



RAILROAD COMMISSION OF TEXAS

HEARINGS DIVISION

OIL AND GAS DOCKET NO. 03-0298165

THE APPLICATION OF TARGA DOWNSTREAM, LLC PURSUANT TO STATEWIDE RULE 95 FOR A NEW PERMIT TO CREATE, OPERATE, AND MAINTAIN AN UNDERGROUND HYDROCARBON STORAGE FACILITY ON THE EAST LEASE, WELL NO. 34, BARBERS HILL FIELD, CHAMBERS COUNTY, TEXAS

HEARD BY: Brian Fancher, P.G. – Technical Examiner
Randall Collins – Administrative Law Judge

HEARING DATE: November 2, 2015
RECORD CLOSED: November 2, 2015
SUBMISSION DATE: November 18, 2015
CONFERENCE DATE: December 8, 2015

APPEARANCES:

REPRESENTING:

APPLICANT:

Tim George, Attorney
Dr. Joe L. Ratigan

Targa Downstream, LLC

OBSERVOR:

Stephen Webb, Attorney

City of Mont Belvieu

EXAMINERS' REPORT AND RECOMMENDATION

STATEMENT OF THE CASE

Pursuant to Statewide Rule 95, Targa Downstream, LLC (Targa) seeks a permit to create, operate, and maintain a new underground hydrocarbon storage facility through its East Lease, Well No. 34, Barbers Hill Field, Chambers County, Texas.¹

On September 15, 2015, a memorandum from the Oil & Gas Division's Technical Permitting Group indicated that it performed a review of the subject application and determined

¹ 16 Tex. Admin. Code §3.95.

it to be administratively complete. The application, however, consists of a newly proposed hydrocarbon storage facility. As a result, Commission rules require that the application be considered only after notice and a public hearing.²

A copy of the subject application's Form H-4 (Application to Create, Operate and, Maintain an Underground Hydrocarbon Storage Facility) was mailed to all affected persons and government entities, pursuant to Statewide Rule 95.³ Beginning on June 26, 2015, the subject application was published once per week for three consecutive weeks in the *The Baytown Sun*, a newspaper of general circulation in Chambers County, Texas.⁴

The application is unopposed. The Examiners believe that Targa has met its burden of proof in the application and recommend that it be granted.

DISCUSSION OF THE EVIDENCE

Governing Rules and Application Process

Statewide Rule 95 requires a person to obtain a permit to create, operate, or maintain an underground hydrocarbon storage facility for liquid or liquefied hydrocarbons prior to use of the facility. A person is required to submit his or her application to the Commission in order to obtain a new permit for an underground storage of liquid or liquefied hydrocarbons, which consists of multiple components. Subsequently the Oil & Gas Division (OGD) makes its determination whether the person's application meets the applicable requirements of Statewide Rule 95. Finally, the application is scheduled for a public hearing.

Application Background

Dr. Joe L. Ratigan, a Geomechanics Consultant, testified on behalf of Targa as an expert in matters dealing with salt cavern storage. Dr. Ratigan has spent 35 years working in solution-mining and underground storage in salt caverns throughout the world.⁵ He has worked in connection with the Barbers Hill Salt Dome (Dome) since 1987. In addition, Dr. Ratigan has published more than 400 engineering consultant reports aimed at various components of salt cavern storage.

The subject facility is proposed to be located on the Barbers Hill Salt Dome in Mont Belvieu, Texas. This Examiners' Report and Recommendation focuses mainly on the completion and usage of the subject well, with regard to Statewide Rule 95.

Targa submitted evidence that indicates there are over 100 salt cavern storage facilities in the Dome.⁶ The subject facility is located near the south-central portion of the Dome between Loop 207 and State Highway 146.⁷ Targa currently operates roughly 33 existing salt cavern

² 16 Tex. Admin. Code §3.95(e)(4).

³ Targa Exh. No. 22.

⁴ Targa Exh. No. 23.

⁵ Targa Exh. No. 1. – Dr. Ratigan's resume.

⁶ Targa Exh. No. 2.

⁷ *Id.* The subject well (*i.e.*, Well No. 34) is identified on Exh. No. 2 by a hollowed, green circle.

storage facilities in the Dome. Dr. Ratigan testified that Targa's existing facilities are located northwest of the subject facility, and that the subject facility will be operated in conjunction with the existing facilities. The Examiners note that there are multiple operators with underground storage facilities in the Dome.

