

**THE APPLICATION OF ENTERPRISE TEXAS PIPELINE, LLC FOR AUTHORITY PURSUANT TO STATEWIDE RULE 97 FOR A PERMIT TO CREATE, OPERATE AND MAINTAIN AN UNDERGROUND HYDROCARBON STORAGE FACILITY, GAS STORAGE TERMINAL LEASE, BARBERS HILL FIELD, CHAMBERS COUNTY, TEXAS**

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**HEARD BY:** Andres Trevino and Jim Dougherty on December 11, 2007

**APPEARANCES:**

Tim George  
Joe Ratigan  
Mark Thompson

Stephen Webb

**REPRESENTING:**

Enterprise Texas Pipeline, LLC

City of Mont Belvieu, Texas

**EXAMINER'S REPORT AND RECOMMENDATION**

**STATEMENT OF THE CASE**

Enterprise Texas Pipeline, LLC ("Enterprise" or "Applicant") already holds a permit for underground storage of hydrocarbon liquids at its facility in the Barbers Hill Salt Dome pursuant to Rule 95. In this docket, Enterprise requests to expand its permit authority to include underground storage of gas pursuant to Statewide Rule 97.

The application was unopposed, and the Examiners recommend approval.

**DISCUSSION OF THE EVIDENCE**

The Enterprise facility is located at the Barbers Hill Salt Dome in Chambers County, Texas. The approximately 5.6 acre facility site is within the city limits of Mont Belvieu, Texas.

The Barbers Hill Salt Dome is the site of the largest underground hydrocarbon storage capacity in the United States, containing numerous facilities, wells, and caverns for underground storage. This Enterprise facility is located nearby those other facilities.

Geological maps and cross sections depict Barbers Hill Salt Dome as a large salt dome with a broad flat top and steeply dipping overhanging flanks. The caprock overlying

the salt is composed of gypsum and anhydrite and varies in thickness from approximately 350 feet to nearly 1,000 feet. The top of the salt occurs at approximately 1,300 feet.

Salt cores have been taken from numerous wells in the Barbers Hill Salt Dome, and extensive testing has been performed on those cores. These tests establish that Barbers Hill salt has a high degree of unconfined compressive strength, higher than ever before reported in the open literature for Gulf Coast domal salts.

The well and storage cavern will be situated within the central portion of the salt dome, away from the perimeter boundaries of the salt. The location of the well and cavern within the facility affords ample distance to other permitted caverns and adjacent properties.

The Texas Commission on Environmental Quality recommends that usable quality water be protected to a depth of 650 feet at this site. A search of public records identified wells within a ¼ mile Area of Review surrounding the facility and well, including both wellbores that have been plugged and abandoned and wellbores currently in active storage or production service, and available plugging reports were submitted.

The well will be cased and completed to confine stored hydrocarbons within the storage well and cavern, to prevent waste of the stored hydrocarbons, to prevent uncontrolled escape of hydrocarbons, and to protect usable-quality water from pollution. The well is planned for a total depth of approximately 6,375 feet with several casing strings: 48" conductor pipe driven to approximately 250 feet; 30" surface casing set at approximately 700 feet and cemented to surface; 24" intermediate casing set at approximately 1,600 feet and cemented to surface; 20" production casing set at approximately 4,200 feet and cemented to surface.

The storage cavern will be created by solution mining. During this process, fresh water will be injected under controlled conditions to dissolve the salt and create the cavern space, and brine will be removed for disposal. A diesel blanket will be used to prevent washing of the cavern above desired depths. The blanket/brine interface depth will be monitored and interface logs will be run to verify the blanket depth. The boundaries of the cavern will be determined by periodical sonar caliper surveys during the development. When fully leached, the cavern will have a capacity of 12.5 million barrels. The top of the cavern will be at a depth of approximately 4,200 feet and the bottom of the cavern will be at a depth of approximately 6,375 feet. The cavern will be approximately 300 feet in diameter. A salt core testing program is planned for core samples taken from the well, and data from this testing will be used to guide the detailed design and creation of the cavern.

After completion of the well, this facility will participate in the annual subsidence monitoring program already conducted by storage operators at the Barbers Hill Salt Dome. The dome-wide program was initiated in the 1980s, and reports are submitted to the Commission and the City of Mont Belvieu annually.

Notice of application and hearing were provided to each person and entity entitled to notice. Notice of the hearing was published in a newspaper of general circulation in Chambers County once a week for four consecutive weeks.

The City of Mont Belvieu originally appeared in the application process, and through negotiation and coordination between the City and Enterprise, the City's concerns were addressed and resolved. Counsel for the City was in attendance at the hearing.

