

OIL AND GAS DOCKET NO. 08-0256399

THE APPLICATION OF WHITING OIL AND GAS CORP. TO INJECT FLUID CONTAINING HYDROGEN SULFIDE GAS INTO A RESERVOIR PRODUCTIVE OF OIL OR GAS PURSUANT TO STATEWIDE RULE 36 FOR NUMEROUS LEASES, WARD-ESTES, NORTH FIELD, WARD COUNTY, TEXAS

HEARD BY: Donna K. Chandler, Technical Examiner

DATE OF HEARING: May 14, 2008

APPLICANT:

Philip Whitworth
Mark Hanna
Pete Hagist

REPRESENTING:

Whiting Oil and Gas Corporation

EXAMINER'S REPORT AND PROPOSAL FOR DECISION

STATEMENT OF THE CASE

Whiting Oil and Gas Corporation seeks authority pursuant to Statewide Rule 36(c)(10)(A) to inject H₂S-CO₂ (hydrogen sulphide-carbon dioxide) gas for secondary recovery operations for more than 700 injection wells on the following leases in the Ward-Estes, North Field:

Hutchings Stock Assn. Lease	07337
E. W. Estes	07336
S. B. Edwards	07352
Lucy Edwards	07358
W. A. Estes	10901
HSA Sec 9/10 CO2	32510
HSA Sec 3 CO2	32404

Whiting has made separate application for Rule 46 authority for each well. This application pursuant to Rule 36 was unopposed and the examiner recommends approval.

DISCUSSION OF THE EVIDENCE

The Ward-Estes, North Field was discovered in 1929. The field covers over 58,000 acres and produces from the Yates, Seven Rivers and Queen formations. Gas injection for pressure maintenance commenced in 1940 and waterflooding began in 1955. In 1989, a CO₂ tertiary project was initiated by Chevron in a portion of the field, but was never fully implemented. Cumulative production from the field is over 382 million BO and 233 BCF of gas.

Whiting Oil acquired numerous leases in the field in 2005 with plans to implement a very large tertiary recovery project. Whiting has recently obtained Rule 36/46 authority from the Commission for its 22,000 acre G. W. O'Brien lease in the northern part of the field. Injection has started on the O'Brien lease. The tertiary project which is planned for the seven subject leases will be implemented in six phases over a period of 8-10 years.

The native gas produced from the field contains approximately 1,350 ppm H₂S. After sufficient water injection has occurred in the field to reach miscibility pressure, CO₂ injection will commence. The produced casinghead gas, containing both CO₂ and H₂S, will be recycled throughout the project. Whiting estimates that about 700 wells on the subject leases will be used for injection, though many more wells are being permitted, as the placement of injection wells may need to be altered.

The CO₂ distribution trunk line will have a maximum daily capacity of 200,000 MCF. For calculation of radii of exposure, Whiting used an H₂S concentration of 3,000 ppm. The 100 ppm ROE for the distribution system trunk line is 5,519 feet and the 500 ppm ROE is 2,522 feet. The 100 ppm ROE includes all of the city of Wickett, Texas, numerous residences and businesses and portions of FM 1219, FM 1776, US Hwy 57, Hwy 18 and I-20. The 500 ppm ROE includes a portion of the city of Wickett, several residences and businesses, and portions of FM 1219, US Hwy 57, Hwy 18 and I-20. The ROE's calculated for the distribution system include all areas which would be included in the ROE's for the gathering system and injection wells. The Certificate of Compliance (Form H-9) and the contingency plan has been reviewed and approved by the Commission's District Office for the proposed injection project.

Automatic emergency shut-down valves (ESD's) are installed at strategic locations on the gathering line and the injection system. These valves will automatically close whenever a sudden loss of pressure is detected. All producing and proposed injection wells will be equipped with tubulars and wellhead equipment designed for H₂S-CO₂ service and installed according to NACE MR-0175 standards. Each injection well will be equipped with a check valve to prevent backflow into the lateral.

Whiting has placed fixed H₂S monitoring units at various locations throughout the field, including along the north and east sides of Wickett. The monitors are capable of detecting 0-25 ppm H₂S. Audible and visual alarms will be trigger whenever an H₂S level

of 10 ppm is detected. The entire injection system will be monitored at the CO₂ plant control room, which is manned seven days a week, 24 hours a day.

Notice of hearing of this application was published in the *Monahans News*, a newspaper of general circulation in Ward County, for four consecutive weeks on April 10, 17, 24 and May 1, 2008. Notice of hearing was provided to all affected parties on April 10, 2007.

FINDINGS OF FACT

1. Notice of hearing of this application was published in the *Monahans News*, a newspaper of general circulation in Ward County, for four consecutive weeks on April 10, 17, 24 and May 1, 2008. Notice of hearing was provided to all affected parties on April 10, 2008.
2. The Ward-Estes, North Field was discovered in 1929 and encompasses over 58,000 productive acres.
3. Cumulative production from the field is over 382 million BO and 233 BCF of gas.
4. Whiting was granted approval for a tertiary CO₂ project on it's G. W. O'Brien lease approximately one year ago. The proposed project expansion will include the seven subject leases, on which injection will be initiated in 6 phases over 8-10 years.
4. The Certificate of Compliance (Form H-9) and the contingency plan has been reviewed and approved for the proposed injection that includes H₂S. The approved H-9 is based on an H₂S concentration of 3,000 ppm and a maximum escape volume of 200,000 MCFD. The 100 ppm radius of exposure (ROE) is 5,519 feet and the 500 ppm ROE is of 2,522 feet.
5. The 500 ppm ROE includes several residences and businesses, a portion of the City of Wickett, and portions of FM 1219, State Hwy18, State Hwy 57, and I-20. The 100 ppm ROE includes the entire City of Wickett, additional residences and businesses and portions of FM 1776.
6. Whiting proposes emergency/safety systems for all injection processes that are designed to prevent or detect an accidental release of H₂S gas.
 - a. The gas plant is manned 24 hours a day and all monitor/alarms are transmitted to the control room at the gas plant.
 - b. Automatic shut down valves are strategically located on the gathering line and the injection system.

- c. All producing and proposed injection wells will be equipped with tubulars and wellhead equipment designed for H₂S-CO₂ service and installed according to NACE MR-0175 standards.
 - d. H₂S monitors/alarms have been located throughout the field, including along the north and east sides of the City of Wickett and near residences and businesses.
 - e. All monitors are equipped with sensors capable of detecting 0-25 ppm H₂S and will trigger audible and visual alarms at levels above 10 ppm.
 - f. Each injection well will be equipped with a check valve to prevent backflow into the lateral.
7. All training, security and sign requirements of Rule 36 have been or will be complied with.

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. Whiting Oil and Gas Corp. has complied with the safety provisions of Statewide Rule 36.

EXAMINER'S RECOMMENDATION

The examiner recommends approval of the application of Whiting Oil and Gas Corp. to inject gas containing hydrogen sulfide on the subject leases in the Ward-Estes, North Field.

Respectfully submitted,

Donna K. Chandler
Technical Hearings Examiner