RAILROAD COMMISSION OF TEXAS
HEARINGS DIVISION

OIL AND GAS DOCKET NO. 8A-0312019

APPLICATION OF SANTA FE MIDSTREAM PERMIAN LLC PURSUANT TO STATEWIDE RULES 9 AND 36 FOR A PERMIT TO DISPOSE OF OIL & GAS WASTE CONTAINING HYDROGEN SULFIDE BY INJECTION INTO A POROUS FORMATION NOT PRODUCTIVE OF OIL OR GAS, RATTLESNAKE AGI NO.1 LEASE, WELL NO. 1, WASSON FIELD, YOAKUM COUNTY, TEXAS

HEARD BY: Robert Musick, Technical Examiner
Jennifer Cook, Administrative Law Judge

HEARING DATE: August 27, 2018

CONFERENCE DATE: October 16, 2018

APPEARANCES:	**REPRESENTING:**
APPLICANT:	
Tim George, Attorney Ryan Lammert, Attorney Alberto Gutierrez, Geologist Paul Dolan, Managing Partner	Santa Fe Midstream Permian LLC

EXAMINERS' REPORT AND RECOMMENDATION

STATEMENT OF THE CASE

Santa Fe Midstream Permian LLC ("Santa Fe" or "Applicant") requests authority pursuant to Statewide Rule ("SWR") 36 to inject fluids containing hydrogen sulfide ("H2S") into Well No. 1 (API No. 501-36998) on the Rattlesnake AGI No. 1 Lease, Wasson Field, Yoakum County, Texas ("Subject Well"). Additionally, Santa Fe (No. 748093) has filed a Form W-14 application required by SWR 9 to dispose of oil and gas waste by injection into a formation not productive of oil and gas.

Although neither application is protested, SWR 36 requires a hearing if the injection fluid is a gaseous mixture, or would be a gaseous mixture in the event of a release to the atmosphere, and . . . the 100 parts per million (ppm) radius of exposure ("ROE") calculated under SWR 36 is 3,000 feet or greater, or if the H2S content of the gaseous mixture to be injected has been increased by a processing plant operation. For the Subject Well, the 100 ppm ROE calculated under SWR 36 is 7,786 feet, and the H2S content of the gas to be injected has been increased

by processing. Therefore, a public hearing and approval by the Commission is required as established by SWR 36 prior to approval of a Form W-14 application under SWR 9 to dispose of oil and gas waste by injection into a formation not productive of oil and gas.

After reviewing Santa Fe's administratively complete Form H-9 dated March 13, 2018 for the Subject Well and conducting the related field review and inspection performed on December 6, 2017, the Commission's Hydrogen Sulfide Coordinator for District 8A issued a letter dated May 8, 2018, advising that the measures Santa Fe proposes to protect the public from the hazardous release of H2S appear to be sufficient and appropriate under SWR 36. The District Office has no objections to authorization for the Subject Well, contingent upon the required public meeting, the issuance of a permit under SWR 9 and compliance with SWR 36 at all times on this lease, and all safety features and systems in the contingency plan are in place and operational. In addition, the Groundwater Advisory Unit of the Commission indicates in a letter dated January 12, 2018, that drilling and using this disposal well and injecting oil and gas waste into the subsurface stratum will not endanger the freshwater strata in the area.

Based on the testimony and evidence presented at the hearing, the Technical Examiner and the Administrative Law Judge (collectively, "Examiners") recommend that the Commission approve the SWR 36 authorization and remand the Form W-14 to the Commission staff for administrative consideration under SWR 9.

DISCUSSION OF THE EVIDENCE

Santa Fe is installing the Subject Well, along with a gas plant ("30-30 Gas Plant") and gas gathering system, approximately 6.5 miles northwest of Denver City, in Yoakum County, to gather and process produced gas from nearby horizontal lateral wells drilled for development of the San Andres formation. The initial input volume to the 30-30 Gas Plant from nearby Santa Fe wells and from another operator, will be approximately 6 to 7 million cubic feet (MMCF) per day of gas. As additional Santa Fe producing wells are added to the gathering system, the input volume of gas to the 30-30 Gas Plant is expected to increase to approximately 14 MMCF per day of gas during Phase I of the operations, and eventually will increase to approximately 60 MMCF per day of gas in Phase II. The 30-30 Gas Plant and associated gathering system is nearing completion, with initial operations expected to commence in October 2018.

