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OIL AND GAS DOCKET NO. 10-0227776

THE APPLICATION OF ONEOK FIELD SERVICES COMPANY FOR AUTHORITY PURSUANT TO STATEWIDE RULE 36 TO INJECT HYDROGEN SULPHIDE GAS INTO ITS SCHAFER RANCH LEASE WELL NO. 1D, INTO THE ARBUCKLE FORMATION IN THE PANHANDLE CARSON COUNTY FIELD AREA, CARSON COUNTY, TEXAS

HEARD BY: Thomas H. Richter, P.E., Technical Examiner

REVIEWED BY: Margaret Allen, Technical Examiner

APPEARANCES

Ana Maria Marsland, attorney
Richard Jones
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REPRESENTING:
Oneok Field Services Co.

EXAMINER'S REPORT AND RECOMMENDATION
STATEMENT OF THE CASE

Oneok Field Services Company ("Oneok") seeks authority pursuant to Statewide Rule 36(c)(10)(A) to reinject produced H₂S (hydrogen sulphide) gas into an existing, permitted saltwater disposal well, the Schafer Ranch Lease Well No. 1D which is currently inactive. The subject well is located at its Gas Plant Facility in the Panhandle Carson County Field area. The proposed injection zone is the Arbuckle Formation which is not productive of oil or gas and does not currently contain H₂S. The examiner proposes the injection formation be designated as a field for proration and tracking purposes to give notice to other operators that the "new field" interval may contain H₂S.

DISCUSSION OF THE EVIDENCE

The Oneok Schafer Gas Plant is located approximately 11 miles west of the City of Pampa. The facility has been in operation for 30 years in the Panhandle Carson County Field as a Gasoline Plant whose operations have included the removal of H₂S components from inlet casinghead gas. Ninety percent of the wells in the area produce oil and gas containing H₂S. There are numerous H₂S gas plants operated by other entities in the area.

The Oneok, Schafer Ranch Well No. 1D was originally drilled and completed by the Skelly

Oil Company in 1966 and produced for several years from the Brown Dolomite. In 1971, Skelly Oil obtained Commission authority to convert the subject well into a saltwater disposal well with an injection interval from 5,832' to 5,966' subsurface depth. The well was completed with 13-3/8" surface casing set at 548' and cement circulated from the casing shoe to the ground surface. Intermediate casing (9-5/8") is set at 2,836' and cement circulated from the casing shoe to the ground surface. The longstring (7") is set at 5,974' and cement circulated from the casing shoe to 4,520'. Perforations from 5,832' to 5,982'. The well was used as a saltwater disposal well until approximately 1996 when it was shut in. Oneok acquired the gas plant and facility from Kinder Morgan approximately one year ago.

Oneok proposes reworking the subject well and equipping it for H₂S gas injection. It proposes removing the existing tubing and packer, the running of new L-80 casing (4-1/2") to 5,775' and cementing the casing from the casing shoe to the ground surface. New 2-3/8" L-80 tubing and packer designed for H₂S service will be installed. A NACE standard injection valve will be placed at the end of the tubing string to prevent backflow (much like a check valve). The tubing casing annulus will be injected with a corrosive inhibitor fluid and 2% KCL with oxygen scavenger and bactericide. All well head equipment, valves, flanges etc will be NACE H₂S certified. The proposed maximum injection pressure is 2000 psig and the maximum injection volume is 200 MCFD.

The Schafer Ranch Gasoline Plant has been Rule 36 certified for many years (Certificate No. 036649). Oneok is responsible for the gathering system, compressor station and the sweetening unit. The inlet H₂S casinghead gas stream has an H₂S concentration of 2099 ppm (parts per million) and a maximum escape volume of 8,099 MCFD. The calculated ROE (radius of exposure) of 100 ppm is 593' and of 500 ppm is 271'. Because a compressor will be used to increase the acid gas pressure for injection, the H₂S concentration will be increased to approximately 354,000 ppm, however, the injection volume will be only 200 MCFD. Thus the greatest risk of a leak is between the compressor and the injection well. The calculated ROE of 100 ppm is 1,012' and of 500 ppm is 462'. There are no public or private dwellings or public roads located within either of the ROE's.

The injection well is located within the fenced confines of the gasoline plant facility. There are already numerous H₂S monitors, wind socks and emergency equipment within the plant confines. The H₂S monitors are set at 10 ppm for an audible alarm and if 20 ppm is detected, the plant's systems automatically are set to purge all gas to the gas plant flare stack. The H₂S compressor and the injection well will each be surrounded by four H₂S monitors. The compressor and injection well will be equipped with Hi-Lo shut down valves.

The certificate of compliance for statewide rule 36 (Form H-9) and the contingency plan have been reviewed and approved, by the Commission, for the proposed injection that includes H₂S. The Department of Public Safety, Sheriff's office and emergency response offices have been briefed on the current application and are aware of the H₂S operations in this entire area over many years. The phone numbers of all contact personnel are listed in the contingency plan.

Notice of hearing was furnished to the County Clerk of Carson County, Myraid Resources Corp., W.O. Operating Co., and the surface owner of the adjoining tract. Notice of this hearing was published in the *Panhandle Herald*, a newspaper having general circulation in Carson County, on November 9, 2000.

A review was made of all wells within one and a half miles of the proposed injection well. All wells within the review area are or were completed in the Panhandle Carson County Field which produces from the Brown Dolomite between 2,800' and 3,300'. The closest well that penetrated the Arbuckle Formation is over one mile away. The Arbuckle is not productive of oil or gas. Oneok performed an injection front profile calculation which shows that after injecting at a sustained rate of 200 MCFD for 20 years, the H₂S would expand to a radius of 455 feet.

