District I
1625 N. French Dr., Hobbs, NM 88240
District II
[illegible] Grand Avenue, Artesia, NM 88210
District III
[illegible] Razos Road, Aztec, NM 87410
District IV
[illegible] Francis Dr., Santa Fe, NM 87505

State of New Mexico
Energy Minerals and Natural Resources

Oil Conservation Division
1220 South St. Francis Dr.
Santa Fe, NM 87505

RECEIVED NOV 2006 OCD-ARTESIA

Form C-
May 27, 2

Submit to appropriate District Of

☒ AMENDED REPC

APPLICATION FOR PERMIT TO DRILL, RE-ENTER, DEEPEN, PLUGBACK, OR ADD A ZONE

[1] Operator Name and Address	[2] OGRID Number
Wagner & Brown, Ltd P O Box 1714, Midland, TX 79702	24499
	[3] API Number 30- 005- 63871

[3] Property Code	[5] Property Name	[6] Well No.
	State 18 Com 36169	1

[9] Proposed Pool 1	[10] Proposed Pool 2
Wildcat; Pennsylvanian	WILDCAT; Silvo-Devonian 96542

[7] Surface Location

UL or lot no.	Section	Township	Range	Lot Idn	Feet from the	North/South line	Feet from the	East/West line	County
F	18	4S	27E		2400	North	1980	West	Chaves

[8] Proposed Bottom Hole Location If Different From Surface

UL or lot no.	Section	Township	Range	Lot Idn	Feet from the	North/South line	Feet from the	East/West line	County

Additional Well Information

[11] Work Type Code	[12] Well Type Code	[13] Cable/Rotary	[14] Lease Type Code	[15] Ground Level Elevation
New Well	Gas	Rotary	State	3866
[16] Multiple	**[17] Proposed Depth**	**[18] Formation**	**[19] Contractor**	**[20] Spud Date**
No	7000'	Montoya	Patterson UTI	12/01/06

Depth to Groundwater	Distance from nearest fresh water well	Distance from nearest surface water
No records found	No records found	No records found

Pit: Liner: Synthetic ☒ 5-7 mils thick Clay ☐ Pit Volume: _____ bbls
Closed-Loop System ☐ approx 21,000
Drilling Method: Rotary
Fresh Water ☒ Brine ☐ Diesel/Oil-based ☐ Gas/Air ☐

[21] Proposed Casing and Cement Program

1000 - 1500

Hole Size	Casing Size	Casing weight/foot	Setting Depth	Sacks of Cement	Estimated TOC
12-1/4"	8-5/8"	14#J55 ST&C	1500'	724	surface
7-7/8"	5-1/2"	17#J55 LT&C	7000'	1160	1000' *
	2-3/8"	4.7# L80EUE	6750'		

* Verify by CBL or Temp Survey; Fresh Water Mud for Surface hole

[22] Describe the proposed program. If this application is to DEEPEN or PLUG BACK, give the data on the present productive zone and proposed new productive zo
Describe the blowout prevention program, if any. Use additional sheets if necessary.

Drill a 12-1/4" hole, set 8-5/8" casing @ 1500', cement w/724 sx of cement to surface. Nipple up Shaffer 11" 3000 psi Type E w/(2) 3" openings below the rams, Shaffer 11", 3000 psi Annular w/5000 psi choke manifold, drill 7-7/8" hole to 7000' TD. E-logs will be ran at TD, if shows are indicative of commercial quantities of oil/gas, then 5-1/2" casing will be ran and cemented.
Estimated top of Glorietta Formation is 2230' below ground level.

Approval for Work Only and NSL/NSP required to produce

[23] I hereby certify that the information given above is true and complete to the best of my knowledge and belief. **I further certify that the drilling pit will be constructed according to NMOCD guidelines ☒, a general permit ☐, or an (attached) alternative OCD-approved plan ☐.**
Signature:

Printed name: Billy W. Harris
Title: Senior Petroleum Engineer
E-mail Address:
Date: 11/16/06 Phone: 432-682-7936

OIL CONSERVATION DIVISION

Approved by: BRYAN G. ARRANT
Title: ~~DISTRICT II GEOLOGIST~~
Approval Date: NOV 17 2006 Expiration Date: NOV 17 2007
Conditions of Approval Attached ☐

District I
1625 N. French Dr., Hobbs, NM 88240
District II
1301 W. Grand Avenue, Artesia, NM 88210
District III
1000 Rio Brazos Rd., Aztec, NM 87410
District IV
1220 S. St. Francis Dr., Santa Fe, NM 87505

