

TEAGUE PILOT PRESSURE MAINTENANCE PROJECT**Teague Field**

The Teague Field, approximately ten miles south of Eunice, in southeast New Mexico is a northwest-southeast trending anticline located on the western flank of the Central Basin Platform. The field produces from stacked Permian age reservoirs as well as the deeper Devonian, Simpson and Ellenburger formations. Cumulative production from all horizons is 18 Million barrels of oil and 60 Billion cubic feet of gas. Production on the Arch leasehold totals 8 Million barrels and 29 Billion cubic feet of gas. The current rate from the Arch leasehold is 1,198 BOPD and 4,410 MCFPD as of (5/01).

Teague Blinebry Pool

Gulf discovered the Teague Blinebry in 1968. Arch Petroleum Inc purchased the Chevron operated leases in 1994. Subsequently the field was infilled to 20 acre spacing. In 1997 the verticle limits of the Teague Blinebry Pool were extended to include the Paddock formation and redesignated as the Teague-Paddock-Blinebry Pool. Production on the Arch leasehold totals 4.2 million barrels oil and 24 BCF gas. The current rate from Arch leasehold is 627 BOPD and 3,910 MCFD from 60 active producers (see production plot).

The Blinebry Formation (called upper Clearfork in Texas) is a back reef carbonate consisting of a very fine mudstones to a fine- medium crystalline sucrosic dolomite. The average gross thickness is 650'. The net pay per well ranges from 75' to 250'. Wells that are higher structurally tend to have greater net pay. Anhydrite occluding of porosity occurs through out the field, but is more predominant along the flanks of the structure. Core measurements from the Lamunyon # 50 indicate permeability ranging from <0.1 to 13 md and porosity from 1 to 15%. Most high permeability and porosity occurs in the top 200 feet of the Blinebry. Step rate testing in the Lamunyon # 62 indicates an effective permeability of 1.15 to 2.09 md. This number is much greater than the matrix permeability of core samples indicating that there must be an effective permeability contribution from a natural fracture system. The core in the Lamunyon # 50 displays a fracture system partially filled with anhydrite.

Paddock Workovers

Detailed geological evaluation of behind pipe potential in the Teague Field identified significant opportunities. In particular, the recognition of a porous dolomite interval in the lower Paddock as an unexploited reservoir resulted in the successful 1999-2000 workover program. The initial completion in the reservoir was the Lamunyon # 51 in December 1998 with an IP flowing of 120 BOPD + 266 MCFD + 25 BWPD. The well was plugged back from the Blinebry and perforated from 5165-5205 in the lower Paddock, acidized and fracture stimulated with 85,000# sand. During the following two years 32 additional workovers and 4 new drills were completed. The Paddock reservoir is in the early stages of depletion and displays the characteristics of a true solution gas reservoir. The original Reservoir pressure was 1614 psi.

The Paddock formation is a Permian Upper Leonardian carbonate correlative to the upper Clearfork in Texas. It is 300 feet thick throughout the Teague Field. It is bound above

by the Glorieta formation and below by the Blinebry formation. The environment of deposition was a carbonate ramp gently dipping southwest to the Delaware basin. Many repeated transgressions and regressions deposited cycles of carbonate grainstones, wackestones, and mudstones along the ramp. Later resurgence of local structural features reshaped the sediments into the present anticlinal form.

The Paddock can be divided into several stratigraphic zones each consisting of one or more cleaning upward cycles. Each cycle grades down from clean packstones and wackestones to mudstones and shales. The upper one half of the Paddock is very porous and permeable. Good mudlog shows are encountered while drilling, however production tests yield only 10 % oil cuts with 90% fresh sulfur water. **The commercially productive oil reservoir is limited to zones 4 and 5 in the lower half of the Paddock formation (see cross section A-A').**

The Paddock 5 zone ranges in thickness from 60 to 90 feet. It is bound above by a thin evaporitic low permeability dolomite that acts as a seal between the oil pay and the sulfur water zones above. The base of the Paddock 5 zone is a thin organic rich lignitic shale. This shale correlates through most of the Teague field and forms a useful time line that represents a significant low stand event. The shale also provides a seal for the Paddock 4 zone below.

The Paddock 4 zone ranges in thickness from 40' to 70' thick. It is bound above by the dark Paddock 5 shale and below by a shaly dolomite.

The Paddock 1,2,& 3 zones consist of a 30'-50' thick anhydritic, tight dolomite with very little effective porosity. This section represents a low stand event dominated by evaporite deposition and serves as a seal for the underlying Blinebry reservoir.

Core Summary

Paddock cores were taken in the Seeton #3 and the Travis # 4 wells. Below is a table of average reservoir parameters taken from core data:

WELL/ZONE	AVERAGE POROSITY, %	AVERAGE MAXIMUM PERM, md	AVERAGE 90 DEGREE PERM, md	AVERAGE VERTICLE PERM, md
SEETON #3				
PADDOCK 5	13	16	12	8
PADDOCK 4	14	30	23	18
TRAVIS # 4				
PADDOCK 5	14	11	8	6
PADDOCK 4	14	17	14	11

OOIP CALCULATIONS

The OOIP was calculated using the volumetric method for each well. The combined OOIP is 16 million barrels for the 723-acre productive area. Estimated ultimate primary reserves based on a 15 percent recovery factor is 2.4 million barrels. It may be possible to recover an equal amount or 2.4 million barrels through secondary water flooding.

Special analysis performed on selected core samples confirms that significant secondary recovery is possible.

Injection Interval

The proposed injection interval in the Teague Paddock-Blinebry Pool is defined as the interval from 4997' to 5950' in the Type Log: Arch Petroleum Inc., C.E. Lamunyon #51(see type log). This well is located in the pilot area in unit A, section 21, T23S R37E.

Conclusion

Arch Petroleum is requesting approval to install a pressure maintenance pilot project to test the feasibility of water flood. The pilot would consist of 1 injector and 4 surrounding producers. The Lamunyon #79WI will be drilled in the NE quarter of Section 21. Water will be injected into the Paddock Pay from approximately 5100' to 5250'. The surrounding wells will be monitored for response.

The pilot will be located on the Lamunyon lease, which is owned by Arch Petroleum 100 percent. No unitization will be necessary to implement the pilot.