



RAILROAD COMMISSION OF TEXAS

HEARINGS DIVISION

OIL AND GAS DOCKET NO. 8A-0280210

THE APPLICATION OF TABULA RASA ENERGY, L.L.C. FOR AUTHORIZATION PURSUANT TO STATEWIDE RULE 36 TO INJECT FLUIDS CONTAINING HYDROGEN SULFIDE FOR EIGHTEEN WELLS IN THE SEMINOLE, EAST (SAN ANDRES) UNIT, IN THE SEMINOLE, EAST (SAN ANDRES) FIELD, GAINES COUNTY, TEXAS

HEARD BY: Andres J. Trevino, P.E., Technical Examiner
Marshall F. Enquist, Hearings Examiner

DATE OF HEARING: May 23, 2013

APPEARANCES:

Flip Whitworth
Dale E. Miller
Tracy Evans
Jim Skurner
Brady J. McConaty

REPRESENTING:

Tabula Rasa Energy, L.L.C.

EXAMINER'S REPORT AND RECOMMENDATION

STATEMENT OF THE CASE

Tabula Rasa Energy, L.L.C. ("Tabula Rasa") requests authority pursuant to Statewide Rule 36 to inject fluids containing hydrogen sulfide ("H₂S") into Well Nos. 11AW, 12W, 16AW, 22AW, 23W, 29W, 30W, 35W, 36AW, 37W, 46W, 47AW, 54, 56W, 73W, 76W, 78W and 81W on its Seminole, East (San Andres) Unit in the Seminole, East (San Andres) Field. Tabula Rasa is making separate application with the Commission's Technical Permitting section for authority pursuant to Rule 46. Similar authority was granted by the Commission on the Lindoss Unit with a Final Order in Oil and Gas Docket 8A-0280186 on May 7, 2013.

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 examiners recommend approval.

DISCUSSION OF THE EVIDENCE

The Seminole, East (San Andres) Field was discovered in 1959. The Seminole, East (San Andres) Field has been subject to waterflooding since 1984. Production from the Seminole, East (San Andres) Field is from the San Andres at an average depth of 5,300 feet. The Seminole, East (San Andres) Unit production is expected to increase from the current 299 BOPD to 1,763 BOPD in year eight and ultimately recover an additional 7 MMBO.

Tabula Rasa is implementing the CO₂ flood in the Seminole, East (San Andres) Unit. The Seminole, East (San Andres) Unit is located on the western edge of the Seminole, East (San Andres) Field. The Seminole, East (San Andres) Unit is the last remaining major project in the Seminole, East (San Andres) Field to undergo CO₂ flood operations. The CO₂ flood project for the Seminole, East (San Andres) Unit will use a water-alternating-gas (WAG) procedure. Under proposed operations in the Seminole, East (San Andres) Unit, pure CO₂ will be purchased from Kinder Morgan CO₂ and will be combined with recycled sour CO₂ and native gas from the Sour CO₂ Recycling Facility (RCF) and injected into the Unit. The native gas contains H₂S at an average concentration of 116,720 ppm. The calculated H₂S concentration at the RCF compressor is expected to be 360 ppm. For purposes of calculating the radius of exposures (ROE) Tabula Rasa assumed the recycled CO₂ proposed to be used in the CO₂ flood will contain H₂S at an average concentration of 3,500 ppm. The produced gas stream will be returned to the RCF for processing and reinjection. Tabula Rasa seeks initial authority to inject sour CO₂ on their existing fluid injection permit F-3737.

The Commission's District Office has approved Form H-9 (Certificate of Compliance Statewide Rule 36) and the Contingency Plan submitted by Tabula Rasa. The Contingency Plan includes all operations associated with the proposed injection, including the wellheads, gathering lines and distribution lines. For each sour CO₂ injection well, the 500 part per million (ppm) radius of exposure (ROE) is 370 feet and the 100 ppm ROE is 811 feet. These calculations are based on a maximum release of 8,000 MCFD and 3,500 ppm H₂S. There are three public roads, CR 104, CR 107 and CR 107-I and 16 residences within the 100 ppm ROE. Only 4 residences are within the 500 ppm ROE.