State of New Mexico
Energy, Minerals & Natural Resources Department
OIL CONSERVATION DIVISION
1220 South St. Francis Dr.
Santa Fe, NM 87505

RECEIVED
NOV 2006
OCD - ARTESIA

Form C-102
Revised October 12, 2005
Submit to Appropriate District Office
State Lease - 4 Copies
Fee Lease - 3 Copies

☐ AMENDED REPORT

WELL LOCATION AND ACREAGE DEDICATION PLAT

[1] API Number	[2] Pool Code	[3] Pool Name
		WILDCAT ; SILURO-DEVONIAN

[4] Property Code	[5] Property Name	[6] Well Number
	STATE 18 COM #1	#1-18

[7] OGRID No.	[8] Operator Name	[9] Elevation
	WAGNER & BROWN, LTD.	3866

[10] Surface Location

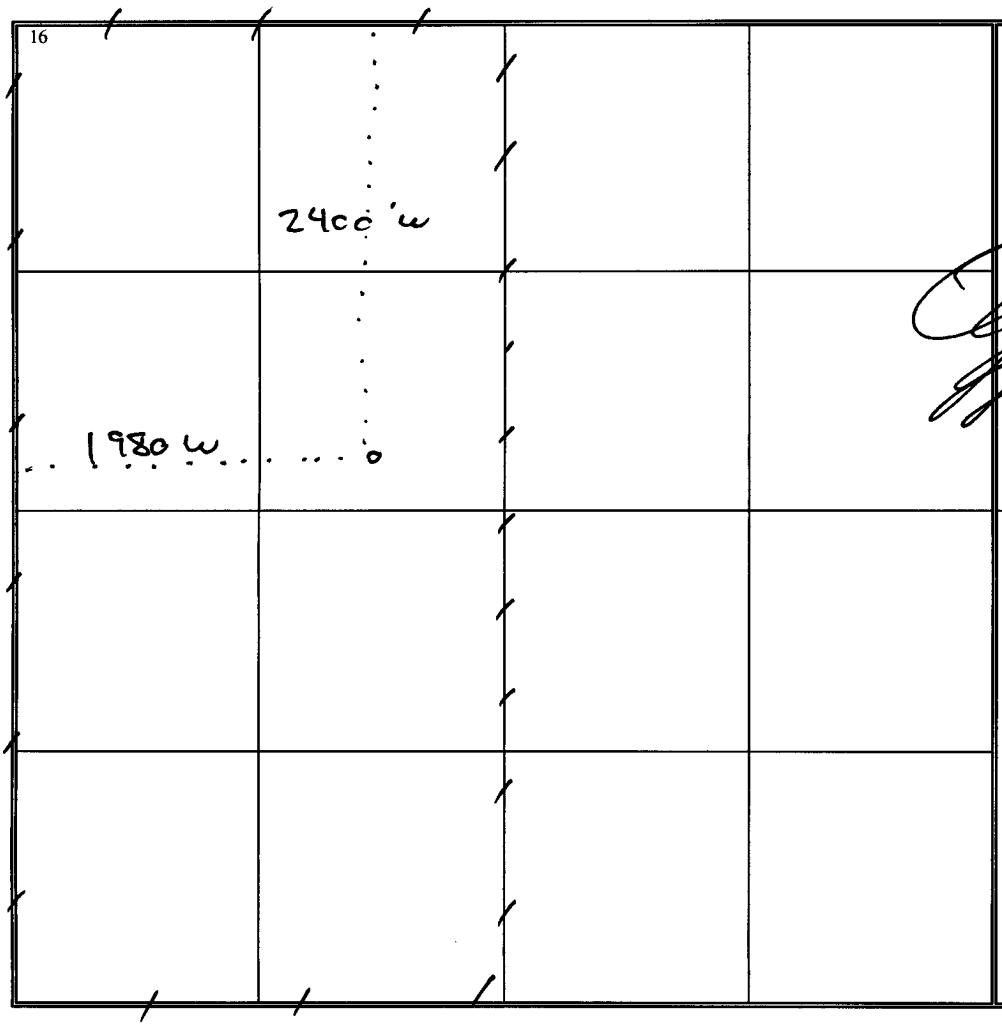
UL or lot no.	Section	Township	Range	Lot Idn	Feet from the	North/South line	Feet from the	East/West line	County
	18	4 S	27 E		2400	NORTH	1980	WEST	CHAVES

[11] Bottom Hole Location If Different From Surface

UL or lot no.	Section	Township	Range	Lot Idn	Feet from the	North/South line	Feet from the	East/West line	County
F									

[12] Dedicated Acres	[13] Joint or Infill	[14] Consolidation Code	[15] Order No.
320			

No allowable will be assigned to this completion until all interests have been consolidated or a non-standard unit has been approved by the division.



