

THE APPLICATION OF SANDRIDGE TERTIARY, LLC TO AMEND PERMIT NO. F-1888 FOR AUTHORIZATION PURSUANT TO STATEWIDE RULE 36 TO INJECT FLUIDS CONTAINING HYDROGEN SULFIDE IN THE SLAUGHTER FIELD, HOCKLEY AND COCHRAN COUNTIES, TEXAS

HEARD BY: Andres J. Trevino, P.E.

DATE OF HEARING: September 30, 2010

APPEARANCES:

Clark Jobe
Dean E. Soderstrom

REPRESENTING:

SandRidge Tertiary, LLC

EXAMINER'S REPORT AND RECOMMENDATION

STATEMENT OF THE CASE

SandRidge Tertiary, LLC requests to amend Fluid Injection Permit No. F-1888 to grant authority pursuant to Statewide Rule 36 to inject fluids containing hydrogen sulfide in 27 wells on its South Mallet Unit in the Slaughter Field. SandRidge is making separate application with the Commission's Technical Permitting section for authority pursuant to Rule 46.

Statewide Rule 36(c)(10)(A)(i) states that injection of fluids containing hydrogen sulfide will be allowed only after public hearing when "... injection fluid is a gaseous mixture, or would be a gaseous mixture in the event of a release to the atmosphere, and 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."

This application was unopposed and the examiner recommends approval.

DISCUSSION OF THE EVIDENCE

The Slaughter Field was discovered in 1937. The Slaughter Field has been subject to waterflooding and carbon dioxide (CO₂) injection for many years. Production from the Slaughter Field is from the San Andres at an average depth of 5,000 feet. The crude oil produced from the San Andres in the Slaughter Field contains H₂S at an average concentration of 35,848 ppm.

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SandRidge is implementing the CO₂ flood within the South Mallet Unit. The South Mallet Unit is located on the southwest flank of the Slaughter Field. Waterflood operations were initiated in the mid 1960's by Texaco. Authorization to inject sweet CO₂ was granted in 1992; however no CO₂ has been injected to date. Current plans are to inject sweet CO₂ supplied by Occidental Permian (Oxy) into the Unit. The produced gas stream will be returned to the Oxy Mallet CO₂ Recycle Plant (MCRP) for processing. No on lease re-injection of any gas stream will occur. SandRidge anticipates that the project will utilize sweet CO₂ injection for the life of the project. Oxy reserves the right to provide the CO₂ supply from the tailgate of the MCRP which includes a H₂S component. Sandridge has authorization to inject only sweet CO₂ and now must amend Permit No. F-1888 to inject sour CO₂.

The Commission's District Office has approved Form H-9 (Certificate of Compliance Statewide Rule 36) and the Contingency Plan submitted by SandRidge. The Contingency Plan includes all operations associated with the proposed injection, including the wells, gathering lines and distribution lines. For each injection well, the 500 part per million (ppm) radius of exposure (ROE) is 284 feet and the 100 ppm ROE is 623 feet. These calculations are based on a maximum release of 4,000 MCFD and 4,590 ppm H₂S. There are no public areas within the 500 and 100 ppm ROEs.

For the Oxy CO₂ supply pipeline, the 500 part per million (ppm) radius of exposure (ROE) is 729 feet and the 100 ppm ROE is 1,595 feet. These calculations are based on a maximum release of 18,000 MCFD and 4,590 ppm H₂S. The 500 and 100 ppm ROEs for the Oxy CO₂ supply pipeline includes a 1,458 foot and 3,190 foot portion of Farm to Market Road 301.

All equipment associated with the injection program satisfies the requirements in the latest editions of NACE Standard MR-0175. The 6" supply line will be monitored for pressure loss via a commercial well monitoring service utilizing SCADA technology. The anticipated operating pressure of the CO₂ supply line is 2,500 psi. Alarms will notify field personnel there is a variance above or below this pressure of 10%. The automatic shut in valve will activate if there is a variance of 20% above or below the operating pressure.

All SandRidge employees associated with the South Mallet Unit area receive hydrogen sulfide safety training regarding the proper response to an H₂S release. Each employee is trained on proper notification procedures in case of a release and are required to be familiar with the contingency plan. Employees also receive periodic training in hazardous material operations, respiratory equipment use, well control procedures and first aid.

FINDINGS OF FACT

1. Notice of this hearing was given to all persons entitled to notice at least ten (10) days prior to the subject hearing.

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2. The Slaughter Field was discovered in 1937. The Slaughter Field has been subject to waterflooding and carbon dioxide (CO₂) injection since mid 1980's.
3. Crude oil production from the Slaughter Field is from the San Andres. The crude oil in the field contains H₂S at an average concentration of 35,848 ppm.
4. SandRidge is implementing their CO₂ flood in the South Mallet Unit in stages. The current permit amendment seeks to add sour CO₂ injection into Well Nos. 104W, 106W, 108W, 109W, 110, 117, 118W, 120W, 132W, 134W, 142, 161, 162, 213W, 217W, 219W, 305W, 310W, 312W, 315W, 317, 318W, 319, 320, 324W, 325W and 327W.
5. Under current operations in the South Mallet Unit, sweet CO₂ is purchased from Occidental Permian (Oxy) and injected into the Unit. Oxy reserves the right to provide the CO₂ supply from the tailgate of the Oxy Mallet CO₂ Recycle Plant which includes a H₂S component.
6. The Commission's District Office has approved Form H-9 (Certificate of Compliance Statewide Rule 36) and the Contingency Plan submitted by Energen. The Contingency Plan includes all operations associated with the proposed injection, including the Oxy supply line, wells, injection well headers, gathering lines and distribution lines.
7. The 500 and 100 part per million (ppm) radius of exposure (ROE) was calculated for the injection wells, injection headers and the CO₂ supply pipeline at various maximum rates.
 - a. For each injection well, the 500 part per million (ppm) radius of exposure (ROE) is 284 feet and the 100 ppm ROE is 623 feet. These calculations are based on a maximum release of 2,742 MCFD and 4,590 ppm H₂S. No public roads, residences or public areas will be affected.
 - b. For each injection header and the CO₂ supply pipeline, the 500 part per million (ppm) radius of exposure (ROE) is 729 feet and the 100 ppm ROE is 1,595 feet. These calculations are based on a maximum release of 18,000 MCFD and 4,590 ppm H₂S. Only the 500 and 100 ppm ROEs for the Oxy CO₂ supply pipeline includes a 1,458 foot and 3,190 foot portion of Farm to Market Road 301. This is the only possible exposure to the public.
8. The 6" CO₂ supply line will be monitored for pressure loss via a commercial well monitoring service utilizing SCADA technology. Alarms will notify field personnel there is a variance above or below this pressure of 10%.The

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automatic shut in valve will activate if there is a variance of 20% above or below the operating pressure.

9. The proposed injection meets the safety requirements of Rule 36 regarding warning and marker provisions, security provisions and materials and equipment.

CONCLUSIONS OF LAW

1. Proper notice was timely given to all parties entitled to noticed pursuant to applicable statutes and rules.
2. All things have occurred and have been accomplished to give the Commission jurisdiction in this case.
3. SandRidge Tertiary, LLC has complied with the safety provisions of Statewide Rule 36 for injection of fluid containing hydrogen sulfide.

EXAMINER'S RECOMMENDATION

The examiner recommends approval of the application of SandRidge Tertiary, LLC to inject fluid containing hydrogen sulfide into twenty seven injection wells on its South Mallet Unit lease in the Slaughter Field.

Respectfully submitted,

Andres J. Trevino, P.E.
Technical Examiner