

July 13, 1999

OIL AND GAS DOCKET NO. 8A-0222023

THE APPLICATION OF UNION OIL COMPANY OF CALIFORNIA TO INJECT HYDROGEN SULFIDE GAS INTO THE REINECKE LEASE WELL NOS. 66, 88, 97, 267 AND 285 IN THE REINECKE FIELD, BORDEN COUNTY, TEXAS

Heard by: Margaret Allen, Technical Hearings Examiner

Procedural history

Hearing requested: June 21, 1999

Hearing held: July 9, 1999

Appearances

Applicant

Bill Black
Mark A. Cochran
James M. Kidd
Jay Mack Waldrop
Frances Merle Steckel

Representing

Union Oil of California

EXAMINER'S REPORT AND PROPOSAL FOR DECISION

STATEMENT OF THE CASE

Union Oil Company of California ("Unocal") is seeking to inject sour gas in its Reinecke Lease Nos. 66, 88, 97, 267, and 285, Reinecke Field into the Canyon Reef formation. Statewide Rule 36(c)(10) require that a public hearing be held before the injection of fluid containing hydrogen sulfide, when "injection fluid is a gaseous mixture...where the 100 ppm radius of exposure is in excess of 50 feet and includes any part of a public area except a public road; or, if the 500 ppm radius of exposure is in excess of 50 feet and includes any part of a public road; or if the 100 ppm radius of exposure is 3,000 feet or greater." The proposed operations require a public hearing.

DISCUSSION OF THE EVIDENCE

Unocal is seeking to dispose of about 15 MMCF of sour carbon dioxide gas produced from twenty Unocal wells in the Reinecke Field. Reinecke Field, whose wells are all operated by Unocal, has been waterflooded. In January of 1998, Unocal began a pilot CO₂ flood in the southern third of the field. The five CO₂ injection wells, the subjects of this application, are located on the top of a Canyon reef and are surrounded by twenty producing wells. The injection wells are perforated between 6600 and 6800 feet.

For its CO₂ injection, Unocal purchased CO₂ that initially had a H₂S content of 10 ppb. The hydrocarbon gas from the producing wells was separated from the sour CO₂ at a plant owned by Texaco. The amount of CO₂ in the gas from the producing wells increased and Texaco's plant was no longer capable of treating the gas. Unocal had to shut-in some wells due to the lack of a place to put the sour gas from the producing wells, but in November of 1998, it installed compression allowing the injection of produced hydrocarbon gas as well as CO₂. New sources of CO₂ entering the distribution line from which Unocal purchases its gas for injection, have greater concentrations of H₂S than the earlier sources. By June of 1999, the percentage H₂S content in the purchased CO₂ for the Reinecke Unit reached 127 ppm.

New permits allowing injection of up to 10 MMCF/D into three injection wells and up to 13 MMCF/D into two of the injection wells have been issued by the Commission. The maximum injection pressure will be 2000 psi through a closed injection system. The calculated exposure radius around only one injection well, of 100 ppm H₂S in the atmosphere, intersects a public highway. The calculated 100 ppm radii of exposure from a catastrophic release of H₂S along all gathering and flow lines, includes 1000 feet of County Road 5 and several thousand feet of FM 1205. There are less than 900 denizens of Borden County and the public highways in the County are not heavily traveled.

Union Pacific has drawn up an emergency response plan and informed the residents of the two houses on the Reinecke Unit of the evacuation routes and procedures. These houses are well outside the 100 ppm H₂S radii of exposure to any possible release of H₂S and no one appeared at the hearing to oppose the application. Signs advising of potential hydrogen sulfide hazards are posted along the gathering system and along the public highways that cross the radii of exposure. There are locked gates with warning signs preventing access by the general public to the unit. Notice of this hearing was also sent to the County Clerk of Borden County.

The system is designed with numerous safeguards and the injection well compressors will be shut-down if the individual well compressors detect low suction pressures, high discharge pressure or high discharge temperatures. If compression is shut down, the producing wells will also be shut-in.

Form H-9, required for injection of H₂S, indicates that the applicant requests up to 1130 ppm of H₂S may be in the gas injected. The maximum escape volume is calculated to be 68,500 MCF/D which can cause 100 ppm H₂S gas to extend to a radius of 1532 feet. The 500 ppm radius of exposure can be as much as 700 feet away from the point of release. The District 8A Director has approved the Form H-9 required for approval of the injection of sour gas which indicates that Unocal's contingency plan satisfies the requirements of Statewide Rule 36.

If this application is denied, Unocal will have to cease its tertiary injection program. The tertiary program to date has been a technical success but has not yet been profitable. Any alternate means of disposal for the H₂S, would increase the cost of the project and cause immediate cessation of tertiary recovery operations.

FINDINGS OF FACT

1. Notice of this application to inject fluid containing hydrogen sulfide was issued to all surface owners, residents, offset operators, and the Borden County Clerk on June 25 or June 29, 1999.
2. Notice of this application was published in the Borden Starr on June 30, 1999.
3. Union Oil of California is conducting a tertiary CO₂ injection project in part of the Reinecke Field.
4. The five injection wells on the top of the Canyon reef structure are surrounded by 20 producing wells.
5. The CO₂ injected into these wells is purchased from a distribution line that gathers CO₂ from other fields.
6. CO₂ injection began in January of 1998, and at that time, Texaco processed the hydrocarbon gas and CO₂ that came from the producing wells.
7. After the percent of CO₂ in the produced gas increased, Texaco's plant could no longer process the produced gas.
7. If this application is approved, Unocal will inject all the gas from the producing wells directly into the injection wells.
8. The produced gas that Unocal will inject, if this application is approved, contains hydrocarbons, CO₂ and H₂S, and can be referred to as sour gas.
9. Originally the CO₂ purchased for injection had a very low H₂S content but the amount of H₂S contained in the purchased gas has increased to 127 ppm.
10. Maximum injection rate per well will be 10 to 13 MMCF per day, at a maximum injection pressure of 2000 psi.
11. During a catastrophic failure of the injection lines and/or the injection wells, portions of public highways (FM 1205 and CR 5) will be within the radius of exposure to gas that is over 500 ppmH₂S.
12. The injection wells and flow lines transmitting sour gas, will be designed to contain the sour

gas, and monitoring devices will immediately shut down the system if any leakage of sour gas is detected.

13. A contingency plan has been devised to warn residents, county officials, and law enforcement immediately if there is any hazardous release of sour gas and the District Office has approved this plan.
14. Unless the proposed method of injecting the sour gas into the injection wells is approved, the tertiary recovery project will be abandoned.

CONCLUSIONS OF LAW

1. Proper notice was issued as applicable in all statutes and regulatory codes.
2. All things have occurred and been accomplished to give the Commission jurisdiction in this matter.
3. The application of Union Oil of California to inject hydrogen sulfide gas containing gas into the Reinecke Unit Well Nos. 66, 88, 97, 267 and 285 in the Reinecke Field, Borden County, substantially complies with the applicable provisions of Statewide Rule 36, 16 T.A.C. §3.36.

EXAMINER'S RECOMMENDATION

Based on the above findings and conclusions, the examiner recommends that the application of Union Oil of California be **APPROVED**.

Respectfully submitted,

Margaret Allen
Technical Hearings Examiner

Date of Commission Action _____