For the sour CO₂ injection distribution system, the 500 part per million (ppm) ROE is 756 feet and the 100 ppm ROE is 1,654 feet. These calculations are based on a maximum release of 25,000 MCFD and 3,500 ppm H₂S. The 500 ppm ROE for the CO₂ injection distribution system includes two public roads, CR 104, and CR 107 as identified earlier. The 100 ppm ROE for the CO₂ injection distribution system includes the two public roads, CR 104, and CR 107 and 12 residences.

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 automated pressure monitoring transmitters. The anticipated operating pressure of the CO₂ supply line is 1,850 psig. The 6" supply line is rated to 2,453 psi working pressure. Alarms will notify field personnel there is a variance below this pressure. The automatic shut in valve will activate if there is a variance above or below the operating pressures.

All Tabula Rasa employees associated with the Seminole, East (San Andres) Unit 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.
2. The Seminole, East (San Andres) Field was discovered in 1959. The Seminole, East (San Andres) Field has been subject to waterflooding since 1984. The Seminole, East (San Andres) Unit is the second major project in the Seminole, East (San Andres) Field to undergo CO₂ flood operations.
3. Crude oil production from the Seminole, East (San Andres) Field is from the San Andres. The native gas contains H₂S at an average concentration of 116,720 ppm. The calculated H₂S concentration at the Sour CO₂ Recycling Facility compressor is expected to be 360 ppm. For purposes of calculating the radius of exposures (ROE) Tabula Rasa assumed the recycled CO₂ proposed to be used in the CO₂ flood will contain H₂S at an average concentration of 3,500 ppm.
4. Tabula Rasa is implementing their CO₂ flood in the Seminole, East (San Andres) Unit in stages. The CO₂ flood project for the Seminole, East (San Andres) Unit will use a water-alternating-gas (WAG) procedure. The current permit seeks to authorize sour CO₂ injection into Well Nos. 11AW, 12W, 16AW, 22AW, 23W, 29W, 30W, 35W, 36AW, 37W, 46W, 47AW, 54, 56W, 73W, 76W, 78W and 81W.
5. Under proposed operations in the Seminole, East (San Andres) Unit, pure CO₂ is purchased from Kinder Morgan CO₂ and will be combined with recycled sour CO₂ and native gas from the Sour CO₂ Recycling Facility (RCF) and injected into the Unit.
6. The Commission's District Office has approved Form H-9 (Certificate of Compliance Statewide Rule 36) and the Contingency Plan submitted by Tabula Rasa. The Contingency Plan includes all operations associated with

the proposed injection, including the RCF's 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 from compression to wellhead at various maximum rates.
 - a. For each sour CO₂ injection well, the 500 part per million (ppm) ROE is 370 feet and the 100 ppm ROE is 811 feet. These calculations are based on a maximum release of 8,000 MCFD and 3,500 ppm H₂S. There are three public roads, CR 104, CR 107 and CR 107-I and 16 residences within the 100 ppm ROE and 4 residences are within the 500 ppm ROE.
 - b. For the sour CO₂ injection distribution system, the 500 part per million (ppm) ROE is 756 feet and the 100 ppm ROE is 1,654 feet. These calculations are based on a maximum release of 25,000 MCFD and 3,500 ppm H₂S. The 500 ppm ROE for the CO₂ injection distribution system includes two public roads, CR 104, and CR 107 as identified earlier. The 100 ppm ROE for the CO₂ injection distribution system includes the two public roads, CR 104, and CR 107 and 12 residences.
8. The 6" CO₂ supply line will be monitored for pressure loss via automated pressure monitoring transmitters. The anticipated operating pressure of the CO₂ supply line is 1,850 psig. Alarms will notify field personnel there is a variance above or below these pressures. The automatic shut in valve will activate if there is a variance above or below the operating pressures.
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. Tabula Rasa Energy, L.L.C. has complied with the safety provisions of Statewide Rule 36 for injection of fluid containing hydrogen sulfide.

EXAMINER'S RECOMMENDATION

The examiners recommend approval of the application of Tabula Rasa Energy, L.L.C. to inject fluid containing hydrogen sulfide into 18 injection wells on its Seminole, East (San Andres) Unit lease in the Seminole, East (San Andres) Field.

Respectfully submitted,



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Technical Examiner



Marshall F. Enquist
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