OIL AND GAS DOCKET NO. 08-0267194

THE APPLICATION OF LEGADO PERMIAN, LLC FOR AUTHORIZATION PURSUANT TO STATEWIDE RULE 36 TO INJECT FLUIDS CONTAINING HYDROGEN SULFIDE IN THE GOLDSMITH-LANDRETH SAN ANDRES UNIT, GOLDSMITH FIELD, ECTOR COUNTY, TEXAS

HEARD BY: Richard D. Atkins, P.E. - Technical Examiner

DATE OF HEARING: October 8, 2010

APPEARANCES:	**REPRESENTING:**
APPLICANT:	
Ana Maria Marsland-Griffith	Legado Permian, LLC
Shawn Young	

EXAMINER'S REPORT AND RECOMMENDATION

STATEMENT OF THE CASE

Legado Permian, LLC ("Legado") requests authority pursuant to Statewide Rule 36 to inject fluids containing hydrogen sulfide ("H2S") into 20 injection wells (Nos. 125W, 126R, 128W, 129R, 151W, 152W, 153W, 154W, 175W, 176W, 177W, 178R, 201W, 202W, 203W, 204R, 223W, 224W, 225W and 226W) on its Goldsmith-Landreth San Andres ("GLSA") Unit in the Goldsmith Field. This authority is sought as part of Legado's proposal to conduct a miscible CO2 flood on a portion of the GLSA Unit. This is the first application for injection of H2S on the Southeast Goldsmith Unit.

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 parts per million ("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." There are two public roads (Station and Scharbauer Roads) and Occidental's Goldsmith field office contained within the 500 ppm radius of exposure.

This application was unprotested and the examiner recommends approval of the injection authority pursuant to Statewide Rule 36.

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DISCUSSION OF THE EVIDENCE

The Goldsmith Field was discovered in 1934 and the GLSA Unit was formed in 1963. Legado acquired the unit from Energen Resources Corporation in April 2008. The GLSA Unit is located approximately 2.3 miles northwest of Goldsmith, Texas, and is in the north-central part of the Goldsmith Field. The unit encompasses approximately 6,200 acres. The producing interval is the San Andres formation at an average depth of 4,200 feet. Currently, there are 63 active producing wells and 54 active injection wells carried on the proration schedule. The unit production is approximately 485 BOPD, 325 MCFGPD, 26,300 BWPD and 2.6 MMCFGPD of CO2. The amount of CO2 being injected is approximately 18.6 MMCFGPD. The native gas in the Goldsmith Field contains approximately 41,000 ppm of H2S.

The GLSA Unit is near several existing sour CO2 floods in the Vacuum, Seminole and Wasson Fields. CO2 miscible floods typically result in substantial incremental oil recovery in the San Andres formation. Legado plans to flood the 100 foot main pay section, as well as, the 150 foot residual oil zone ("ROZ"). For this proposed project, Legado estimates that peak production will be approximately 10,000 BOPD with an incremental recovery of 76.1 MMBOE.

After taking over operations in 2008, Legado reactivated a number of producing and injection wells and contracted to purchase sweet CO2 for a small pilot injection project from Kinder Morgan CO2 Company, LP ("Kinder Morgan"). Legado built a 3.5 mile 8" C02 pipeline to deliver the CO2 and constructed a sour C02 recycling and fluid processing facility. The injection of sweet CO2 commenced in July 2009 into 2 wells with an injection volume of 5.0 MMCFGPD. The recycling compression of sour C02 commenced in March 2010 into two wells (203W & 204RW) with an injection volume of 1.5 MMCFGPD. Legado was given H2S authority to inject into these two wells since there was no public areas within the radius of exposure. The maximum H2S concentration of recycled sour C02 is estimated to be 20,000 ppm prior to mixing it with sweet CO2.

Legado proposes the installation of its Phase I Sour C02 Project and requests authority to inject H2S gas into 20 injection wells. Legado will inject sour CO2 at a maximum rate of 17 MMCFGPD with 20,000 ppm H2S from the recycling facility. The sour gas will be mixed with incoming sweet C02 from Kinder Morgan's pipeline prior to injection. The peak volume of sweet CO2 to be mixed with the recycled sour C02 will be 50 MMCFGPD. The total volume of the commingled injection stream will peak at 67 MMCFGPD with an H2S concentration of 5,100 ppm. Following the implementation of Phase 1, Legado will continue to expand the San Andres sour C02 flood with 5 additional phases of development that will ultimately include 124 sour C02 injectors, 18 water containment injectors and 146 oil producers. These future expansion phases are expected to be completed by the end of 2017.

