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**WAGONWHEEL PROSPECT**  
**EDDY COUNTY, NEW MEXICO**

BEFORE THE  
OIL CONSERVATION DIVISION  
Santa Fe, New Mexico

Case No. 11545 Exhibit No. 7

Submitted by: Penwell Energy, Inc.

Hearing Date: June 13, 1996

**INTRODUCTION**

Wagonwheel Prospect is located in west central Eddy County, immediately to the south and east of the giant Indian Basin Field. The primary objective at Wagonwheel is a gas and oil bearing Cisco-Canyon reef with an estimated thickness approaching 500'. The reef targeted at Wagonwheel is a direct extension of the productive Cisco-Canyon reef developed along trend to the northeast which forms the reservoir and trap at Indian Basin, Dagger Draw South and Dagger Draw North Fields. Secondary objectives include reefal buildups in the Wolfcamp section, along with gas bearing channel sands in the Pennsylvanian Morrow section.

The Cisco-Canyon reef is one of the most prolific reservoirs in Southeast New Mexico as is evidenced by field and individual well cumulatives. Indian Basin, through September 1995 had produced 1.4 TCFG and 8.7 MMBO from approximately 96 wells, averaging 14 BCFG and 90 MBO/well. The Field is currently producing 4 BCFG and 33 MBO/month. Dagger Draw North and South, through September 1995, had produced in excess of 35 MMBO and 158 BCFG from approximately 280 wells, averaging to date 125 MBO and 564 MMCFG/well. The fields are currently producing 800 MBO and 3 BCFG/month, which averages out to approximately 2850 BO and 10 MMCFG/month/well.

The proximity of the Wagonwheel reef to the Indian Basin-Dagger Draw reef, along with the indicated relief associated with the Wagonwheel reef, suggests highly favorable conditions for stratigraphic entrapment of hydrocarbons within the proposed Wagonwheel Unit area.

**CISCO-CANYON GEOLOGY AND RESERVE POTENTIAL**

The accompanying Cisco-Canyon Structural Cross-Section A-A' illustrates reef morphology and trapping geometries in the Wagonwheel area. The cross-section

documents the presence of two rock types within the Cisco-Canyon interval, a tight limestone facies and a porous reef dolomite facies. The dolomite facies is encased in the tight limestone and pinches out updip to the west at point A. Isopach mapping of the dolomite reservoir facies indicates the Wagonwheel reef is, depositionally, part of the Indian Basin-Dagger Draw reef complex. Post depositional structural activity separated the two areas through creation of a syncline. This syncline bounds the southwest side of Indian Basin and the northeast side of Wagonwheel. Evidence of this area as a persistent low through time is suggested by thinning of the reef into the low. Conversely, evidence of persistent structural highs is suggested by thickening of the reef facies away from the syncline to the northeast, into Indian Basin and to the southwest, into the Wagonwheel area. Thick reservoir facies is documented in the prospect area by the Inexco-L.A. Federal #1 and #2 wells in sections 11 and 12, T22S, R22E, respectively; the Midwest-Federal "M" #1 in section 23 and the Inman-Cawley Draw #1 in section 3. These wells document reef thicknesses in excess of 400' and create ideal conditions for Indian Basin-Dagger Draw type trapping geometries.

Regional dip across Wagonwheel is established by structure mapping on the Cisco Shale, which is illustrated on cross-section A-A'. The key well on the prospect, the Midwest-Federal "M" #1, is 187' regionally downdip to the Atlantic Richfield-Cawley Unit #1 in section 16 and 250' regionally downdip to the El Paso-Patterson "A" #1 in section 20. Significantly, however, structure on top of the dolomite facies is counter to regional dip, indicating strong potential for closure on this horizon. The top of the dolomite facies in the Midwest-Federal "M" #1 is 68' high to the Atlantic-Cawley Unit #1 and 92' high to the El Paso-Patterson "A" #1, thereby establishing critical dip on top of the reservoir section. Further mapping on this horizon indicates potential for approximately 100-150' of stratigraphic closure resulting from reef growth and regional tilting. Cross-section A-A' illustrates this stratigraphic closure while also illustrating the second potential trapping geometry which results from the updip pinchout of individual zones within the reef. Critical dip and/or loss of reservoir is established in the prospect area by existing subsurface penetrations on the north, west and south sides of the prospect.

