RAILROAD COMMISSION OF TEXAS
HEARINGS DIVISION

OIL AND GAS DOCKET NO. 03-0319401

THE APPLICATION OF PHILLIPS 66 PIPELINE LLC (663865) FOR AUTHORITY PURSUANT TO STATEWIDE RULE 97 FOR A NEW PERMIT TO CREATE, OPERATE AND MAINTAIN AN UNDERGROUND GAS STORAGE FACILITY ON THE CLEMENS SALT DOME B (26843) LEASE, WELL NO. 7, CLEMENS, NE (FRIO B) FIELD, BRAZORIA COUNTY, TEXAS

HEARD BY: John L. Moore - Technical Examiner
Kristi M. Reeve - Administrative Law Judge

HEARING DATE: June 3, 2019

APPEARANCES:	**REPRESENTING:**
For Applicant	
David E. Jackson, Attorney	Phillips 66 Pipeline LLC
Josh Bivins, Project Manager	
Dr. Joe L. Ratigan, Consulting Engineer	
Kathleen Bertolatus, Sr. Counsel, Environmental & Regulatory	
Observing	
Jessica Mendoza, Staff Attorney	Railroad Commission of Texas

EXAMINERS' REPORT AND RECOMMENDATION

STATEMENT OF THE CASE

Phillips 66 Pipeline LLC ("Phillips 66") seeks a permit to create, operate and maintain an underground gas storage facility in the Clemens Salt Dome on the Clemens Salt Dome B (26843) Lease, Well No. 7, Clemens, NE (Frio B) Field, Brazoria County, Texas. The application is filed pursuant to Statewide Rule 97.

Notice of the application and hearing were provided to each person and entity entitled to notice. Notice of the application was also published in *The Facts,* a newspaper of general circulation in Brazoria County, for three consecutive weeks: January 2, 2019,

January 9, 2019, and January 16, 2019. The application is unprotested and the Technical Examiner and Administrative Law Judge ("Examiners") recommend approval of the application for an underground gas storage facility, as requested by Phillips 66.

DISCUSSION OF THE EVIDENCE

The proposed underground gas storage facility is located atop the Clemens Salt Dome in Brazoria County. Phillips 66 requests authority to create, operate and maintain one (1) storage cavern for the storage of hydrogen. The proposed Phillips 66 facility consists of approximately 6.58 acres located approximately 4.8 miles south of Brazoria, Texas. The property is owned by Phillips 66 Company, the parent company of the applicant.

Phillips 66 has mapped the Clemens Dome using 3-D seismic, vertical seismic profile surveys, and well control. The Clemens Dome is a shallow piercement dome (diapir) that is an offshoot of a deep (at least 20,000 feet), more extensive, raised mass of the Louann Formation source salt. The salt body within the Clemens Dome consists of a cylinder approximately one mile wide and two miles high, slightly bent to the northwest in its upper half. The Clemens Dome salt body exhibits a similar geomorphology to many Gulf Coast salt domes. The top of the salt body is found at approximately 1,400 feet (subsea depth) and has a relatively flat surface. The salt is overlain by caprock that is up to 800 feet thick, and the top of which is found at a depth of approximately 600 feet (subsea depth).

The Clemens Dome is typical of other Gulf Coast domal salt formations and is suitable for underground storage of gas. The salt rock to be encountered by the wells and caverns at the proposed facility is an impermeable salt formation that will confine stored gases, prevent waste of the stored gases, prevent uncontrolled escape of gases, prevent danger to life or property, and protect usable-quality water from pollution by stored gases.

Through a search of public records, Phillips 66 identified all wells within the area of review of the proposed storage facility. The application identifies each such well and provides well records and plugging records, if applicable. None of the wells within the area of review affect the integrity of the proposed cavern and gas storage facility.

Phillips 66 plans to create and operate one (1) storage cavern at the proposed facility. The top of the proposed cavern will be at a depth of approximately 2,800 feet and the bottom of the proposed cavern will be at a depth of approximately 5,000 feet.

The Commission Groundwater Advisory Unit recommends that usable-quality ground water is to be protected to a depth of 1,000 feet. The well will be completed with multiple strings of casing: 48" conductor casing, 36" surface isolation casing set to a depth of 1,000± feet and cemented to the surface; 26" intermediate casing set to a depth of 1,700± feet and cemented to the surface; 20" final cemented production casing set to a depth of 2,600± feet and cemented to the surface; 16" outer hanging string; and 10-3/4" inner hanging string.

The storage cavern will be created by solution mining. After a well is drilled and completed at total depth, fresh water will be injected under controlled conditions to dissolve the salt and create the cavern space, and brine fluid will be removed. An inert gas (nitrogen) blanket will be used to control and limit dissolution. Brine density will be monitored periodically as fluid is removed. Sonar caliper surveys will be performed periodically to monitor cavern development.

The proposed cavern will have a capacity of 8.0 million barrels when fully leached. The anticipated maximum cavern radius when fully leached will be approximately 250 feet. The maximum injection rate will be 130 million standard cubic feet per day ("MMscf") and the maximum injection pressure will be 2,198 pounds per square inch gauge ("psig").

The proposed storage facility is in the public interest. It will provide hydrogen gas storage capacity in an area and market with current and future needs. The proposed facility is located in close proximity to the Phillips 66 Sweeny refinery and hydrogen supply sources. The reclaimed hydrogen gas will be used in the hydro-crackers of the refining process and in the de-sulfurization of feedstock and refined products.

The Commission's Technical Permitting staff has reviewed the application. On March 29, 2019, the Injection-Storage Permits Unit of Technical Permitting determined that the application was administratively and technically complete and transmitted the application and draft permit to Docket Services for the setting of a hearing.