[17] OPERATOR CERTIFICATION

I hereby certify that the information contained herein is true and complete to the best of my knowledge and belief, and that this organization either owns a working interest or unleased mineral interest in the land including the proposed bottom hole location or has a right to drill this well at this location pursuant to a contract with an owner of such a mineral or working interest, or to a voluntary pooling agreement or a compulsory pooling order heretofore entered by the division.

Signature — Date: 11-16-06

Billy W. Harris
Printed Name
Sr. Petroleum Engineer

[18] SURVEYOR CERTIFICATION

I hereby certify that the well location shown on this plat was plotted from field notes of actual surveys made by me or under my supervision, and that the same is true and correct to the best of my belief.

Refer to original plat
Submitted 10/12/06

Date of Survey: Sept. 1, 2006
Signature and Seal of Professional Surveyor:

W.O. NO. W-490-06
Certificate Number: Wilson D. Watson 3959

Newpark Drilling Fluids, LLC

DRILLING FLUIDS PROGRAM

PREPARED FOR:

Penn Sand Test

Section 18, T-4-S, R-27-E
Chaves County, New Mexico

SUBMITTED TO:

Mr. Jerry Hamilton

Wagner & Brown, LTD
300 N. Marienfeld
Suite 1100
Midland, Texas 79702

PREPARED BY:

Mike Davis

Newpark Drilling Fluids, LLC

July 28, 2006

Mr. Jerry Hamilton
Wagner & Brown, LTD
300 N. Marienfeld
Suite 1100
Midland, Texas 79702

Dear Mr. Hamilton,

Enclosed are our drilling fluids recommendations for your Penn Sand Test in section 18, T-4-S, R-27-E in Chaves County, New Mexico. They are derived from information from your office, offset well data, and our knowledge of the area.

Estimated mud cost is $ 18,000.00 to 20,000.00 based on 14 to 16 total days with ideal conditions. Excessive pressure, lost circulation, stuck pipe, water flows, or extended days on the well will increase the estimated cost.

For questions or comments, call (800) 592-4627 or (432) 697-8661. Both are 24-hour numbers.

Sincerely,

Mike Davis

Newpark Drilling Fluids, LLC

Wagner & Brown, LTD

Penn Sand Test

Section 18, T-4-S, R-27-E
Chaves County, New Mexico

PROGRAM HIGHLIGHTS:

TOTAL DEPTH	:	**7,000'**
CASING REQUIREMENTS	:	**Interval 1: 12-1/4" hole to 1,500', set 5-5/8" casing.**
	:	**Interval 2: 7-7/8" hole to 4,200', set 5-1/2" casing.**
MUD WEIGHT REQUIREMENTS	:	**8.6 – 9.9 ppg @ 1,500'**
	:	**9.9 – 10.0 ppg @ 7,000'**
DAYS TO REACH TD	:	**16 – 18**
COST ESTIMATE	:	**$18,000.00 - $20,000.00**
WAREHOUSE	:	**Lovington,NM** (800) 592-4627 **David Volz**, Distribution Manager
PERMIAN BASIN PERSONNEL		**Midland, Texas** (800) 592-4627 **Joe Henderson**, Permian Basin Business Unit Manager **Al Boudreaux**, Sales Manager **Doug Thomas**, Account Manager **Ken Anthony**, Technical Engineer **Mike Davis**, Technical Engineer

MUD PROPERTIES SUMMARY:

1000 '						
0' – 1,500' **Set 8-5/8" Casing**	8.6 – 9.9	34-38	NC	6-10	6-20	**Native/New Gel**
1,500' – 4,200'	9.9 – 10.0	29	NC	0-1	0-1	**Brine**
4,200' – 7,000' **Set 5-1/2" Casing**	10.0 – 10.3	36-38	10-12	4-6	8-10	**Salt Gel/ Starch/ Oil**

Note: The mud weight schedule is intended as a guideline only. Actual mud weights used should be determined by hole conditions and drilling parameters. Drilling with a minimum amount of overbalance will reduce the possibility of losing returns and/or of differentially sticking the drill string.

Newpark Drilling Fluids, LLC

Wagner & Brown, LTD
Penn Sand Test
Section 18, T-4-S, R-27-E
Chaves County, New Mexico

PROGRAM HIGHLIGHTS (CONT'D):

HOLE & CASING DESIGN:

INTERVAL 1	1,500'	12-1/4"	8-5/8"	8.6 - 9.9
INTERVAL 2	7,000'	7-7/8"	5-1/2"	9.9 – 10.3

SOLIDS CONTROL:

INTERVAL 1	Reserve.
INTERVAL 2	Reserve.
INTERVAL 3	One linear motion shale shakers.