The produced gas gathered from the nearby Santa Fe will contain approximately 1.5% H2S and 10% carbon dioxide ("CO2") as it enters the 30-30 Gas Plant. After processing by the 30-30 Gas Plant, pipeline quality gas will be sent to markets, and treated acid gas containing approximately 13% H2S and 87% CO2 by volume will be sent to the Subject Well for disposal into the assigned reservoir. The Subject Well will have sufficient capacity to dispose of approximately 8 MMCF per day of treated acid gas, which is the anticipated volume of treated acid gas to be injected when the 30-30 Gas Plant is operating at the planned Phase II capacity of 60 MMCF per day. When injected into the Subject Well, the 8 MMCF per day of gas results in an estimated volume of 3,100 barrels per day being disposed in the reservoir.

Testimony indicate the location of the Subject Well is suited for an acid gas injection well because it is geographically remote from residential and commercial development. Evidence presented at the hearing indicate there are no residences or businesses within the 500 ppm ROE calculated under SWR 36 and there are no public areas and only limited public roadways in the vicinity of the Subject Well. The geologic data presented at the hearing indicate the disposal interval for the Subject Well is situated in an isolated Devonian-age fault block, bounded by inactive faults, remote from any producing wells, and stratigraphically below the Woodford Shale

and other impermeable formations that serve as an isolating and confining geologic cap above the disposal interval. Testimony also established that the United States Geological Survey (USGS) has no recorded seismic activity in the geographic vicinity of the Subject Well.

Additionally, well inventories presented as evidence in the hearing indicate there are minimal wellbore penetrations to the proposed injection zone in the vicinity of the Subject Well, with only a single dry hole in the quarter-mile area of review and only two wells within a half-mile of the Subject Well, all of which are much shallower than the Devonian-age disposal interval and not in hydraulic communication with the injection reservoir. The well inventory also suggests there are no water wells within one-half-mile of the Subject Well. None of these identified wellbores pose any significant risk of becoming a conduit for migration to the usable-quality water or USDW freshwater strata, as determined by the Commission's Groundwater Advisory Unit.

Santa Fe's Form H-9, indicate a maximum escape volume of 8 MMCF per day of gas is expected. At 100 ppm and at 500 ppm, respectively, the ROEs calculated under SWR 36 are 7,786 feet and 3,558 feet, assuming the treated acid gas flowing into the Subject Well from the 30-30 Gas Plant contains an average of 130,000 ppm or 13.0 mole percent H2S at a maximum daily (24-hour) treated acid gas production of 8 MMCF. The Form H-9 also shows that the facility is equipped with an emergency shutdown system, H2S detection equipment, plant alarms, visible beacons, and wind indicators, as required by SWR 36. In addition, the H2S Contingency Plan presented as part of Exhibit 18 contains the emergency action procedures and plans specified by the Commission for compliance with SWR 36.

Testimony indicates the Subject Well is designed and will be cased and cemented to protect groundwater resources, to contain the disposal fluid to the disposal zone, and to withstand the corrosive nature of the treated acid gas. The Subject Well will be constructed with the following casing, each cemented from the surface to the following designated depth:

- 13 3/8-inch surface casing set to 500 feet;
- 9 5/8-inch intermediate casing set to 5,500 feet;
- 7-inch deep casing set to 11,000 feet.

The deep casing set (7-inch) will be cemented using a resin-based cement that is specially formulated to be resistive to the corrosive conditions in the injection zone due to the injection of H2S and CO2. The Subject Well will be completed with corrosion-resistant nickel-coated tubing, packer, and safety valve, all of which are NACE-rated for sour gas compatibility.

Testimony and supporting volumetric calculations presented in the hearing demonstrate that the plume of injected disposal fluid will be confined within the Devonian-age formation and fault block in which the Subject Well is completed. Calculations indicate the Subject Well will inject fluid from 11,000 to 12,000 feet into the Devonian formation reservoir, confined by the Woodford formation located above the injection interval, at a maximum daily injection volume of 4,500 barrels per day (at ground surface) and a maximum surface injection pressure of 5,000 psig. Testimony indicate the injection fluids will be composed of approximately 87% CO_2 and 13% H2S in a dense-liquid phase. Fluid injection calculations assume a 214-foot thick rock reservoir with 7.7% average net porosity, 36% water saturation, and 10,685 barrels of water per day (BWPD) being injected over 30 years. Calculations established the injected disposal fluid plume radius is less than 0.45 mile.