Phillips 66 has complied with the requirements set forth in Statewide Rule 97 for approval of the requested permit. The Phillips 66 facility, well and cavern will be subject to the rules and safety standards adopted by the Commission pursuant to Statewide Rule 97.

FINDINGS OF FACT

1. Notice of the application and hearing were provided to each person and entity entitled to notice.

   a. Notice of the application was published in *The Facts,* a newspaper of general circulation in Brazoria County, for three consecutive weeks: January 2, 2019, January 9, 2019, and January 16, 2019.

   b. On December 21, 2018, Phillips 66 mailed a copy of the application to those persons entitled to receive notice of the application.

   c. On April 12, 2019, the Commission mailed a copy of the Notice of Hearing to those persons entitled to receive notice of the hearing.

   d. On May 1, 2019, the Commission mailed a copy of the Amended Notice of Hearing to those persons entitled to receive notice of the hearing.

2. The application is unprotested.

3. The proposed Phillips 66 storage facility will be located atop the Clemens Salt Dome, on approximately 6.58 acres located approximately 4.8 miles south of Brazoria, Texas. The property on which the proposed facility is located is owned by Phillips 66 Company, the parent company of the applicant.

4. Phillips 66 has mapped the Clemens Dome using 3-D seismic, vertical seismic profile surveys, and well control.

   a. The Clemens Dome is a shallow piercement dome (diapir) that is an offshoot of a deep (at least 20,000 feet), more extensive, raised mass of the Louann source salt.

   b. The salt body within the Clemens Dome consists of a cylinder approximately one mile wide and two miles high, slightly bent to the northwest in its upper half.

   c. The Clemens Dome salt body exhibits a similar geomorphology to many Gulf Coast salt domes. The top of the salt body is found at approximately 1,400 feet (subsea depth) and has a relatively flat surface.

   d. The salt is overlain by the caprock that is up to 800 feet thick, and the top of which is found at a depth of approximately 600 feet (subsea depth).

5. The Clemens Dome is typical of other Gulf Coast domal salt formations and is suitable for underground storage of gas. The salt rock to be encountered by the wells and caverns at the proposed facility is an impermeable salt formation that will confine stored gases, prevent waste of the stored gases, prevent uncontrolled escape of gases, prevent danger to life or property, and protect usable-quality water from pollution by stored gases.

6. Through a search of public records, Phillips 66 identified all wells within the area of review of the proposed storage facility. The application identifies each such well and provides well records and plugging records, if applicable. None of the wells within the area of review affect the integrity of the proposed caverns and storage facility.

7. Phillips 66 plans to create and operate one (1) storage cavern at the proposed facility. The top of the proposed cavern will be at a depth of approximately 2,800 feet and the bottom of each proposed cavern will be at a depth of approximately 5,000 feet.

8. Usable-quality ground water is to be protected to a depth of 1,000 feet. Each well will be completed with multiple strings of casing: 48" conductor casing, 36" surface isolation casing set to a depth of 1000± feet and cemented to the surface; 26" intermediate casing set to a depth of 1,700± feet and cemented to the surface; 20" final cemented production casing set to a depth of 2,600± feet and cemented to the surface; 16" outer hanging string; and 10-3/4" inner hanging string.

9. The storage cavern will be created by solution mining. After a well is drilled and completed at total depth, fresh water will be injected under controlled conditions to

dissolve the salt and create the cavern space, and brine fluid will be removed. An inert gas (nitrogen) blanket will be used to control and limit dissolution. Brine density will be monitored periodically as fluid is removed. Sonar caliper surveys will be performed periodically to monitor cavern development.

10. The proposed cavern will have a capacity of 8.0 million barrels when fully leached. The anticipated maximum cavern radius when fully leached will be approximately 250 feet. The maximum injection rate will be 130 MMscf per day and the maximum injection pressure will be 2,198 psig.

11. The proposed storage facility is in the public interest. It will provide hydrogen gas storage capacity in an area and market with current and future needs. The proposed facility is located in close proximity to the Phillips 66 Sweeny refinery and hydrogen supply sources. The reclaimed hydrogen gas will be used in the hydro-crackers of the refining process and in the de-sulfurization of feedstock and refined products.

12. The Commission's Technical Permitting staff has reviewed the application. On March 29, 2019, the Injection-Storage Permits and Support Unit of Technical Permitting determined that the application was administratively and technically complete and transmitted the application and draft permit to Docket Services for the setting of a hearing.

13. Phillips 66 has complied with all of the requirements set forth in Statewide Rule 97 for approval of the requested permit.

14. The Phillips 66 facility, well and cavern will be subject to the rules and safety standards adopted by the Commission pursuant to Statewide Rule 97.

15. Phillips 66 on the record agree that, pursuant to the provisions of Texas Government Code §2001.144(a)(4)(A), this Final Order can be final and effective on the date a Master Order relating to this Final Order is signed.

CONCLUSIONS OF LAW

1. Proper notice was timely given to all parties entitled to notice pursuant to applicable statutes and rules.

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

3. The use of the proposed cavern to store hydrogen gas will not endanger oil, gas, or geothermal resources or cause the pollution of surface water or freshwater strata.

4. The facility is in the public interest. It will provide hydrogen gas storage capacity in an area and market with current and future need for hydrogen storage capacity.

5. Phillips 66 has complied with the requirements for approval, as set forth in Statewide Rule 97.

6. Phillips 66 on the record agreed that, pursuant to the provisions of Texas Government Code §2001.144(a)(4)(A), this Final Order can 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 approve the underground gas storage facility, as requested by Phillips 66 Pipeline LLC, and that Technical Permitting be directed to issue the appropriate permit with the usual conditions, restrictions and limitations, as required by the Commission.

Respectfully Submitted,

John L. Moore
Technical Examiner

Kristi M. Reeve
Administrative Law Judge