Because of the H2S content of the native gas in the Goldsmith Field, there are existing H2S production operations in the area and a Contingency Plan is already in place for those operations. This includes operation of the existing 6 inch and 8 inch trunk lines, 3 inch injection lines and recycling compressor. The Form H-9 for the proposed GLSA Unit H2S injection operations, including the sour CO2 distribution line and compressor facility, was approved by the Commission's District Office on September 1, 2010.

The maximum escape volume is 67 MMCFGPD with an H2S concentration of 5,100 ppm, which is based on a worst-case scenario event involving the CO2 distribution line. The 100 ppm Radius of Exposure (ROE) is 3,880 feet and the 500 ppm ROE is 1,773 feet. There are two (2) public roads and Occidental's Goldsmith field office within the 500 ppm ROE. Information explaining the characteristics of CO2 and H2S has been delivered to Occidental's Goldsmith field office and the office is included in Legado's Contingency Plan.

The proposed H2S injection operations on the GLSA Unit meet all safety requirements of Statewide Rule 36. There will be automated emergency shut-down ("ESD") valves on the CO2 distribution line that will close in the event of abnormal operating pressure. In addition, H2S monitors are installed at strategic locations that will trigger an ESD valve to the corresponding operation to either shut-in or divert the gas to the flare. The injection system is designed for a maximum allowable operating pressure of 2,000 psi, while normal operating pressure will be 1,400 psi. All equipment used in this sour CO2 injection project will meet or exceed industry standards for H2S service, including ASTM, ANSI, API and NACE. The 20 wells proposed for conversion to sour CO2 injection operations meet all requirements of Statewide Rule 46.

The 20 wells that are the subject of this application are being permitted for water, CO2 and H2S injection. There is no evidence that the proposed injection will cause harm to usable-quality groundwater or other mineral bearing strata. The Form H-1 and H-1A injection well applications are being administratively reviewed by the Commission. The Form H-9 and Contingency Plan have been approved by the Commission's District Office and the requirements of Statewide Rule 36 pertaining to injection fluids containing H2S have been met.

FINDINGS OF FACT

1. Notice of these injection applications and hearing was provided to all persons entitled to notice at least ten (10) days prior to the date of the hearing.

2. The Goldsmith Field was discovered in 1934 and the GLSA Unit was formed in 1963. Legado acquired the unit from Energen Resources Corporation in April 2008. Currently, there are 63 active producing wells and 54 active injection wells carried on the proration schedule.

3. The GLSA Unit is located in the north-central part of the Goldsmith Field. The unit encompasses approximately 6,200 acres. The producing interval is the San Andres formation at an average depth of 4,200 feet.

4. The 20 wells that are the subject of this application are currently permitted for water injection in conjunction with the ongoing waterflood project. The wells are being permitted for water, CO2 and H2S injection, as Legado plans to conduct a miscible CO2 flood.

5. The proposed injection operations into the 20 wells that are the subject of this application will not endanger usable-quality water and the injected fluids will be confined to the San Andres formation.

6. The proposed CO2 injection is necessary to conduct a miscible CO2 flood on the GLSA Unit and will result in peak production of approximately 10,000 BOPD with an incremental recovery of 76.1 MMBOE that otherwise would not be recovered.

7. The native gas in the Goldsmith Field contains approximately 41,000 ppm of H2S. The maximum H2S concentration of gas injected on the GLSA Unit is estimated to be 5,100 ppm.

8. The maximum escape volume is 67 MMCFGPD with an H2S concentration of 5,100 ppm, which is based on a worst-case scenario event involving the CO2 distribution line. The 100 ppm Radius of Exposure (ROE) is 3,880 feet and the 500 ppm ROE is 1,773 feet.

9. There are two public roads (Station and Scharbauer Roads) and Occidental's Goldsmith field office contained within the 500 ppm radius of exposure.

10. The proposed injection operations meet the safety requirements of Statewide Rule 36 regarding warning marker provisions, security provisions, and materials and equipment.

11. The Contingency Plan for the proposed project has been approved by the Commission's District Office.

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. Legado has complied with the safety provisions of Statewide Rule 36 for injection of fluid containing H2S for the 20 wells that are the subject of this application.

4. Legado has met its burden of proof and satisfied the requirements of the Railroad Commission's Statewide Rule 36.

EXAMINER'S RECOMMENDATION

Based on the above findings of fact and conclusions of law, the examiner recommends approval of the application of Legado Permian, LLC to inject fluids containing hydrogen sulfide into 20 injection wells on its GLSA Unit, in the Goldsmith Field, Ector County, Texas.

Respectfully submitted,

Richard D. Atkins, P.E.
Technical Examiner