ESTIMATED FORMATION TOPS:

San Andres	1,055'
Glorietta	2,137'
Yeso	2,263'
Tubb	3,735'
Abo	4,336'
Cisco	5,755'
Penn	6,075'
Mississippian	6,075'
Pre Cambrian	6,455'
Total Depth	7,000'

Newpark Drilling Fluids, LLC

Wagner & Brown, LTD

Penn Sand Test

Section 18, T-4-S, R-27-E

Chaves County, New Mexico

Interval 1: **12-1/4" Hole**
Interval: **0' – 1,500'**
Casing: **8-5/8**
Days: **4**

Drilling Fluid Properties:

0' – 1,500'	8.6-9.9	34-38	6-10	6-20	9.0-10.0	No Control	<6

Drilling Fluid Recommendations:

A non-dispersed **NewGel** system is recommended for this interval, with pre-hydrated **NewGel** and **Lime** as the primary system components for rheological control. Utilize **Paper** sweeps to aid in seepage control. If losses occur batch treat with 12-15 ppb **Fiber Seal** in a 50 bbl premix with 36-38 sec/1000cc viscosity.

At total depth, sweep the hole with 100-barrels of fresh water and **New Gel** for a 80-90 sec/1000cc viscosity and 0.25-ppb **Super Sweep**. Circulate hole clean prior to running casing.

Materials Consumption

150	sx	New Gel
25	sx	Lime
25	sx	Paper
4	bx	Super Sweep

Newpark Drilling Fluids, LLC

Wagner & Brown, LTD

Penn Sand Test

Section 18, T-4-S, R-27-E

Chaves County, New Mexico

Maintenance Procedure: Interval 1

Fluid Loss - Fluid loss control is unnecessary through the upper portion of this interval.

Mud Weight - Maintain minimum fluid densities. Run water and premixes as needed to maintain volume and weight as specified. Drilling with a minimum amount of overbalance will reduce the possibility of losing returns and/or of differentially sticking the drill string.

Rheology - Solids content is the primary factor that will affect rheology.

Alkalinity - Maintain pH in the 9.0-10.0 range with Lime.

Hole Cleaning - Optimum hydraulics and rheological properties should be maintained to provide maximum hole cleaning and minimize washout of the well bore..

Mud Losses Down hole - Loss of circulation is a possibility through this interval. Use **Fiber Plug** and **Fiber Seal**. Keep the hole full at all times, and avoid excessive swabbing and/or surge actions when tripping pipe. Bring pumps on the hole gradually anytime circulation has been interrupted, increasing pump strokes only after full returns are established.

Solids Control - Maintain low gravity solids at <6% by volume. The shakers should be equipped with the finest mesh screens that will handle the circulating volume.

Newpark Drilling Fluids, LLC

Wagner & Brown, LTD

Penn Sand Test

Section 18, T-4-S, R-27-E

Chaves County, New Mexico

Interval 2: **7-7/8" Hole**
Interval: **1,500' – 4,200'**
Casing: **-**
Days: **6**

Drilling Fluid Properties:

1,500' – 4,200'	9.9 – 10.0	29	0-1	0-1	9.0-10.0	No Control	<6

Drilling Fluid Recommendations:

Drill out from the 8-5/8" casing with brine water circulating a controlled portion of the reserve pit for gravitational solids control. Utilize **Paper** sweeps to aid in seepage control. The pH should be maintained at 9.0-10.0 with additions of **Caustic Soda**. Sweep the hole with 0.25-lbs of **Super Sweep** every 500 feet drilled to aid in cuttings removal. If losses occur batch treat with 12-15 ppb **Fiber Seal** in a 50 bbl premix with 36-40 sec/1000cc viscosity.

Materials Consumption

40 sx Paper
20 sx Caustic Soda
1 bx Super Sweep

Newpark Drilling Fluids, LLC

Wagner & Brown, LTD

Penn Sand Test

Section 18, T-4-S, R-27-E

Chaves County, New Mexico

Maintenance Procedure: Interval 2

Fluid Loss - Fluid loss control is unnecessary through this interval.

Mud Weight - Maintain minimum fluid densities. Run water and premixes as needed to maintain volume and weight as specified. Drilling with a minimum amount of overbalance will reduce the possibility of losing returns and/or of differentially sticking the drill string.

Alkalinity - Maintain pH in the 9.0-10.0 range with Lime.