On June 11, 2018, Santa Fe requested a hearing for an application for a Permit pursuant to SWR 9 and 36 to dispose of oil and gas waste containing hydrogen sulfide by injection into a

porous formation not productive of oil and gas. A Notice of Hearing was issued by the Commission on July 10, 2018 to interested parties by certified mail which included land owners within one-half mile radius. A hearing was held on August 27, 2018. At the hearing, it was determined that notice was not sent to one party entitled to notice, therefore on September 5, 2018, the Hearings Division, provided the party with the opportunity to file an opposition to the issuance of the Permit, etc. In addition to the mailed notices, Santa Fe published notice on March 15, 2018, of the application in the Denver City Press, a weekly newspaper of general circulation.

The Examiners find that the subject application meets all requirements of SWR 36 and recommend approval. Upon Commission approval of the SWR 36 application, the Examiners recommend that the Commission remand Santa Fe's Form W-14 application to the Commission staff for administrative processing.

FINDINGS OF FACT

1. Santa Fe Midstream Permian LLC, Inc. ("Santa Fe" or "Applicant") requests authority pursuant to Statewide Rule ("SWR") 36 to inject fluids containing hydrogen sulfide (H2S) into Well No. 1 (API No. 501-36998) on the Rattlesnake AGI No. 1 Lease, Wasson Field, Yoakum County, Texas ("Subject Well").

2. Santa Fe (No. 748093) has filed a Form W-14 application required by SWR 9 to dispose of oil and gas waste by injection into a formation not productive of oil and gas.

3. SWR 36 requires a hearing if the injection fluid is a gaseous mixture, or would be a gaseous mixture in the event of a release to the atmosphere, and . . . the 100 parts per million (ppm) radius of exposure ("ROE") calculated under SWR 36 is 3,000 feet or greater, or if the hydrogen sulfide ("H2S") content of the gaseous mixture to be injected has been increased by a processing plant operation.

4. For the Subject Well, the 100 ppm ROE calculated under SWR 36 is 7,786 feet, and the H2S content of the gas to be injected has been increased by processing. Therefore, a public hearing and approval by the Commission is required as established by SWR 36 prior to approval of a Form W-14 application under SWR 9 to dispose of oil and gas waste by injection into a formation not productive of oil and gas.

5. On June 11, 2018, Santa Fe requested a hearing for an application for a Permit pursuant to SWR 9 and 36 to dispose of oil and gas waste containing hydrogen sulfide by injection into a porous formation not productive of oil and gas. Notice of this hearing was provided to all persons entitled to notice. On July 10, July 24, and September 5, 2018, a Notice of Hearing, a Supplemental Notice of Hearing, and a Notice of Hearing and Opportunity to Protest/Object, respectively, were sent by U.S. Mail to surface owners of the Subject Well tract, surface owners within the 100 and 500 radius of exposures (ROEs), operators within one-half mile of the location of the Subject Well, the Yoakum County EMS offices, and the Yoakum County Clerk. No protests were received. In addition, Santa Fe published notice of the application in the Denver City Press, a weekly newspaper of general circulation, as required by rule. Notice of the application was published in the newspaper on March 15, 2018.

6. A hearing was held on August 27, 2018. No person appeared at the hearing on the merits in protest of the subject application.

7. The Commission's Hydrogen Sulfide Coordinator for District 8A issued a letter dated May 8, 2018, advising that the measures Santa Fe Midstream proposes to protect the public from the hazardous release of H2S appear to be sufficient and appropriate under SWR 36. The District Office has no objections to authorization for the Subject Well (Well No. 1) contingent upon the required public meeting, the issuance of a permit under SWR 9 and compliance with SWR 36 at all times on this lease, and all safety features and systems in the contingency plan are in place and operational.

8. The Commission's Groundwater Advisory Unit indicates in a letter dated January 12, 2018, that drilling and using this disposal well and injecting oil and gas waste into the subsurface stratum will not endanger the freshwater strata in the area.

9. Santa Fe is installing the Subject Well, along with a gas plant ("30-30 Gas Plant") and gas gathering system to gather and process produced gas from nearby horizontal lateral wells drilled for development of the San Andres formation. Completion are expected to commence in October 2018.

10. The requested disposal injection authority for the Subject Well requires a public hearing because the 100 parts per million (ppm) radius of hydrogen sulfide exposure calculated as specified by SWR 36 for the Subject Well is 7,786 feet, and because the hydrogen sulfide content of the gaseous mixture to be injected into the Subject Well has been increased by gas processing plant operations.

11. The initial input volume to the 30-30 Gas Plant from nearby Santa Fe wells and from another operator, will be approximately 6 to 7 million cubic feet (MMCF) per day of gas. As additional wells are added to the gathering system, the input volume of gas to the 30-30 Gas Plant is expected to increase to approximately 14 MMCF per day of gas during Phase I of the operations, and eventually will increase to approximately 60 MMCF per day of gas in Phase II.

