unit Well No. 1. This waste gas is removed from hydrocarbon gas at the Waha treatment plant operated by Enterprise.
4. The Reese Cleveland Gas Unit Well No. 1 was permitted for disposal of plant effluent water from the Waha Plant in 1983.
 - a. The approved disposal interval is the non-productive Cherry Canyon from 6,190 feet to 6,300 feet.
 - b. The maximum permitted surface injection pressure is 1,800 psig and the maximum permitted injection volume is 1,200 BWPD.
5. The Reese Cleveland Gas Unit Well No. 1 is located on the same property as the Waha treating plant which removes H₂S and CO₂ from produced gas.
6. The maximum requested injection rate for the Reese Cleveland Gas Unit Well No. 1 is 840 BWPD and 8,500 MCFD of compressed acid gas.
7. The proposed Reese Cleveland Gas Unit Well No. 1 is completed in a manner which will confine the injected fluid to the permitted disposal interval and protect usable quality water.

- a. The TCEQ recommends that useable quality water be protected to a depth of 2,150 feet.
 - b. The well had 8 5/8" surface casing set at 2,200 feet with cement circulated to surface.
 - c. The well has 5 1/2" casing set at 6,305 feet with top of cement calculated to be at 2,657 feet.
 - d. Injection will be through tubing set on a packer set at 6,139 feet.
 - e. All of the equipment installed that might come in contact with H₂S will be corrosion resistant fiberglass or H₂S-resistant stainless steel and alloys that meet all Commission and industry safety standards.
 - f. If the injection fluid is not confined to the approved strata, then the disposal well permit will be suspended and disposal ceased until the fluid migration from such strata is eliminated.
8. The injection well, compressor and flow lines transmitting sour gas, will be designed to contain the sour gas/produced water mixture, and monitoring devices will immediately shut down the system if any leakage of sour gas is detected.
 9. The calculated ROE for 100 ppm H₂S due to a catastrophic release from the disposal well is 3,429 feet. The calculated exposure radius ROE for 500 ppm H₂S due to a catastrophic release from the well is 1,567 feet.
 10. The 500 ppm ROE includes a portion of a county road. The 100 ppm ROE includes one residence.
 11. There are two wellbores within 1/4 mile of the Reese Cleveland Gas Unit No. 1.
 - a. The Wayne Moore No. 7 is not drilled deep enough to penetrate the disposal interval.
 - b. The Reese Cleveland Gas Unit No. 1 was plugged and abandoned in 1996. This well has a total depth of 14,964 and there are numerous plugs set in the well. However, calculations indicate that there is no cement behind casing across the Cherry Canyon disposal interval.
 - c. Enterprise will re-enter the plugged Reese Cleveland Gas Unit No. 1 and perform a cement squeeze at 6,200 feet to insure that the well does not provide a conduit for migration of fluids out of the disposal interval.
 12. Field Operations has approved the contingency plan for the plant, which incorporates the disposal well.

CONCLUSIONS OF LAW

1. Proper notice was issued as applicable in all statutes and regulatory codes.
2. All things have occurred and been accomplished to give the Commission jurisdiction in this matter.
3. The application of Enterprise Products Operating LLC to inject hydrogen sulfide gas (acid gas) into the Reese Cleveland Gas Unit Well No. 1, in the Waha (Cherry Canyon-H₂S Disp) Field, Reeves County, complies with the applicable provisions of Statewide Rules 9 and 36.

EXAMINER'S RECOMMENDATION

Based on the above findings and conclusions, the examiner recommends that the application of Enterprise Products Operating LLC be approved as set out in the attached Final Order.

Respectfully submitted,



Donna K. Chandler
Technical Examiner