Hole Cleaning - Sweep the hole with 0.25-lbs of **Super Sweep** every 500 feet drilled to aid in cuttings removal. If losses occur batch treat with 12-15 ppb **Fiber Seal** in a 50 bbl premix with 36-40 sec/1000cc viscosity every 500' will provide additional hole cleaning.

Mud Losses Down hole - Loss of circulation is a possibility through this interval. Use **Fiber Plug** and **Fiber Seal**. Keep the hole full at all times, and avoid excessive swabbing and/or surge actions when tripping pipe. Bring pumps on the hole gradually anytime circulation has been interrupted, increasing pump strokes only after full returns are established.

Solids Control - Maintain low gravity solids at <6% by volume. Circulating the reserve will provide gravitational solids control.

Newpark Drilling Fluids, LLC

Wagner & Brown, LTD

Penn Sand Test

Section 18, T-4-S, R-27-E
Chaves County, New Mexico

Interval 3: **7-7/8" Hole**
Interval: **4,200' – 7,000'**
Casing: **5-1/2"**
Days: **20**

Drilling Fluid Properties:

4,200' – 7,000'	10.0-10.3	36-38	4-6	8-10	9.0-10.0	10-12cc	<6

Drilling Fluid Recommendations:

At **4,200'**, Increase the viscosity to 36-40 sec/1000cc with Saltgel prior to drilling the Abo shale. We recommend circulating the reserve pit for gravitational solids removal. Add 6-8% lease oil for lubricity and maintain until TD. The Abo is subject to a high degree of erosion and requires a laminar flow in the annulus to clean the hole. Abo drilling practices should be established. On connections, kick out the pump while on bottom, pull up make a new connection then tag up on bottom. Start the pump and resume drilling.

At **6,000'**, prior to drilling the Penn Sands, return to steel pits and mix Newcide to prevent bacterial degradation of organic materials. Mix Starch (White) to reduce API filtrate to 10-12cc.

If torque and/or drag are encountered sweep the hole with 100 barrels of pre-mixed brine water, Saltgel having a viscosity of 65-70 sec/1000cc.

Materials Consumption

500	sx	Salt Water Gel
20	sx	Paper
20	sx	Caustic Soda
125	pl	Starch (Yellow)
2	bx	Super Sweep
10	cn	Defoamer

Newpark Drilling Fluids, LLC

Wagner & Brown, LTD

Penn Sand Test

Section 18, T-4-S, R-27-E

Chaves County, New Mexico

Maintenance Procedure: Interval 3

Fluid Loss – Maintain an API Fluid loss of 10-12 cc /30 min. A relaxed filtrate system will inhibit shales while providing the maximum penetration rate possible through lubricity.

Mud Weight - Maintain minimum fluid densities. Run water and premixes as needed to maintain volume and weight as specified. Drilling with a minimum amount of overbalance will reduce the possibility of losing returns and/or of differentially sticking the drill string.

Alkalinity - Maintain pH in the 9.0-10.0 range with Lime.

Hole Cleaning - Optimum hydraulics and rheological properties should be maintained to provide maximum hole cleaning and minimize washout of the well bore.

Mud Losses Down hole - Loss of circulation is a possibility through this interval. Use **Fiber Plug** and **Fiber Seal**. Keep the hole full at all times, and avoid excessive swabbing and/or surge actions when tripping pipe. Bring pumps on the hole gradually anytime circulation has been interrupted, increasing pump strokes only after full returns are established.

Solids Control - Maintain low gravity solids at <6% by volume. Circulating the reserve will provide gravitational solids control.

Newpark Drilling Fluids, LLC

Wagner & Brown, LTD
Penn Sand Test
Section 18, T-4-S, R-27-E
Chaves County, New Mexico

ENGINEER / WAREHOUSE INFORMATION

WELL NAME: *Penn Sand Test*

LOCATION: *Section 18, T-4-S, R-27-E*

Chaves County, New Mexico

MUD ENGINEER: *Bill Stewart* *Hobbs, New Mexico*

Gil Cortez *Lubbock, Texas*

(800) 592-4627 or (432) 697-8661. Both 24 hours.

WAREHOUSE: *Midland, Texas*

(800) 592-4627 or (432) 697-8661. Both 24 hours.

Newpark Drilling Fluids, LLC

Wagner & Brown, LTD
Penn Sand Test
Section 18, T-4-S, R-27-E
Chaves County, New Mexico

Lost Circulation Procedures

Seepage Losses – Mud consumed at the rate of 2.0-2.5 barrels per barrel of hole drilled (18.5± bbls of mud per 100' of 8-1/2" hole drilled) can be expected. The 1.0-1.5 bbls lost per barrel of hole drilled is due to mud retained on cuttings and filtration losses down hole. Volumes in excess of 20 bbls per 100' of hole should be considered seepage losses and the following remedial action taken:

1. Discontinue drilling and circulate cuttings out of the hole at a reduced rate for 5 minutes. Pull one stand and stop pumps to see if the hole is standing full. Keep pipe moving while checking fluid level.