Targa submitted multiple subsurface cross sections to depict the stratigraphic and structural nature of the Dome.⁸ In short, the Dome originated from salt in the LouAnn Formation that is located roughly 30-40,000 feet below the surface. Basically, the salt from the LouAnn Formation rose through the sub-surface due to density differences between it and overlying formations (*i.e.* diapirism). Today, the top of the Dome has uplifted to Pleistocene-age strata and extends beyond Eocene-age.

Two aquifers overlie the Dome – the Chicot and Evaneline Aquifers. The OGD's Groundwater Advisory Unit determined the base of usable quality water (BUQW) occurs from surface to a depth of 750 feet at the subject well's surface location.

The Dome's cap-rock facies consists of two zones comprised of roughly three stratigraphic rock-types. The top of the Dome's salt is immediately overlain by a massive anhydrite layer, which comprises the lower cap rock. The upper cap rock consists of interbedded gypsum and calcite followed by an upper layer of calcite.⁹ Dr. Ratigan testified that the top of the Dome's caprock occurs at roughly ± 700 feet below ground surface (bgs), while the top of the Dome's salt strata beings at roughly $\pm 1,400$ feet bgs.

Dr. Ratigan testified in general that salt is an excellent material for underground storage of hydrocarbons, mainly due to its inherent porosity being impermeable. Moreover, he testified that it is extremely difficult to obtain any permeability measurement from salt rock-types because its permeability is so extraordinarily low. In addition, salt domes have an inherent characteristic that allow it to shift, or slowly flow in the subsurface, without cracking (*i.e.* creep). In other words, salt deforms without cracking or degrading.

Targa proposes to complete the subject well as follows:¹⁰

- 48" conductor pipe from surface to ± 230 feet bgs;
- 36" surface casing from surface to ± 800 feet bgs;
- 30" intermediate casing from surface to $\pm 1,800$ feet bgs;
- 24" production casing from surface to $\pm 2,000$ feet bgs;
- 16" tubing string hung from surface to $\pm 3,500$ feet bgs;
- 10-3/4" tubing string hung from surface to $\pm 4,000$ bgs.

Targa also proposes to wrap each of the above casing strings with cement from the surface to each casing strings respective setting depth. Targa provided a detailed list that summarizes its proposed casing and cementing programs for the subject well.¹¹

⁸ Targa Exh. No. 3.

⁹ Targa Exh. No. 4.

¹⁰ Targa Exh. No. 12.

¹¹ *Id.* Pgs. 3 and 4 of the exhibit.

As previously mentioned, the subject facility will be new. Therefore, a new salt cavern will be constructed through solution-brine mining an estimated volume of the Dome's salt strata at the subject well's location.¹² The subject application's proposed underground salt cavern will result once solution-brine mining of the salt strata is complete at the subject well's location. Targa submitted a detailed procedure that will be used in the development of the subject application's proposed underground salt cavern.¹³

Targa submitted a copy of its Form H-4 filed for the subject application.¹⁴ Targa's Form H-4 indicates that the following: (1) the top of the proposed salt cavern is at 2,100 feet bgs; (2) the bottom of the proposed salt cavern is at 4,000 feet bgs; (3) the storage capacity of proposed salt cavern will be roughly 4,000,000 barrels of liquid; (4) the subject well's maximum injection rate will be 325,000 barrels of liquid per day; and (5) the subject well's daily maximum injection pressure will be 1,292 pounds per square inch. Targa submitted a list of the types of liquid or liquefied hydrocarbons it seeks to store at the subject facility.¹⁵

Targa performed a review of existing wells located within ¼-mile of the subject well's surface location to determine the following: (1) the number of existing wells that penetrate the Dome's caprock; (2) and the number of wells that are plugged and abandoned (P&A'd).¹⁶ Targa identified 57 total wellbores exist within ¼-mile of the subject well. Of those 57 wellbores, 41 wellbores penetrate the Dome's caprock and 23 are P&A'd. The nearest existing hydrocarbon storage wellbore is located about 445 feet west to north-west of the subject well.¹⁷