Enterprise has complied with the requirements set forth in Statewide Rule 97 for approval of the requested permit. When operating in gas storage service under the requested Rule 97 permit, the 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 application and hearing were provided to each person and entity entitled to notice. Notice of the hearing was published in *The Progress*, a newspaper of general circulation in Chambers County, on November 7, 14, 21, and 28, 2007.
2. The approximately 5.6 acre subject facility is located within the city limits of Mont Belvieu, Texas, in an area occupied by numerous other underground hydrocarbon storage wells, caverns, and facilities in the Barbers Hill Salt Dome.
3. Enterprise currently holds a Commission permit under Statewide Rule 95 for storage of hydrocarbon liquids at this facility.
4. Geological mappings and cross sections depict Barbers Hill Salt Dome as a large salt dome with a broad flat top and steeply dipping overhanging flanks. This facility is located within the central portion of the salt dome, away from the perimeter boundaries of the salt.
5. Testing of salt core samples from Barbers Hill establish that the salt rock comprising this dome and located beneath this facility is strong and competent in comparison to other Gulf Coast salt domes tested and utilized for underground storage of hydrocarbon liquids and gas. Salt rock beneath the subject facility is an impermeable salt formation that will confine stored hydrocarbons, prevent waste of stored hydrocarbons, prevent uncontrolled escape of hydrocarbons, and protect usable-quality water from pollution by stored hydrocarbons.
6. The location of the storage well and cavern at the subject facility will afford ample distance between the cavern and the perimeter of the facility and other caverns.
7. When constructed, the cavern at the subject facility will have a capacity of 12.5 million barrels. The top of the cavern will be at a depth of approximately 4,200 feet and the bottom of the cavern will be at a depth of approximately 6,375 feet. The

cavern will be approximately 300 feet in diameter.

8. The evidence establishes that usable-quality ground water is to be protected to a depth of 650 feet, and existing wellbores within the required area of review are shown by map and spreadsheet data. The storage well at the subject facility will be cased and completed to confine stored liquids within the storage well and cavern, to prevent waste of the stored hydrocarbons, to prevent uncontrolled escape of hydrocarbons, and to protect usable-quality water from pollution.
9. The storage cavern at the subject facility will be created by solution mining. After the 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. A diesel 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 at stages to monitor cavern development.
10. This facility will participate in the dome-wide annual subsidence survey monitoring program of wells and benchmarks conducted by all storage operators at Barbers Hill, with reports submitted annually to the Commission staff.
11. The Applicant has complied with the requirements set forth in Statewide Rule 97 for approval of the requested permit.
12. When operating in gas storage service under the requested permit, the facility, well, and cavern will be subject to the rules and safety standards adopted by the Commission pursuant to Statewide Rule 97.

### **CONCLUSIONS OF LAW**

1. Proper legal notice was timely given to all persons and entities entitled to notice under applicable statutes and rules.
2. All things have occurred and have been accomplished to give the Commission jurisdiction in this case. The Commission has jurisdiction to authorize issuance of a permit pursuant to Statewide Rule 97 to create, operate, and maintain an underground hydrocarbon storage facility for storage of gas in a salt formation.
3. The subject gas storage facility, well, and cavern will not endanger oil, gas, or geothermal resources or cause the pollution of surface water or fresh water strata unproductive of oil, gas, or geothermal resources. The record establishes that this facility will be created, operated, and maintained so as to confine stored gas within the storage wells and caverns, to prevent waste of the stored hydrocarbons, to prevent uncontrolled escape of hydrocarbons, and to protect usable-quality water from pollution.

4. The Applicant has complied with the requirements for approval set forth in Statewide Rule 97.
5. When operating in gas storage service under the requested Rule 97 permit, the facility, well, and cavern shall be subject to the rules and safety standards adopted by the Commission pursuant to Statewide Rule 97.
6. The application should be granted, and the Commission staff should be authorized and directed to issue the permit.

### **EXAMINER'S RECOMMENDATION**

Based on the above findings and conclusions, the examiner recommends that the application of Enterprise Texas Pipeline, LLC to create, operate and maintain a facility to store gas be approved pursuant to Statewide Rule 97. Technical Permitting is directed to issue the appropriate permit pursuant to Statewide Rule 97 with the usual conditions, restrictions, and limitations as required by the Commission. Enterprise Texas Pipeline, LLC shall comply with all applicable rules and safety standards adopted by the Commission pursuant to Statewide Rule 97.

Respectfully submitted,

Andres Trevino  
Technical Hearings Examiner