2. If the hole is standing full while static, the seepage losses may be from excessive cuttings, out of gauge hole o circulating pressure losses (ECD). Break circulation slowly and return to drilling, carefully monitoring mud consumption rates and static hole conditions on connections.

3. If the hole is taking fluid while static, prepare a 50-60 bbl pill of 45-50 viscosity mud with 10-20 ppb of Fiber-Plug and 10-20 ppb of Fiber-Seal, and spot near bottom. Pull five stands and check static level of fluid in the hole. Keep hole full at all times and monitor the mud loss rate.

4. If little or no improvement is noted after pumping the 50-60 barrel LCM pill, prepare a balanced, high-filtrate (50cc/30min@100psi) water based pill (40 bbls). This pill can be formulated with Dynazan or New Gel (flocculated with CaCl2 or Lime) and Barite. Pull pipe above the suspected loss zone and spot the pill outside the drill pipe at 1 barrel per minute. Pull out of the pill, close the hydril and if a float collar is in the string, pump down the annulus until sufficient backpressure is established. Hold the maximum allowable backpressure (300-900 psi) for 2-4 hours, open the hydril and establish full circulation before going to bottom.

Newpark Drilling Fluids, LLC

Wagner & Brown, LTD

Penn Sand Test

Section 18, T-4-S, R-27-E

Chaves County, New Mexico

Severe Losses:

1. Should complete returns be lost, stop the pumps and pull the pipe into the casing while pumping through the fill-up line to keep the hole full.

2. Allow the hole to remain static while filling with mud on the annulus side, monitoring the rate of mud loss.

3. Build 50-60 bbl pill of 45-50-viscosity mud with 10-20 ppb of Fiber-Plug and 10-20 ppb of Fiber-Seal, and spot near bottom. Pull five stands and check static level of fluid in the hole. Keep hole full at all times and monitor the mud loss rate. Should the hole stand full, allow 4-6 hours of healing time before staging back to bottom slowly and resuming drilling.

4. Should only partial returns be established, repeat the LCM pill once more. If complete loss of circulation persist, or if only partial returns can be established after the 2nd LCM pill, prepare a balanced, high-filtrate (50cc/30min@100psi) water based pill (40 bbls). Pull pipe above the suspected loss zone and spot the pill outside the drill pipe at 1 barrel per minute. Pull out of the pill, close the hydril and if a float collar is in the string, pump down the annulus until sufficient backpressure is established. Hold the maximum allowable backpressure (300-900 psi) for 2-4 hours, open the hydril and establish full circulation before going to bottom.

5. Should the LCM pills fail to establish returns, be prepared to squeeze cement into loss zone.

Loss of circulation is a possibility on any well. Although each well is different, there are some basic procedures and drilling practices that can aid in reducing the severity and in some, cases prevent lost circulation. Below is a list of several parameters, which may prove helpful.

1. Maintain viscosities as low as possible and still clean the hole.

2. Maintain mud weights as low as possible without jeopardizing safety.

3. Use slower tripping speeds to prevent swabbing and surging.

4. Break circulation in stages while tripping in the hole.

5. Rotate pipe while breaking circulation.

Newpark Drilling Fluids, LLC

Wagner & Brown, LTD
Penn Sand Test
Section 18, T-4-S, R-27-E
Chaves County, New Mexico

Solids Control

The most important contributing factor to good mud properties for this well, is a low native solids content. A good solids control plan can reduce over-all cost with increased penetration rates, lower cost on chemical additions and whole mud replacement.

The solids control equipment for this well should include:

- High Speed Linear Motion shale shaker with fine mesh screens.
- Desilter.
- Centrifuge.

Shale Shaker

Use a high-speed linear motion shale shaker with fine mesh screens. It is imperative to remove cuttings as quickly as possible before they have a chance to mechanically break up in the circulating system. Initial screen sizes should be 80-100 mesh. Screen down to smaller mesh screens as soon as practicable to reduce the amount of solids being dispersed into the fluid system.

Desilter

Will be employed to remove solids in the 176 to 74 micron range. The desilter should have 6-8 hydro clones (six inch or larger) to work properly. A centrifugal pump should supply the feed line with a minimum of 35 psi on the desilter chamber.

Centrifuge

A variable speed centrifuge is recommended for use in the final stage of solids removal.