FINDINGS OF FACT

1. Targa Downstream, LLC ("Targa") seeks a permit to create, operate, and maintain a new underground hydrocarbon storage facility through its East Lease, Well No. 34, Barbers Hill Field, Chambers County, Texas ("Subject Well") pursuant to 16 Tex. Admin. Code §3.95 (collectively "Subject Application").
2. Beginning on June 26, 2015, the Subject Application was published once per week for three consecutive weeks in the *The Baytown Sun*, a newspaper of general circulation in Chambers County, Texas
3. Notice of the Subject Application was made to all persons affected, as described in 16 Tex. Admin. Code §3.95, on October 14, 2015, through the application's Notice of Hearing.
4. Proper notice of hearing was issued to all persons or parties entitled to receive notice.
5. The Subject Application is unopposed.

¹² Targa Exh. No. 7.

¹³ Targa Exh. No. 19.

¹⁴ Targa Exh. No. 11.

¹⁵ Targa Exh. No. 20.

¹⁶ Targa Exh. Nos. 14, 15, and 16.

¹⁷ Targa Exh. No. 10.

6. The Subject Well will be completed in the Barbers Hill Field, which is comprised of the Barbers Hill Salt Dome (“Dome”).
7. The Barbers Hill Field is governed by Special Field Rules, as approved in Oil & Gas Final Order 03-0223293.
8. The Subject Well will be completed in the Dome, where it will be utilized for solution-mining of the Dome’s salt strata to create a salt cavern that is capable of storing up to 4,000,000 barrels of liquid.
9. Targa’s Subject Application is surrounded by numerous existing underground storage facilities in the Barbers Hill Field.
10. Targa proposes to complete the Subject Well as follows:
 - a. 48” conductor pipe from surface to ± 230 feet below ground surface (“bgs”);
 - b. 36” surface casing from surface to ± 800 feet bgs;
 - c. 30” intermediate casing from surface to $\pm 1,800$ feet bgs;
 - d. 24” production casing from surface to $\pm 2,000$ feet bgs;
 - e. 16” tubing string hung from surface to $\pm 3,500$ feet bgs;
 - f. 10-3/4” tubing string hung from surface to $\pm 4,000$ bgs.
11. Targa proposes to wrap cement from the ground surface to each casing’s respective setting depth in each of the casing strings mentioned in Finding of Fact No. 10 above.
12. The Commission’s Groundwater Advisory Unit determined the base of usable quality water (BUQW) occurs from surface to a depth of 750 feet at the Subject Well’s surface location.
13. The top of the Dome’s caprock occurs at roughly ± 700 feet bgs, while the top of the Dome’s salt strata beings at roughly $\pm 1,400$ feet bgs.
14. Targa’s Form H-4 indicates as follows:
 - a. the top of the proposed salt cavern is at 2,100 feet bgs;
 - b. the bottom of the proposed salt cavern is at 4,000 feet bgs;
 - c. the storage capacity of proposed salt cavern will be roughly 4,000,000 barrels of liquid;
 - d. the Subject Well’s maximum injection rate will be 325,000 barrels of liquid per day;
 - e. the Subject Well’s daily maximum injection pressure will be 1,292 pounds per square inch.
15. There are a total of 57 wellbores that exist within ¼-mile of the Subject Well.

16. There are 41 wellbores that penetrate the Dome's caprock within ¼-mile of the Subject Well.
17. There are 23 wellbores that are plugged and abandoned within ¼-mile of the Subject Well.
18. The Commission's Oil & Gas Division determined the Subject Application to be administratively complete on September 15, 2015.

CONCLUSIONS OF LAW

1. Resolution of the subject application is a matter committed to the jurisdiction of the Railroad Commission of Texas – Tex. Nat. Res. Code §81.051.
2. Legally sufficient notice has been provided to all affected persons.
3. The Subject Application meets the requirements of Statewide Rule 95 – 16 Tex. Admin. Code §3.95.

EXAMINERS' RECOMMENDATION

Based on the above findings of fact and conclusions of law, the Examiners recommend that Targa Downstream, LLC's application for a new underground hydrocarbon storage facility through the East Lease, Well No. 34, Barbers Hill Field, Chambers County, Texas, be approved as requested by Targa.

Respectfully submitted,



Brian Fancher, P.G.
Technical Examiner



Randall Collins
Administrative Law Judge