

**THE APPLICATION OF ENTERPRISE PRODUCTS OPERATING, LLC PURSUANT TO STATEWIDE RULE 95 TO SUPPLEMENT THE EXISTING PERMIT TO CREATE, OPERATE AND MAINTAIN AN UNDERGROUND HYDROCARBON STORAGE FACILITY TO INCLUDE HYDROCARBON LIQUIDS STORAGE, PG & E STORAGE LEASE, BOLING FIELD, WHARTON COUNTY, TEXAS**

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**HEARD BY:** Donna Chandler on October 14, 2010

**APPEARANCES:**

Tim George  
Joe Ratigan  
Mark Thompson

**REPRESENTING:**

Enterprise Products Operating, LLC

**EXAMINER'S REPORT AND RECOMMENDATION**

**STATEMENT OF THE CASE**

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

The application was unopposed, and the Examiner recommends approval.

**DISCUSSION OF THE EVIDENCE**

The Enterprise facility is located at the Boling Salt Dome in the Boling Field in Wharton County, Texas. The facility site is approximately 2 miles north of the city of Boling, Texas.

Geological maps and cross sections depict Boling Salt Dome as a large salt dome with a broad flat top and steeply dipping flanks. The caprock overlying the salt varies in thickness; depth to the top of caprock is generally about 630 feet, with the shallowest caprock encountered at a depth of 383 feet. The top of the salt occurs generally at an approximate depth of 1,000 feet.

Salt cores tests establish that Boling Salt Dome salt has a high degree of unconfined compressive strength, comparable to and consistent with other Gulf Coast domal salts utilized for storage of hydrocarbons.

The wells and storage caverns will be situated within the central portion of the salt dome, away from the perimeter boundaries of the salt. The locations of the wells and caverns within the facility afford 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 200 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 three wells currently proposed for liquids storage service under Rule 95 (Well Nos. 6, 7 and 8) will be cased and completed to confine stored hydrocarbons 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. Each well is planned for a total depth of approximately 5,100 feet with several casing strings: 42" conductor pipe driven to approximately 280 feet; 36" surface casing set at approximately 500 feet and cemented to surface; 30" intermediate casing cemented to surface; 26" intermediate casing cemented to surface; and 20" production casing cemented to surface.

The storage caverns 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, each cavern will have a capacity of 10 million barrels. If created for liquids storage service under Rule 95, the top of each cavern will be at a depth of approximately 2,200 feet and the bottom of the cavern will be at a depth of approximately 3,900 feet. If created for gas storage service under Rule 97, the top of each cavern will be at a depth of approximately 3,700 feet and the bottom of the cavern will be at a depth of approximately 5,100 feet. Each cavern will be approximately 300 feet in diameter.

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

Enterprise has complied with the requirements set forth in Statewide Rule 95 for approval of the requested permit. When operating in liquids storage service under the requested Rule 95 permit, the facility, well, and cavern will be subject to the applicable rules and safety standards adopted by the Commission pursuant to Statewide Rule 95.

**FINDINGS OF FACT**

1. Notice of application and hearing were provided to each person and entity entitled to notice.
2. The subject facility is located approximately 2 miles north of the city of Boling, Texas.
3. Enterprise currently holds a Commission permit under Statewide Rule 97 for storage of hydrocarbon gas at this facility.
4. Geological mappings and cross sections depict Boling Salt Dome as a large salt dome with a broad flat top and steeply dipping 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 Boling Salt Dome 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 locations of the storage wells and caverns at the subject facility will afford ample distance between each cavern and the perimeter of the facility and other caverns.
7. When constructed, the caverns for Wells 6, 7, and 8 at the subject facility will each have a capacity of 10.0 million barrels. If created for liquids storage service under Rule 95, the top of each cavern will be at a depth of approximately 2,200 feet and the bottom of the cavern will be at a depth of approximately 3,900 feet. If created for gas storage service under Rule 97, the top of each cavern will be at a depth of approximately 3,700 feet and the bottom of the cavern will be at a depth of approximately 5,100 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 200 feet, and existing wellbores within the required area of review are shown by map and spreadsheet data. Each 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 caverns 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. The Applicant has complied with the requirements set forth in Statewide Rule 95 for approval of the requested permit.
11. When operating in liquids storage service under the subject permit, the facility, well, and cavern will be subject to the applicable rules and safety standards adopted by the Commission pursuant to Statewide Rule 95.

### **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 95 to create, operate, and maintain an underground hydrocarbon storage facility for storage of hydrocarbon liquids in a salt formation, in addition to an existing permit for the same facility to create, operate, and maintain an underground hydrocarbon storage facility for storage of hydrocarbon liquids in a salt formation pursuant to Statewide Rule 97.
3. The subject 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 hydrocarbon liquids and 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 95.
5. When operating in hydrocarbon liquids storage service under the requested Rule 95 permit, the facility, well, and cavern shall be subject to the applicable rules and safety standards adopted by the Commission pursuant to Statewide Rule 95.
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 Products Operating, LLC to create, operate and maintain a facility to store gas be approved pursuant to Statewide Rule 95. Technical Permitting is directed to issue the appropriate permit pursuant to Statewide Rule 95 as a supplemental or additional amendment to the Applicant's existing permit for gas storage pursuant to Statewide Rule 97, with the usual conditions, restrictions, and limitations as required by the Commission. Enterprise Products Operating, LLC shall comply with all applicable rules and safety standards adopted by the Commission pursuant to Statewide Rule 95.

Respectfully submitted,

Donna Chandler  
Technical Examiner