EXAMINER'S OPINION

The examiner recommends the application be approved. The application is in compliance pursuant to Statewide Rule 36(c)(10)(A)(ii) and the other relevant provisions of the rule. Introduction of H₂S components into a "clean" formation raises unusual safety concerns. The Arbuckle Formation was used by the subject well as a saltwater disposal well for 25 years. The Commission's Compliance Section is concerned that an uninformed operator may drill a well to or through the Arbuckle Formation in the future not knowing it may contain H₂S. Environmental Services has reviewed the application and expressed no objection to the permit.

A new field designation is proposed which clearly indicates that this formation may contain H₂S. The District Office reviews all Forms W-1 (Application to Drill), not only for a possible H₂S field target, but also for areas where a deeper well may penetrate an existing H₂S field. The examiner proposes the new field designation of Panhandle (Arbuckle-H₂S Displ) Field. The Commission's Proration Schedule will provide field and well tracking, and the District Office will have an easily identifiable field area to check against incoming W-1's.

FINDINGS OF FACT

1. Notice of hearing was furnished to the County Clerk of Carson County, Myraid Resources Corp., W.O. Operating Co., and the surface owner of the adjoining tract. Notice of this hearing was published in the *Panhandle Herald*, a newspaper having general circulation in Carson County, on November 9, 2000.
2. The Oneok Schafer Gas Plant has been in operation for 30 years in the Panhandle Carson County Field as a Gasoline Plant. Its operations have included the removal of H₂S components from the inlet casinghead gas.
3. Ninety percent of the wells in the area produce oil and gas containing H₂S. There are

numerous H₂S gas plants operated by other entities in the area.

4. The Oneok, Schafer Ranch Well No. 1D was originally drilled and completed by the Skelly Oil Company in 1966 and produced for several years from the Brown Dolomite.
5. In 1971, Skelly Oil converted the subject well to saltwater disposal, with an injection interval from 5,832' to 5,966' in the non-productive Arbuckle Formation.
6. The well was used as a saltwater disposal well until approximately 1996 when it was shut in.
7. The subject well is located within the fenced confines of the Schafer Gasoline Plant facility.
8. The well is completed and will be worked over in such a manner to reduce the potential of H₂S leaks and confine the injected gas into the formation into which it is being disposed.
 - a. New 2-3/8" L-80 tubing and a packer designed for H₂S service will be installed.
 - b. A NACE-standard injection valve will be placed at the end of the tubing string to prevent backflow.
 - c. The tubing casing annulus will be injected with a corrosive inhibitor fluid and 2% KCL with oxygen scavenger and bactericide.
 - d. All well head equipment, valves, flanges etc will be NACE-certified for H₂S.
9. The proposed maximum injection pressure is 2000 psig and the maximum injection volume proposed is 200 MCFD.
10. The Schafer Ranch Gasoline Plant has been Rule 36 certified for many years (Certificate No. 036649).
11. The inlet H₂S casinghead gas stream will have an H₂S concentration of 2099 ppm (parts per million) and a maximum escape volume of 8,099 MCFD. The calculated ROE (radius of exposure) of 100 ppm is 593' and of 500 ppm is 271'.
12. The acid gas compressor will increase the pressure for injection and cause the H₂S concentration to be increased to approximately 354,000 ppm though the injection volume will decrease to only 200 MCFD. The calculated ROE of 100 ppm is 1,012' and of 500 ppm is 462'.
13. There are no public or private dwellings, or public roads located within either of the ROE's.
14. The Certificate of Compliance with Statewide Rule 36 (Form H-9) and the contingency plan have been reviewed and approved by the Commission for the proposed injection that will

include H₂S.

15. Oneok has in-place and proposed emergency/safety systems for all injection processes that are designed to prevent or detect an accidental release of H₂S gas.
 - a. There are already numerous H₂S monitors, wind socks and emergency equipment within the plant confines.
 - b. The H₂S monitors are set at 10 ppm for an audible alarm and if 20 ppm is detected, the plants systems automatically are set to purge all gas to the gas plant flare stack.
 - c. The H₂S compressor and the injection well will each be surrounded by four H₂S monitors. The compressor and injection well will be equipped with Hi-Lo shut down valves.
16. All training, security and sign provisions of Rule 36 have been or will be complied with.
17. The contingency plan contains the names and phone numbers of all law enforcement agencies and emergency services.
18. All tubulars and other metal components which will come into contact with H₂S meet NACE standards.
19. The new field designation of Panhandle (Arbuckle-H₂S Displ) will clearly indicate the field to be a H₂S disposal field.
20. Environmental Services has reviewed the application and expressed no objection to the permit.

CONCLUSIONS OF LAW

1. Proper notice was timely given to all parties entitled to noticed pursuant to applicable statutes and rules.
2. All things have occurred and have been accomplished to give the Commission jurisdiction in this case.
3. Oneok Field Services has complied with the safety provisions of Statewide Rule 36.

EXAMINER'S RECOMMENDATION

The examiner recommends that the application of Oneok Field Services to inject gas containing hydrogen sulphide into the Schafer Ranch Lease Well No. 1D in the proposed Panhandle (Arbuckle-H₂S Displ) Field be approved.

Respectfully submitted,

Margaret Allen
Technical Examiner
Office of General Counsel