Newpark Drilling Fluids, LLC

Wagner & Brown, LTD
Penn Sand Test
Section 18, T-4-S, R-27-E
Chaves County, New Mexico

Hydraulics

While drilling the deep mature shales in the Permian Basin, it is important to maintain an API filtrate to prevent hydration of the clays contained in those shales. Equally important is to maintain a Laminar Hydraulic Profile in the annulus while drilling those shales. These shale exhibit a high degree of erosion when the annular profile is in turbulent flow.

The annular velocity in the well bore is a measure to control hole cleaning and to determine the annular hydraulic profile. Critical velocity is the point at which flow transitions from laminar to turbulent flow. Mud weight, Plastic Viscosity, Yield Point, Pump Rate, Hole Diameter and tool diameter all are factors in determining critical velocity.

If adjusting the pump rate will affect the bit nozzle optimization, then the rheology can be adjusted to bring the annular profile into laminar flow.

$$\tau C = \frac{1.08\ PV + 1.08\sqrt{PV^2 + 9.26(dh-dp)^2\ YP\ M}}{M\ (dh-dp)}$$

PV = Plastic Viscosity
YP = Yield Point
M = Mud Weight (ppg)
Dh = Diameter of hole (inches)
Dp = Diameter of pipe (inches)

τC = Critical Velocity in feet per second.

Newpark Drilling Fluids, LLC

Wagner & Brown, LTD

Penn Sand Test

Section 18, T-4-S, R-27-E

Chaves County, New Mexico

Filtration Control & Filter Cake Quality:

Sealing permeable zones in the well bore has long been accepted as a major function of a drilling fluid. The cost of the filtration control represents a major portion of the mud cost. Traditionally, most of this cost has resulted from controlling the filtration rate as opposed to controlling the filter cake quality. This is understandable since a definitive number is more a comfortable target than a subjective evaluation of a filter cake.

The primary objectives of filtration are:

- Minimize damage to the production zones.
- Optimize formation evaluation.
- Avoid differential pressure sticking of the pipe.
- Avoid under gauged holes due to thick filter cakes.

These objectives are achieved by focusing on important design factors:

- Compatibility of filtrate with formation solids.
- Thin, impermeable, and deformable filter cakes.
- Lubricious and shearable filter cakes.

Filtration Control Mechanisms:

There are four basic mechanisms for controlling filtration control and reducing the filter cake permeability. Understanding these mechanisms along with how filtration control products function is important.

1. **Bridging**- Bridging reduces filtration rates and permeability by plugging or blocking the pore spaces at the face of the filter medium. It generally requires solids about one-third the diameter of the pore space to form a bridge. New Gel, Calcium Carbonate, Lost Circulation Materials, Starch, and Soltex (LST-MD) are primary bridging materials.

2. **Bonding**- Bonding is the connecting or binding of solids together. New Pac, Dynazan, WL-100 and other high molecular weight polymers function as bonding materials. Secondarily, these materials function as bridging materials as well as increasing the viscosity of the filtrate.

3. **Deflocculation**- Deflocculants reduce the electro-chemical attraction between solids. This allows solids to be filtered individually, as opposed to flocs, and also reduces the void spaces in the cake created by flocs of solids. Lignite, Chrome Ligno-Sulphonates, Desco, and other low molecular weight polymers perform as deflocculants.

4. **Viscosity**- Fluid loss decreases proportional to the increase in viscosity of the filtrate. Temperature alone will change the filtrate viscosity. Therefore, filtration control is more difficult at high temperatures. Any soluble material added to the fluid

will viscosity the filtrate.

Hydration, Flocculation, and Deflocculation

The degree of hydration and flocculation of the filtered solids influence filter cake permeability. The effectiveness in permeability reduction may be demonstrated by ranking of clay solids according to their surface characteristics:

1. Dehydration/Aggregated/Flocculated (high permeability)
2. Hydrated/Flocculated (medium permeability)
3. Hydrated/Deflocculated (low permeability)

Since fluid loss and filter cake quality are important design factors, it is important to understand the predominate electro-chemical state of the solids. Initially, cake permeability is reduced as pre-hydrated bentonite is added to the system. When flocculated, these hydrated solids promote deformability or permeability reduction with increased pressure. This results from the compaction of hydrated flocs. With deflocculation, permeability is further decreased, as the void spaces created by the flocs diminish.

During drilling operations, hydrated solids are eventually dehydrated as the solids content increases and/or the system is converted to an inhibitive fluid. At this point, a decision must be made on the basis of economic and operational objectives. More pre-hydrated bentonite and/or other products may be added. These other products include New Pac, Calcium Carbonate, CMC, starch, or one of the new generation polymers.