12. The Subject Well will have sufficient capacity to dispose of approximately 8 MMCF per day of treated acid gas, which is the anticipated volume of treated acid gas to be injected when the 30-30 Gas Plant is operating at the planned Phase II capacity of 60 MMCF per day.

13. The produced gas from the nearby Santa Fe wells will typically contain approximately 1.5% H2S and 10% carbon dioxide ("CO2") as it enters the 30-30 Gas Plant. After processing by the 30-30 Gas Plant, pipeline quality gas will be sent to markets, and treated acid gas containing approximately 13% H2S and 87% CO2 by volume will be sent to the Subject Well for disposal into the assigned reservoir.

14. The location and proposed injection zone of the Subject Well is appropriate for installation and operation of an acid gas injection well.

    a. Subject Well is geographically remote from most residential and commercial development. There are no residences or businesses within the 500 ppm radius of exposure (ROE), and only a few residences within the 100 ppm ROE. There are no public areas and only limited public roadways in the vicinity.

    b. The disposal interval for the Subject Well is situated in an isolated Devonian-age fault block, bounded by inactive faults, remote from any producing wells, and below

the Woodford Shale and other impermeable formations that will serve as isolating and confining geologic caps above the disposal interval.

c. The United States Geological Survey has no recorded seismic activity in the geographic vicinity of the Subject Well.

d. There are minimal wellbore penetrations in the vicinity, with only a single dry hole in the quarter-mile area of review and only two wells in the half-mile area of review, all of which are much shallower than the Devonian-age disposal interval and not in hydraulic communication with the injection reservoir. There are no water wells in the half-mile area of review. None of these wellbores pose any significant risk of becoming a conduit for migration to usable-quality water or USDW freshwater strata, as determined by the Commission's Groundwater Advisory Unit.

15. Volumetric calculations demonstrate that the plume of injected disposal fluid from disposal injection by the Subject Well will be confined within the Devonian formation and fault block in which the Subject Well is completed.

a. The Subject Well will inject fluid from 11,000 feet to 12,000 feet into the Devonian formation, confined by the Woodford formation located above the injection interval, at a maximum daily injection volume of 4,500 barrels per day and a maximum surface injection pressure of 5,000 psig.

b. Injection fluids will be composed of approximately 87% CO2 and 13% H2S in dense-liquid phase.

c. Assuming 214 feet of formation rock with 7.7% average net porosity, 36% water saturation, and 10,685 barrels of water per day of disposal injection being injected over 30 years. Calculations established the injected disposal fluid plume radius is less than 0.45 mile.

16. The Subject Well will be cased and cemented to protect groundwater resources, to contain the disposal fluid to the disposal zone, and to withstand the corrosive nature of the treated acid gas.

a. The Subject Well will be constructed with the following casing strings, each cemented to the surface: 13 3/8-inch surface casing set to 500 feet; 9 5/8-inch intermediate casing set to 5,500 feet; and 7-inch long string set to 11,000 feet.

b. The basal portion of the 7-inch casing will be cemented using a resin-based cement that is specifically designed to be resistive to high H2S and CO2 environments.

c. The well will be completed with corrosion-resistant nickel-coated tubing, packer, and safety valve, all of which are NACE-rated for sour service.

17. Applicant agreed on the record that, pursuant to Texas Government Code § 2001.144(a)(4)(A), this Final Order shall be final and effective on the date a Master Order relating to this Final Order is signed.

CONCLUSIONS OF LAW

1. Proper notice was issued to all persons entitled to notice pursuant to all applicable statutes and regulatory codes.

2. All things have occurred and been accomplished to give the Commission jurisdiction in this matter.

3. Santa Fe has complied with all requirements of Statewide Rule 36(c)(10)(A).

4. Pursuant to Texas Government Code § 2001.144(a)(4)(A), this Final Order shall be final and effective on the date a Master Order relating to this Final Order is signed.

EXAMINERS' RECOMMENDATION

Based on the above findings of fact and conclusions of law, the Examiners recommend that the Commission grant and approve Statewide Rule 36 authorization for Well No. 1, Rattlesnake AGI #1 Lease, Wasson Field, Yoakum County, Texas, and remand the Form W-14 application to the Commission staff for administrative consideration under Statewide Rule 9.

Respectfully submitted,

Robert Musick
Technical Hearings Examiner

Jennifer Cook
Administrative Law Judge