Drillstem tests in the Cisco-Canyon dolomite section on the key wells flanking the reef further confirm reservoir quality by establishing both bottomhole reservoir pressures and flow pressures. In addition, it is significant that the highest existing penetration on the reef, the Midwest-Federal "M" #1 in section 23, while recovering substantial volumes of water, also flowed gas to surface through two inch tubing indicating both outstanding reservoir conditions and hydrocarbon charging of the feature. High proven water on the Wagonwheel feature is currently established at a subsea elevation of 3082' by the Midwest-Federal "M" #1 drillstem test. An estimated gas/water contact at a subsea elevation of -3050 is projected based on the show of gas in the Midwest-Federal "M" #1 drillstem test. This subsea elevation forms the basis for the outline of the proposed Wagonwheel Federal Unit. Should this elevation be confirmed, the Unit would yield 15 prospective locations above the -3050' elevation on 320 acre spacing.

Estimation of reserve potential at Wagonwheel can be accomplished through a comparison of producing Cisco-Canyon Fields. Cisco-Canyon Fields of similar size and trapping geometries have been developed at Springs and Lake McMillan. Springs Field exhibits approximately 60 feet of stratigraphic closure, while Lake McMillan Field exhibits approximately 250 feet of stratigraphic closure. Springs Field has produced 23 BCFG and 685 MBO from 6 wells, averaging 3.8 BCFG and 114 MBO/well. Lake McMillan, while still on-line, has produced 14 BCFG and 350 MBO from 5 wells, averaging to date 2.8 BCFG and 70 MBO/well. The Lake McMillan wells are currently averaging 1.4 MMCFGPD and 40 BOPD/well. Indicated relief on the Wagonwheel feature compares with the Springs and Lake McMillan features, suggesting reserves could be reasonably expected in the range of 4 BCFG and 120 MBO/well. Subsurface mapping indicates potential for 15 locations at Wagonwheel on 320 acre spacing.

### **WOLFCAMP AND MORROW GEOLOGY AND RESERVE POTENTIAL**

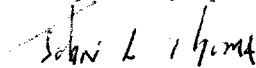
Wolfcamp carbonates and Morrow clastics offer significant reserve potential in the area while also mitigating dry hole risk. Wolfcamp production directly offsets the prospect area in Rocky Arroyo Field. The El Paso Patterson "A" #1, located in section 20, T22S, R22E and also illustrated on Cisco-Canyon Cross-Section A-A', produced 3 BCFG from a Wolfcamp reef and is still producing at the rate of 8 MMCFG/month. Other penetrations in the area have recorded both oil and gas shows from Wolfcamp reservoirs, indicating a charged section with attractive reservoir potential.

Morrow depositional trends in the prospect area assume a northwest-southeast orientation and are the result of channels incising the Barnett shale. Traps are stratigraphic and are formed by either updip termination of these channels or by occlusion of porosity by clay deposition. Excellent reservoir is documented in the prospect area by the Inexco L.A. Federal #1 located in section 11 and the Midwest Federal "M" #1 in section 23, T22S, R22E. The Federal "M" #1 yielded water with shows of gas during production testing of the objective Morrow reservoir. The L.A. Federal #1 drillstem tested the subject sand with gas to surface at rates up to 918 MCFPD. Pipe and sample chamber recovery included 7,534 feet of salt water and 2100cc of condensate and gas cut salt water. Measured bottomhole pressures indicated a reservoir with significant extent. The strong show of hydrocarbons suggests proximity to a trap. The Wagonwheel lease block is positioned immediately adjacent to, and updip of, both the L.A. Federal #1 and Federal "M" #1 wellbores. The proposed location in section 22 will be updip of these show wells. Similar trapping conditions have proven productive at Box Canyon Field, located approximately 7 miles northwest of Wagonwheel, where downdip water bearing sands have tested productive in updip offsets. Producing Morrow wells at Box Canyon have yielded approximately 2 BCFG/location. Existing Penwell leasehold at Wagonwheel holds potential for up to 6 Morrow locations spaced on 320 acres. Assuming per well reserves comparable to Box Canyon, Wagonwheel offers up to 12 BCFG from the Morrow section.

## SUMMARY

Wagonwheel offers significant gas and condensate potential from prolific Cisco-Canyon reservoirs which produce along trend in Indian Basin and Dagger Draw Fields. Existing subsurface penetrations in the prospect area define a closure on the Cisco-Canyon dolomite which could yield up to 15 locations within the proposed Unit boundary. Reserve potential for the Cisco-Canyon feature is estimated at 4 BCFG and 120 MBO/well, with the proposed Unit area offering gross reserve potential of 60 BCFG and 1.8 MMBO. Secondary objectives in the shallower Wolfcamp and deeper Morrow section could increase reserve potential by 3-5 BCFG/well, with up to 6 prospective locations within the Unit area.

Respectfully Submitted,

A handwritten signature in black ink, appearing to read "John L. Thoma".

John L. Thoma  
Geologist, Penwell Energy, Inc.