Fluid loss control is a very complex process. The major factors that affect the process include time, pressure, temperature, filtrate viscosity, solids hydration, flocculation and filter cake erodability. Effective evaluation of the process requires that all factors be given strong consideration. Testing the fluids relative to the various factors is necessary to understand how a fluid may perform under down-hole conditions.

Wagner & Brown, Ltd.

Oil & Gas Producers

Suite 1100 The Summit
300 N. Marienfeld
P. O. Box 1714
MIDLAND, TEXAS 79702

(432) 682-7936

November 9, 2006

State of New Mexico
Oil & Gas Conservation Commission
1220 South St Francis Dr.
Santa Fe, New Mexico 87505

Re: State #1-18,
Sec. 18, T4S, R27E
Chaves County, New Mexico

Gentlemen:

Wagner & Brown, Ltd is requesting administrative approval for a non-standard spacing unit pursuant to Subsection D, Paragraph (2), Subparagraph (b) of 19.15.3.104.
Enclosed herewith are the following:

1) Application to Drill
2) Plat
3) Notification Statement
4) List of affected persons
5) Statement discussing the reasons for the formation of the non-standard spacing unit
6) Administrative Application Checklist

Sincerely,

WAGNER & BROWN, LTD

Billy W. Harris,
Senior Petroleum Engineer

NOV 13 PM 3 11

Wagner & Brown, Ltd.

Oil & Gas Producers

Suite 1100 The Summit
300 N. Marienfeld
P. O. Box 1714
MIDLAND, TEXAS 79702

(432) 682-7936

November 16, 2006

State of New Mexico
Oil & Gas Conservation Commission
Attn: Bryan Arrant
1301 W. Grand Ave
Artesia, New Mexico 88210

Re: State Com # 18-1
Sec. 18, T4S, R27E
Chaves County, New Mexico

Gentlemen:

Wagner & Brown, Ltd is requesting administrative approval for a non-standard spacing unit pursuant to Subsection D, Paragraph (2), Subparagraph (b) of 19.15.3.104.
Enclosed herewith are the following:

1) Application to Drill
2) Plat
3) Notification Statement
4) List of affected persons
5) Statement discussing the reasons for the formation of the non-standard spacing unit
6) Administrative Application Checklist
7) Waiver from Affected Parties

Sincerely,

WAGNER & BROWN, LTD

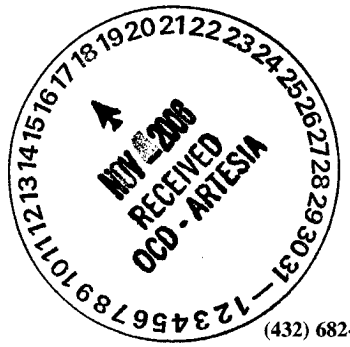
Juanita Salsich,
Operations Coordinator

Wagner & Brown, Ltd.

Oil & Gas Producers

Suite 1100 The Summit
300 N. Marienfeld
P. O. Box 1714
MIDLAND, TEXAS 79702

(432) 682-7936



November 16, 2006

New Mexico Oil Conservation Division
Attn: Bryan Arrant
1301 W. Grand Ave
Artesia, New Mexico 88210

Re: State 18 Com #1
Sec 18, T4S, R27E
Chaves County, New Mexico

Gentlemen:

In response to Mr. Arrant's e-mail of this date, enclosed are the following documents:
1) Revised C-102 showing the correct well name;
2) Mud Program for proposed well;
3) Statement regarding NMOCD Rule 118;
4) Amended Form C-101.

Sincerely,

WAGNER & BROWN, LTD

Billy W. Harris,
Senior Petroleum Engineer

Encls.
BWH/js

Wagner & Brown, Ltd.

Oil & Gas Producers

Suite 1100 The Summit
300 N. Marienfeld
P. O. Box 1714
MIDLAND, TEXAS 79702

(432) 682-7936

November 16, 2006

New Mexico Oil Conservation Division
Attn: Bryan Arrant
1301 W. Grand Avenue
Artesia, New Mexico

Re: NMOCD Rule 118

Gentlemen:

Wagner & Brown, Ltd. plans to drill a 7,000' test well in Sec. 18, T4S, R27E, Chaves County, New Mexico. This well is expected to T.D. in the Montoya formation with Pennsylvanian sand objective. No hydrogen sulfide gas is expected to be encountered during the drilling of this well. Consequently, no contingency plan for NMOCD Rule 118 is required.

Sincerely,

Billy W. Harris
Senior Petroleum Engineer

BWH:mlh