STATE OF NEW MEXICO
DEPARTMENT OF ENERGY, MINERALS AND NATURAL RESOURCES
OIL CONSERVATION DIVISION

APPLICATION OF PARALLEL PETROLEUM CORPORATION FOR APPROVAL OF A UNIT AGREEMENT EDDY COUNTY, NEW MEXICO. **CASE NO. 13862**

AFFIDAVIT OF MICHAEL M. GRAY

BEFORE THE OIL CONSERVATION COMMISSION
Santa Fe, New Mexico
Case No. 13862 Exhibit A
Submitted by:
PARALLEL PETROLEUM CORPORATION
Hearing Date: January 18, 2007

STATE OF TEXAS)
) ss.
COUNTY OF MIDLAND)

I, Michael M. Gray, being first duly sworn on oath, states as follows:

1. My name is Michael M. Gray. I reside in Midland County, Texas. I am the Landman employed by Parallel Petroleum Corporation ("Parallel") who is responsible for the formation of the proposed Walnut Draw State Exploratory Unit ("the Unit") comprised of 1,040 acres, more or less, of State of New Mexico lands situated in Eddy County, New Mexico. The horizontal limits of said Unit Area are described as follows:

Township 18 South, Range 21 East, N.M.P.M.

Section 24: S/2, S/2 NW/4
Section 25: All

2. Parallel, as the designated Unit Operator in the Walnut Draw State Exploratory Unit Agreement, proposes the formation of the Unit to test all formations from the surface to the top of the Wolfcamp shale formation.

3. The initial unit well will be drilled at a surface location 660 feet FNL and 230 feet FEL with an orthodox penetration point in the Wolfcamp formation 670 feet FNL and 660 feet FEL with an orthodox terminus in the Wolfcamp formation at 760 feet FNL and 660 feet FWL of Section 25, Township 18 South, Range 21 East, NMPM Eddy County, New Mexico to an approximate vertical depth of 4,550' feet and an approximate measured depth of 8,733 feet to test all formations from the surface to the top of the Wolfcamp shale formation. The estimated costs for this well are $2,411,400.

(The AFE is attached as Exhibit 1).

4. Attachment A to the Affidavit is a copy of the Unit Agreement for the proposed Walnut Draw State Exploratory Unit. This agreement is on the New Mexico State Land Office State/Fee Unit Agreement form.

5. Attachment B to the Affidavit is the plat to the Unit Agreement that shows the boundaries of the Walnut Draw State Exploratory Unit. Attachment B-1 is a copy of the C-102 location plat depicting the location of the initial unit test well.

6. Attachment C to this Affidavit is a copy of Schedule B to the Unit Agreement for the Walnut Draw State Exploratory Unit that identifies the working interest ownership in the unit area. One hundred percent of the working interest in the Unit Area is committed to the Unit.

7. The schedule under Attachment C to the Affidavit also identifies the royalty interest and overriding royalty interest in the Unit Area. One hundred percent of the royalty interest is owned by the State of New Mexico. Attachment D to this Affidavit is a letter from the New Mexico Commissioner of Public Lands giving preliminary approval of the State Land Office to the proposed Walnut Draw State Exploratory Unit.

8. All of Parallel's interest in the Unit Area has been committed to the Unit.

9. Attachment E to this affidavit is a Gross Isopach Map of the Wolfcamp pay (porosity) "target zone". This is the interval that is targeted for horizontal drilling. It demonstrates the rather irregular nature (i.e.: thickness and distribution) of the target pay interval across the proposed unit area. Porosity within this play occurs as 2' to 10' thick "spiky" (5% to 14%) units separated by low porosity dolomites and limestones. Core analysis indicates the presence of intercrystalline porosity, probably related to diagenetic alteration of limestone to dolomite. This porosity was proven to be gas charged when production was established in *Cottonwood Creek; Cottonwood Creek, East; Cottonwood Creek, West; Eagle Creek; High Hope; High Hope, East; Collins Ranch; Collins Ranch N.E., Gopher; Antelope Sink; Antelope Sink, West; and Runyon Ranch* fields. These fields were established when Pennsylvanian (Morrow) exploratory wells were plugged-back to the Wolfcamp reservoir which was considered a salvage zone. Poor reservoir characteristics (porosity and permeability), which could not be improved by completion techniques such as fracture treatments, resulted in recoveries of hydrocarbons which did not justify commercial development. Based on the distribution of these fields and the widespread occurrence of porosity (extending

approximately 30 miles by 8 miles across portions of Eddy and Chaves Counties), a probable depositional setting for this reservoir is an open to restricted platform environment behind a Wolfcamp platform margin situated basinward (southeast) from the production. This platform would have formed as part of the Northwest Shelf (landward along the northwest margin of the Delaware Basin). Cores and open hole logs indicate the porosity is typically overlain by anhydrite filled dolomitic carbonates. Well control located to the northwest suggests that the gas filled porosity becomes increasingly occluded by anhydrite in that direction (in response to the increasingly more saline conditions that were present during deposition). It seems probable that up-dip anhydrite-filled porosity is the stratigraphic trap responsible for this hydrocarbon filled play.

10. Attachment F to this affidavit is a Structure Map of the top of the Wolfcamp shale. This shale represents a regionally deposited zone from which true structural dip across the proposed unit can be established. Dip determination is critical for the planning and design of each lateral to keep the well path within the target porosity horizon.

11. Attachment G is a northwest-southeast oriented Stratigraphic Cross-section (A-A') which incorporates porosity well logs of the Wolfcamp pay (horizontal target zone) on both sides of the proposed unit. These well logs demonstrate gradual thinning of the pay to the northwest.

12. Attachment H is a north-south oriented Stratigraphic Cross-section (B-B'), which also incorporates porosity well logs from former vertically productive wells, but also includes pilot hole logs for recent horizontally directed wellbores. Fracture porosity is also critical to overall recoveries of natural gas. Oriented core analysis, micro-seismic monitoring and FMI logs within this play, all suggest a roughly northeast-southwest general fracture orientation. Most operators have re-designed well path orientation from north-south to east-west in order to maximize fracture encounters within laterals. The potential of enhanced recoveries of natural gas from fracture systems is suspected since well performance in recent horizontally drilled wells cannot be determined based on the pay/porosity thickness encountered in the pilot hole. The Attachment H (cross-section B-B') demonstrates this by the fact that the Parallel *Box Top 1921 Federal* #1 well does not have any demonstrably higher or thicker porosity than any of the adjacent wells displayed on this cross-section, but has significantly out performed any well included on either of the cross-sections.

13. If the initial unit well is successful, additional wells will be drilled in the Unit Area. Accordingly, approval of the unit agreement will result in the efficient recovery of hydrocarbons.

14. The primary target is the Wolfcamp formation. Parallel is proposing to drill a horizontal wildcat well to develop natural gas production on acreage where there has been non-commercial vertical production.

FURTHER AFFIANT SAYETH NOT.

Michael M. Gray

SUBSCRIBED AND SWORN before me on this 15th day of January, 2007.

Notary Public

PAMELA J. REECE
NOTARY PUBLIC
STATE OF TEXAS
My Comm. Expires 01-03-2008

My Commission Expires:
01-03-2008